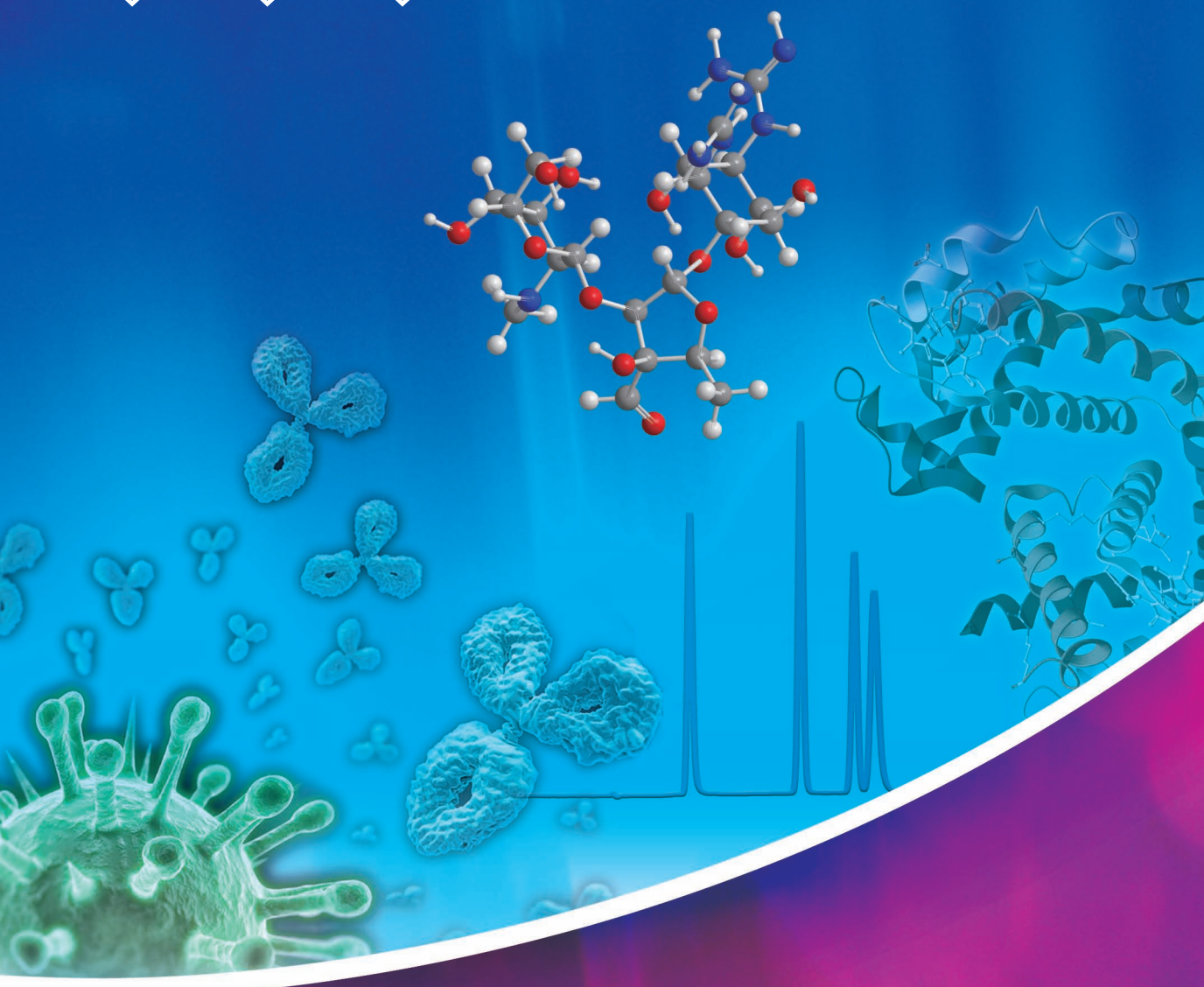
Reagent Guide

8th Edition



Bioscience & Analytical Science

Placing Your Order

When you need a product in this catalog

Orders can be placed on our TCI website (eShop)* or with our TCI local offices or distributors.

TCI website (eShop)*

Easy online ordering is available on www.TCIchemicals.com.
An eShop account is necessary to place your orders online. Please register yourself as a "MyTCI" member or consult with your local TCI offices.
**for limited markets only*

TCI local offices or distributors

Please contact your local TCI office or distributor listed on page 370 to 381.
If you can't find a distributor in your country, please contact the TCI Global Business Department listed at the bottom of this page.

Please provide the following information to order:

- **Product number**
  In this catalog, the product number is shown to the left of the chemical name. The product number consists of one letter followed by four digits.
- **Packing unit size**
  Please select the required packing unit size from the list in this catalog.
- **Quantity**
  Please specify the number of bottles required.
  Please consult TCI distributors if you need larger amounts.

If you need a product that is not listed in this catalog

Please consult us if you cannot find the product you require. We will be pleased to provide a quotation for custom synthesis.

Please provide the following information:

- **Name of compound**
- **Structure formula**
- **CAS number**
- **Required purity**
- **Required quantity**
- **Requested delivery time**
- **Any other needs** (physical data, synthesis method, literature, etc.)

You can also send your requests online via our website.

www.TCIchemicals.com/custom/

TOKYO CHEMICAL INDUSTRY CO., LTD.

Global Business Department

Tel: +81-3-5640-8878 Fax: +81-3-5640-8902
E-mail: globalbusiness@TCIchemicals.com

TCI Local Offices: The business names and contact addresses are listed on page 370.
TCI Distributors: The business names and contact addresses are listed on page 371.

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Bioscience & Analytical Science

We have reviewed our product line-ups and organized them according to the research areas of bioscience and analytical science. We hope that this reagent guide will be of assistance to your research and development laboratories.

However, this guide is not an inclusive list of all the reagents we deal in. Please be sure to look up our catalog and visit our website as well to remain updated on the latest information in the various fields of your interest.

www.TCIchemicals.com

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If you are looking for products in the field of Synthetic Organic Chemistry & Materials Chemistry, please see below.

Reagent Guide 8th Edition
Synthetic Organic Chemistry & Materials Chemistry

Synthetic Organic Chemistry
Example :
Asymmetric Organocatalysts / Cross-coupling Reaction Using Transition Metal Catalysts / Condensation & Active Esterification etc.
Materials Chemistry
Example :
Reagents for Solar Cell Research / Photochromic Compounds / OLED Materials etc.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Nucleosides, Nucleotides, Nucleic Acids

Genetic information is stored in DNA as combinatorial codes held in nucleosides and nucleotides, in which form it is passed from parents to their offspring. Analogs of nucleosides and nucleotides are used clinically as medicinal agents such as reverse transcriptase inhibitors. Therefore, the preparation and development of these species as effective, selective and nontoxic antiviral and antitumor agents has been the subject of intense research.[1)]

In addition to this, the development of Polymerase Chain Reaction (PCR) methodology has brought a dramatic change and rapid development in studies of DNA. At the current time the draft version in decoding and mapping human genome has been almost completed, and the functional analyses of genome and analyses of "Single Nucleotide Polymorphism" (SNP) are being vigorously pursued. Discovery of the RNAi process has facilitated the fast progression of studies of RNA. At the same time, chemically synthesized oligoDNA and oligoRNA have been studied as potential antisense DNAs, siRNAs and DNA aptamers, as oligonucleotide therapeutic agents, primers for PCR method, and elements of DNA computers.

●Nucleosides and their Analogs

Nucleosides are glycosylamines made by attaching a nucleobase to a ribose or 2'-deoxyribose, which can be phosphorylated producing nucleotides. Nucleoside analogues are an established class of clinically useful medicinal agents possessing a wide range of antiviral and anticancer activities. Consequently, extensive modifications have been made to both the heterocyclic base and the sugar moiety. Some representative examples of these are 9-[(2-hydroxyethoxy)methyl]guanine (acyclovir) developed by Elion in 1977, which shows antiviral activity; 3'-azido-3'-deoxythymidine (AZT) discovered by Mitsuya *et al.* in 1985 and used for the treatment of HIV infection; and cytosine β-D-arabinofuranoside (cytarabine) approved by the FDA in 1969 and which has been shown to display a range anticancer activities. In addition, modified nucleosides such as 2'-deoxy-5-methylcytidine are ubiquitous in living systems, and their functions have received due attention from the scientific community.[2)]

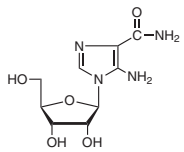
Protected nucleosides, in which reactive amino and hydroxyl groups have been masked, e.g. N^6-benzoyl-5'-*O*-(4,4'-dimethoxytrityl)-2'-deoxyadenosine (Bz-DMT-dA), have been used for chemical synthesis of DNA and RNA.

Pyrimidine Nucleosides

Product No.	Product Name	Unit Size		
A2528	Acadesine			50mg
A2073	1-(3,5-Anhydro-2-deoxy-β-D-*threo*-pentofuranosyl)thymine		5g	25g
A2431	2,2'-*O*-Anhydro-5-methyluridine			1g
A2356	1-β-D-Arabinofuranosyluracil		1g	5g
A2033	5-Azacytidine		100mg	1g
A2232	5-Aza-2'-deoxycytidine		20mg	100mg
A0559	6-Azauridine			10mg
A2052	Azidothymidine		1g	5g
B3094	N^4-Benzoylcytidine		1g	5g
B3102	N^4-Benzoyl-2'-deoxycytidine		100mg	1g
B3087	N^4-Benzoyl-5'-*O*-(4,4'-dimethoxytrityl)-2'-deoxycytidine		1g	5g
B3631	N^4-Benzoyl-3',5'-*O*-(1,1,3,3-tetraisopropyl-1,3-disiloxanediyl)cytidine		1g	5g
B3404	Brivudine		100mg	1g
B1575	5-Bromo-2'-deoxyuridine		1g	5g
B0666	5-Bromouridine		100mg	1g
C2878	Capecitabine		1g	5g
C2207	2,2'-*O*-Cyclocytidine Hydrochloride		1g	5g
C2208	2,2'-*O*-Cyclouridine		5g	25g
C2035	Cytarabine			5g
C0522	Cytidine	1g	5g	25g
C0525	Cytidine Sulfate		100mg	1g
D3583	2'-Deoxycytidine		1g	5g
D0048	2'-Deoxycytidine Hydrochloride		5g	25g
D3614	2'-Deoxy-2'-fluorocytidine Hydrate			1g
D3642	2'-Deoxy-5-fluorocytidine		1g	5g
D4342	5'-Deoxy-5-fluorocytidine		1g	5g

Product No.	Product Name	Unit Size		
D3615	2'-Deoxy-2'-fluorouridine			1g 5g
D2235	2'-Deoxy-5-fluorouridine	100mg	500mg	1g
D3579	5'-Deoxy-5-fluorouridine			1g 5g
D4220	2'-Deoxy-5-(hydroxymethyl)cytidine			50mg 200mg
D3610	2'-Deoxy-5-methylcytidine	100mg	500mg	5g
D0060	2'-Deoxyuridine	1g	5g	25g
D3566	5'-*O*-(4,4'-Dimethoxytrityl)thymidine			5g 25g
E1057	5-Ethynyl-2'-deoxyuridine			50mg 200mg
D4200	Fialuridine			10mg
F0534	5-Fluorocytidine			1g
F0636	5-Fluorouridine			1g 5g
G0367	Gemcitabine Hydrochloride			100mg 1g
I0258	Idoxuridine	1g	5g	25g
I0882	5-Iodo-2'-deoxycytidine			1g
L0217	Lamivudine			100mg 1g
M1931	5-Methylcytidine			1g
M2317	2'-*O*-Methylcytidine			200mg 1g
M1405	5-Methyluridine	1g	5g	25g
M2290	2'-*O*-Methyluridine			1g 5g
M2399	Mizoribine			50mg 250mg
R0077	Ribavirin			100mg 500mg
D3580	Stavudine			1g 5g
F0635	Tegafur			5g 25g
T0233	Thymidine	1g	5g	25g
T2549	2',3',5'-Tri-*O*-acetyluridine			5g 25g
T2511	Trifluorothymidine			100mg 1g
U0020	Uridine			5g 25g
D3581	Zalcitabine			1g
Z0022	Zebularine			200mg 1g

A2528



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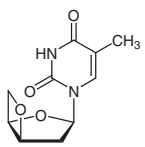

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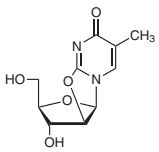

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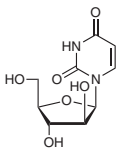

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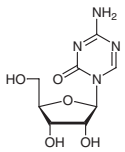

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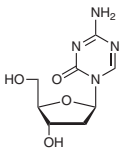

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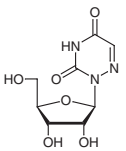

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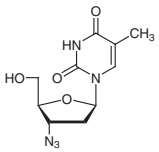

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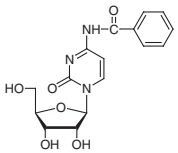

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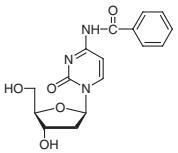

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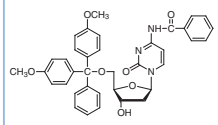

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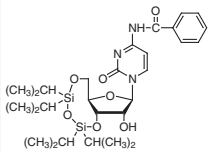

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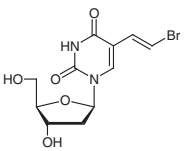

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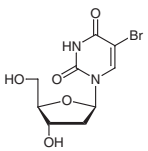

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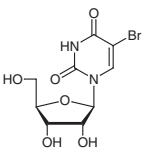

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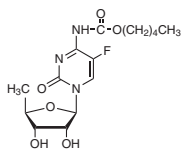

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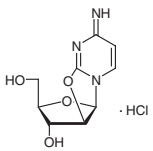

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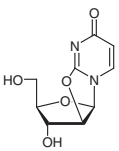

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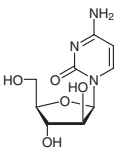

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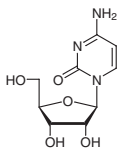

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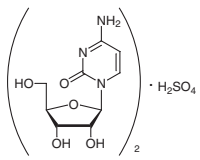
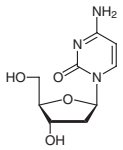
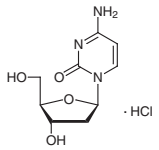
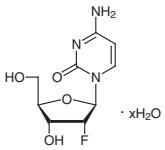
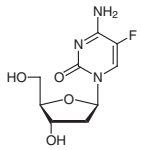
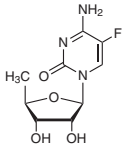
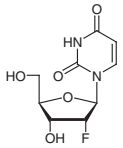
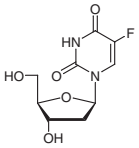
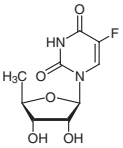
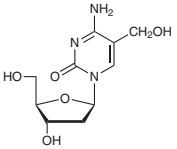
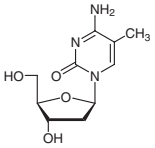
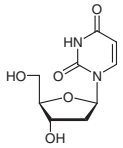
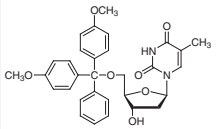
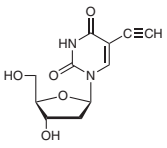
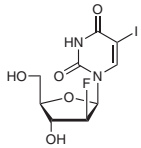
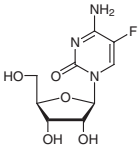
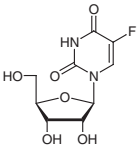
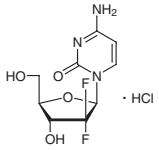
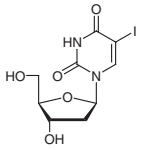
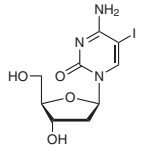
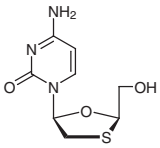
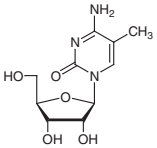
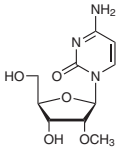
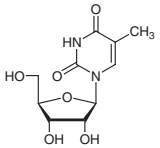
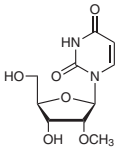
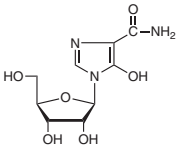
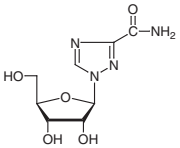
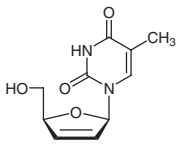
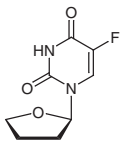
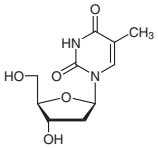
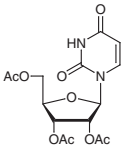
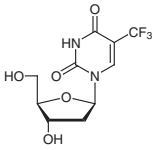
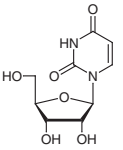
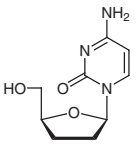
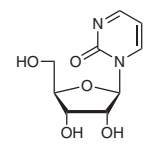
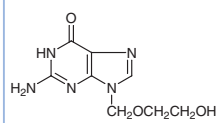
C0525 	D3583 	D0048 	D3614 	D3642 
D4342 	D3615 	D2235 	D3579 	D4220 
D3610 	D0060 	D3566 	E1057 	D4200 
F0534 	F0636 	G0367 	I0258 	I0882 
L0217 	M1931 	M2317 	M1405 	M2290 
M2399 	R0077 	D3580 	F0635 	T0233 
T2549 	T2511 	U0020 	D3581 	Z0022 

Purine Nucleosides

Product No.	Product Name	Unit Size		
A1915	Acyclovir	1g	5g	25g
A2414	Adefovir Dipivoxil		100mg	1g

Product No.	Product Name			Unit Size
A0152	Adenosine	5g	25g	100g
A2135	2-Aminoadenosine		5g	25g
A2054	2-Amino-6-chloropurine Riboside		1g	5g
A2739	9-β-D-Arabinofuranosylguanine Hydrate		10mg	50mg
B3093	N^6-Benzoyladenosine Hydrate		1g	5g
B3101	N^6-Benzoyl-2'-deoxyadenosine Hydrate		100mg	1g
B3103	N^6-Benzoyl-5'-*O*-(4,4'-dimethoxytrityl)-2'-deoxyadenosine		100mg	1g
B4001	8-Bromo-2'-deoxyguanosine		200mg	1g
B4002	8-Bromoguanosine Hydrate		1g	5g
C2192	2-Chloroadenosine Hydrate		100mg	1g
C2206	6-Chloropurine Riboside		1g	5g
C2499	Cladribine			50mg
C2500	Clofarabine		20mg	100mg
C2815	Cordycepin Hydrate		25mg	100mg
C2689	Cordycepin			25mg
D4137	2'-Deoxyadenosine Anhydrous			5g
D0046	2'-Deoxyadenosine Monohydrate		5g	25g
D0052	2'-Deoxyguanosine Hydrate	1g	5g	25g
D3584	2'-Deoxyinosine		1g	5g
B3460	N^6-Dibenzoyladenosine 2',3'-Dibenzoate		100mg	1g
D4228	N^6,2'-*O*-Dibutyryladenosine 3',5'-Cyclic Monophosphate Sodium Salt			25mg
D4292	5,6-Dichlorobenzimidazole 1-β-D-Ribofuranoside		100mg	1g
D3066	Didanosine		100mg	500mg
D3065	2',3'-Dideoxyadenosine			100mg
D4256	Diethyl [[2-(6-Amino-9*H*-purin-9-yl)ethoxy]methyl]phosphonate		1g	5g
F0842	Famciclovir		500mg	5g
F0656	2-Fluoroadenosine		200mg	1g
G0315	Ganciclovir Hydrate		5g	25g
G0171	Guanosine	5g	25g	100g
H1290	9-(2-Hydroxyethyl)adenine		5g	25g
I0037	Inosine		25g	500g
I0759	2-Iodoadenosine	200mg	1g	5g
I0700	N^2-Isobutyryl-2'-deoxyguanosine		100mg	1g
I0697	N^2-Isobutyryl-5'-*O*-(4,4'-dimethoxytrityl)-2'-deoxyguanosine		1g	5g
I0699	N^2-Isobutyrylguanosine Monohydrate		100mg	1g
I0702	2',3'-*O*-Isopropylideneadenosine		5g	25g
I0703	2',3'-*O*-Isopropylideneguanosine			5g
I0704	2',3'-*O*-Isopropylideneinosine			5g
M2291	2'-*O*-Methyladenosine			1g
M2318	2'-*O*-Methylguanosine Hydrate		200mg	1g
O0401	8-Oxoadenosine		200mg	1g
P2164	Penciclovir		200mg	1g
T2690	2',3',5'-Tri-*O*-acetyl-2-amino-6-chloropurine Riboside			1g
T2691	2',3',5'-Tri-*O*-acetyl-6-chloro-2-iodopurine Riboside		1g	5g
T2692	2',3',5'-Tri-*O*-acetylguanosine		1g	5g
V0111	Valacyclovir Hydrochloride Hydrate		100mg	1g
V0098	Vidarabine Monohydrate		1g	5g
X0008	Xanthosine Dihydrate			100mg

A1915



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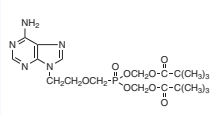

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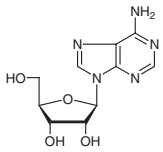

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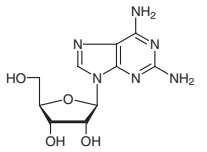

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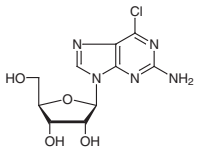

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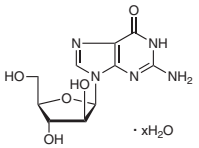

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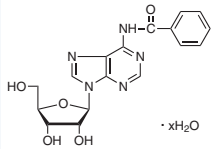

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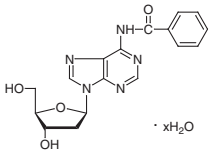

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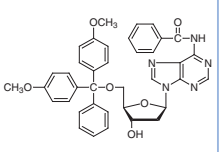

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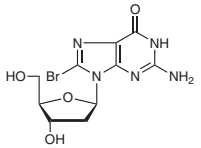

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

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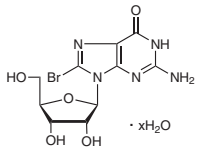

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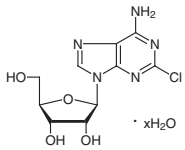

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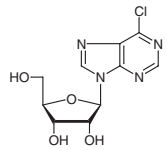

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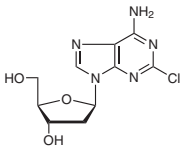

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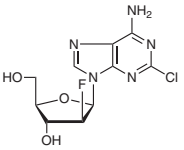

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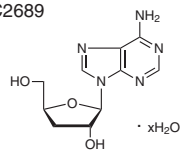

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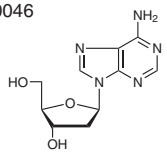

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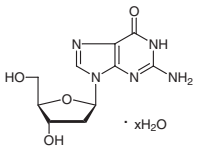

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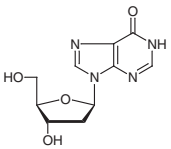

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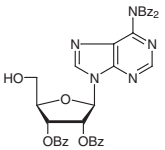

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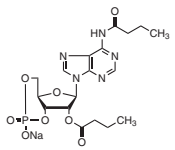

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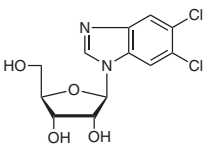

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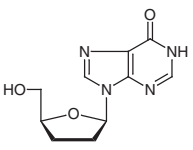

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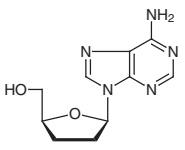

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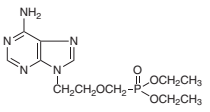

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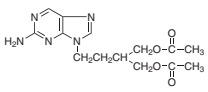

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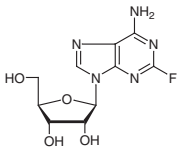

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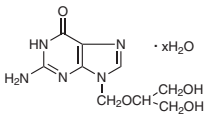

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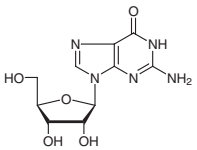

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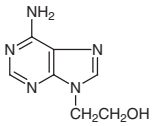

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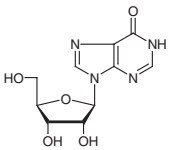

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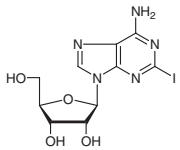

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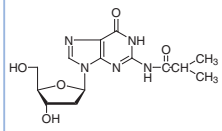

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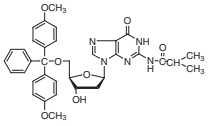

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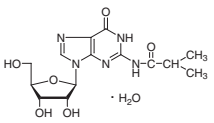

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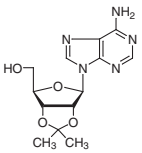

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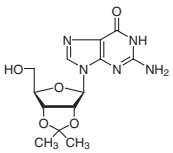

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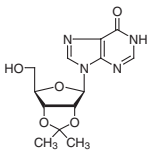

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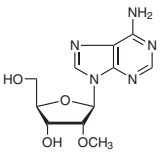

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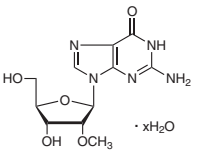

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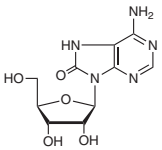

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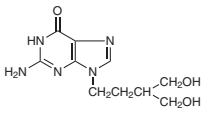

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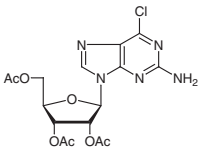

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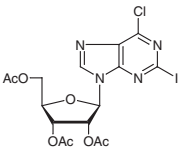

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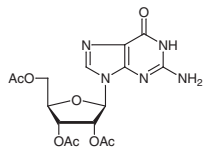

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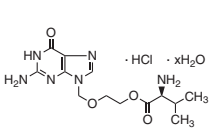

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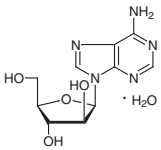

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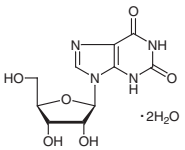


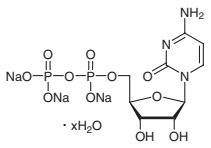
Nucleotides and their Analogs

Nucleotides are formed from the condensation of nucleoside and a phosphate group. The nucleosides themselves are formed from a nucleobase (see below) and a sugar moiety which is either ribose (RNA) or 2'-deoxyribose (DNA). Nucleotides are the minimum structural units of DNA and RNA, and serve as important cofactors in metabolism.

Pyrimidine Nucleotides

Product No.	Product Name	Unit Size		
C0523	Cytidine 5'-Diphosphate Trisodium Salt Hydrate	10mg	100mg	1g
C1675	Cytidine 5'-Monophosphate			5g
C0524	Cytidine 5'-Monophosphate Disodium Salt Hydrate		1g	5g
C2632	Cytidine 5'-Triphosphate Disodium Salt Hydrate		200mg	1g
D3673	2'-Deoxycytidine 5'-Monophosphate Hydrate		100mg	1g
T0845	Thymidine 5'-Monophosphate Disodium Salt Hydrate			100mg
U0086	Uridine 5'-Diphosphate Disodium Salt Hydrate		1g	5g
U0021	Uridine 5'-Monophosphate Disodium Salt Hydrate		5g	25g
U0022	Uridine 5'-Triphosphate Trisodium Salt Hydrate			100mg

C0523



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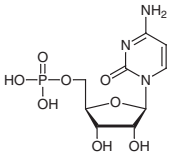

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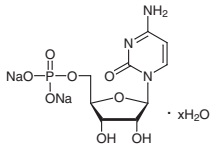

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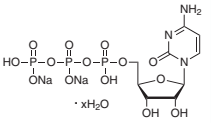

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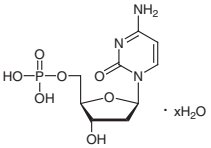

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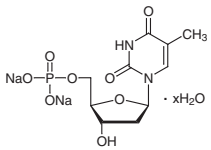

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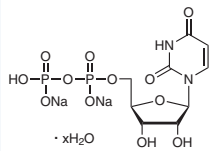

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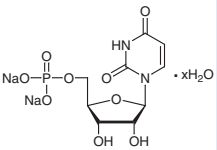

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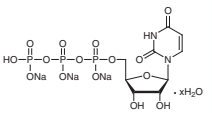
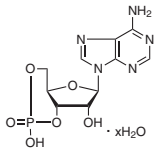


Purine Nucleotides

Product No.	Product Name	Unit Size		
A2381	Adenosine 3',5'-Cyclic Monophosphate Hydrate		1g	5g
A2112	Adenosine 3',5'-Cyclic Monophosphate Sodium Salt Hydrate		100mg	1g
A0626	Adenosine 5'-Diphosphate Disodium Salt Hydrate		100mg	1g
A0157	Adenosine 5'-Triphosphate Disodium Salt Hydrate		1g	25g
A0159	Adenylic Acid Hydrate (2'- and 3'- mixture) from Yeast			Price on request
A0158	5'-Adenylic Acid	1g	5g	25g
F0913	Fludarabine Monophosphate		25mg	100mg
G0338	Guanosine 5'-Monophosphate Hydrate			200mg
G0172	Guanosine 5'-Monophosphate Disodium Salt Hydrate		25g	100g
G0173	Guanylic Acid Sodium Salt (2'-,3'- mixture) from Yeast		1g	5g
I0039	Inosine 5'-Monophosphate Barium Salt Hydrate			100mg
I0036	Inosine 5'-Monophosphate Disodium Salt Hydrate	1g	5g	25g
I0038	Inosine 5'-Triphosphate Trisodium Salt Hydrate			100mg

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2381



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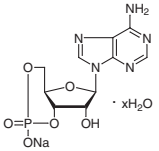

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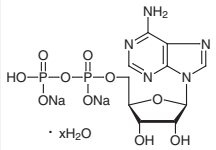

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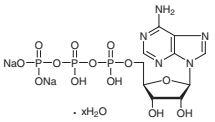

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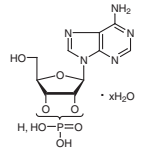

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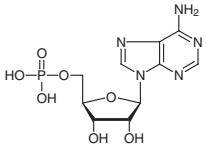

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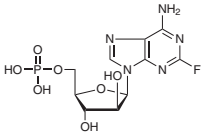

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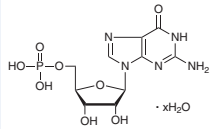

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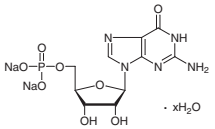

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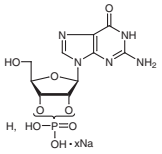

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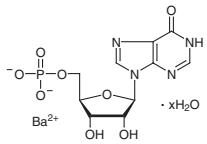

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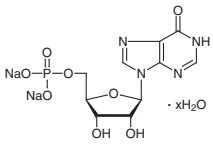

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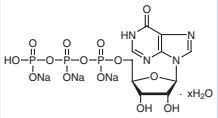


●Nucleic Acids

Product No.	Product Name	Unit Size
D0054	Deoxyribonucleic Acid not highly polymerized from Herring sperm	25g
D3545	Deoxyribonucleic Acid Sodium Salt from Salmon Milt	5g 25g
R0022	Ribonucleic Acid from Yeast	25g
R0024	Ribonucleic Acid Sodium Salt from Yeast	25g

●Enzymes and Coenzymes in Nucleic Acids

Product No.	Product Name	Unit Size
D1140	Deoxyribonuclease from Bovine Spleen	100mg
D0919	β-NAD Hydrate, oxidized form	1g 5g
D0920	β-NADH Disodium Salt Hydrate, reduced form	100mg 1g 5g
T0521	β-NADPH Tetrasodium Salt reduced form	100mg
C0379	β-NADP Sodium Salt Hydrate, oxidized form	100mg 1g
N0943	β-Nicotinamide Adenine Dinucleotide Phosphate	100mg
P0251	Phosphatase, Acid from Wheat Germ	100mg
T2979	Thionicotinamide Adenine Dinucleotide oxidized form	100mg

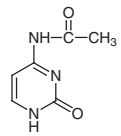
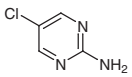
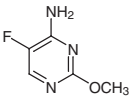
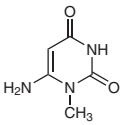
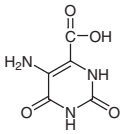
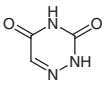
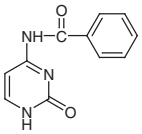
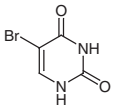
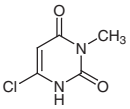
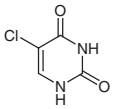
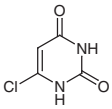
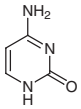
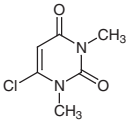
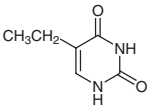
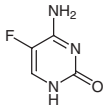
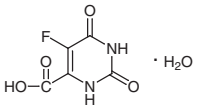
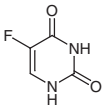
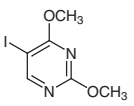
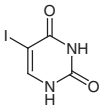
●Nucleobases and their Analogs

Nucleobases, usually simply called “bases”, are a vital sense component of DNA and RNA. The bases can be divided into two groups based on the structure: purines such as adenine and guanine; and pyrimidines such as cytosine, thymine and uracil. Other nucleobases can be created by the modification of these basic structures. For example, hypoxanthine and xanthine are generated in living systems through deamination of adenine and guanine, respectively. Furthermore, nucleobase analogue 5-fluorouracil (5-FU) is used as an anticancer agent. Derivatives of 2-fluoroadenine have been widely reported as prodrug forms of anticancer agents.

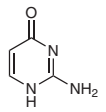
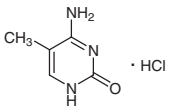
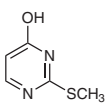
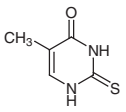
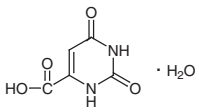
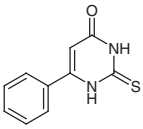
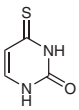
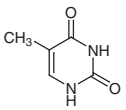
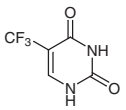
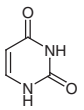
Pyrimidine Nucleobases

Product No.	Product Name	Unit Size
A2089	N^4-Acetylcytosine	5g 25g
A1918	2-Amino-5-chloropyrimidine	5g
A2136	4-Amino-6-chloropyrimidine	1g 5g
A2125	4-Amino-5-fluoro-2-methoxypyrimidine	5g

Product No.	Product Name	Unit Size		
A2449	6-Amino-1-methyluracil		5g	25g
A0947	5-Aminoorotic Acid			25g
A0558	6-Azauracil		1g	5g
B3169	N^4-Benzoylcytosine			5g
B0665	5-Bromouracil			25g
C2300	6-Chloro-3-methyluracil		5g	25g
C0969	5-Chlorouracil		5g	25g
C2093	6-Chlorouracil		5g	25g
C0528	Cytosine	5g	25g	100g
D1619	1,3-Dimethyl-6-chlorouracil		5g	25g
E0807	5-Ethyluracil		1g	5g
F0321	5-Fluorocytosine	1g	5g	25g
F0382	5-Fluoroorotic Acid Monohydrate		100mg	1g
F0151	5-Fluorouracil		5g	25g
I0531	5-Iodo-2,4-dimethoxypyrimidine		1g	5g
I0219	5-Iodouracil		5g	25g
I0814	Isocytosine			5g
M0204	5-Methylcytosine Hydrochloride	100mg	1g	5g
M2355	2-Methylthio-4-pyrimidinol		1g	5g
M0994	5-Methyl-2-thiouracil		10g	25g
O0065	Orotic Acid Monohydrate		25g	500g
P0236	6-Phenyl-2-thiouracil		1g	5g
T2757	4-Thiouracil			1g
T0234	Thymine	5g	25g	100g
T1622	5-(Trifluoromethyl)uracil		1g	5g
U0013	Uracil		25g	500g

A2089 	A1918 	A2136 	A2125 	A2449 
A0947 	A0558 	B3169 	B0665 	C2300 
C0969 	C2093 	C0528 	D1619 	E0807 
F0321 	F0382 	F0151 	I0531 	I0219 

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

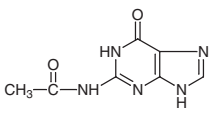
I0814 	M0204 	M2355 	M0994 	O0065 
P0236 	T2757 	T0234 	T1622 	U0013 

Purine Nucleobases

Product No.	Product Name	Unit Size		
A1248	2-Acetamido-6-hydroxypurine		1g	5g
A0149	Adenine		25g	250g
A0150	Adenine Hydrochloride Hemihydrate			25g
A0151	Adenine Sulfate Dihydrate			25g
A0907	Allopurinol		25g	250g
A1407	2-Amino-6-chloropurine		1g	5g
A2068	2-Amino-6-iodopurine		5g	25g
A2805	Aminophylline		25g	100g
A1111	2-Aminopurine		200mg	1g
A1041	4-Aminopyrazolo[3,4-*d*]pyrimidine			100mg
A0625	8-Azaguanine			1g
A0555	8-Azahypoxanthine			1g
A2069	Azathioprine		5g	25g
B3344	N^6-Benzoyladenine		5g	25g
B1088	N^6-Benzyladenine		5g	25g
B3355	6-Benzyloxypurine		5g	25g
B3456	8-Bromotheophylline		1g	5g
C2042	Caffeine		25g	500g
C2575	2-Chloroadenine		1g	5g
C2306	6-Chloro-7-deazapurine		1g	5g
C2748	7-(2-Chloroethyl)theophylline		5g	25g
C2221	6-Chloro-2-fluoropurine			1g
C0278	6-Chloropurine		5g	25g
C2470	4-Chloro-1*H*-pyrrolo[2,3-*b*]pyridine		200mg	1g
C2845	6-Chloro-9-(tetrahydropyran-2-yl)purine		200mg	1g
C0293	8-Chlorotheophylline		25g	250g
D3604	N^2,9-Diacetylguanine			25g
D1625	2,6-Diaminopurine Hydrate		5g	25g
D4295	5,6-Dichlorobenzimidazole Hydrochloride		1g	5g
D4284	2,6-Dichloro-7-deazapurine		1g	5g
D2470	2,6-Dichloropurine	1g	5g	25g
D3894	6-(Dimethylamino)purine		1g	5g
D3600	Diprophylline		25g	500g
D4302	Doxofylline		1g	25g
H0402	Etofylline		25g	500g
F0647	2-Fluoroadenine		200mg	1g
G0169	Guanine	1g	25g	250g
G0170	Guanine Hydrochloride Hydrate			25g
G0168	Guanine Sulfate Dihydrate		1g	25g
H1290	9-(2-Hydroxyethyl)adenine		5g	25g
H0311	Hypoxanthine			25g
I0370	Isoguanine			100mg
K0009	Kinetin		1g	5g
M0063	6-Mercaptopurine Monohydrate		1g	5g
M1925	6-Methoxypurine		1g	5g
M2432	1-Methylxanthine		50mg	200mg

Product No.	Product Name	Unit Size		
M2073	3-Methylxanthine		5g	25g
H1430	Proxyphylline		5g	25g
T0179	Theophylline	25g	100g	500g
T2941	Theophylline-7-acetic Acid			25g
T0212	6-Thioguanine		1g	5g
T0225	2-Thioxanthine		1g	5g
X0004	Xanthine			25g
X0007	Xanthopterin Hydrate		1g	5g

A1248



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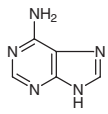

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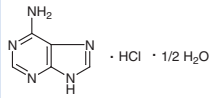

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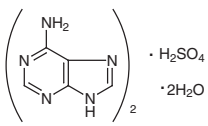

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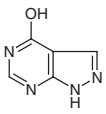

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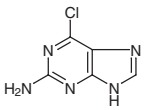

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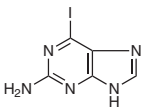

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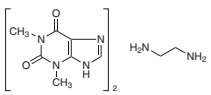

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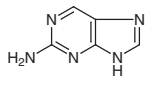

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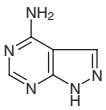

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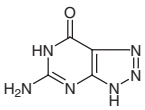

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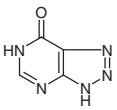

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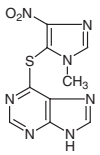

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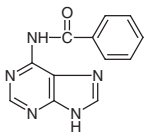

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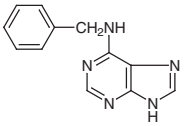

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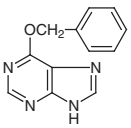

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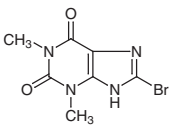

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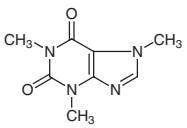

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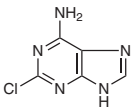

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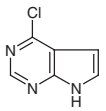
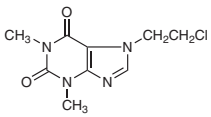


C2748



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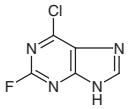

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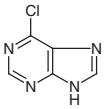

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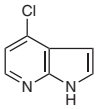

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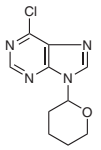

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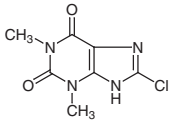

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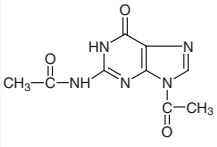

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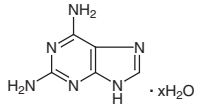

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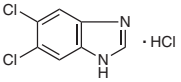

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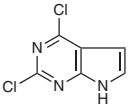

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

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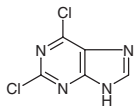

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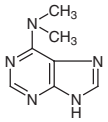

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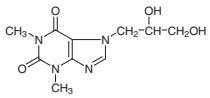

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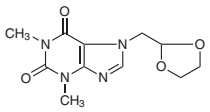

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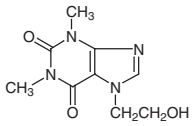

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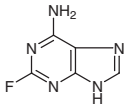

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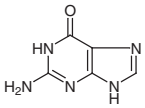

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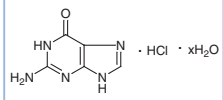

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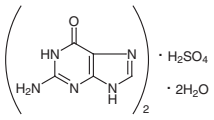

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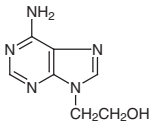

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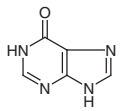

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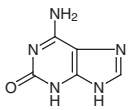

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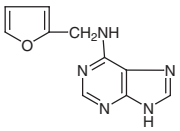

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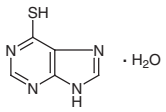

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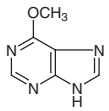

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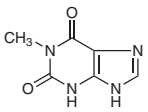

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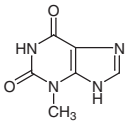

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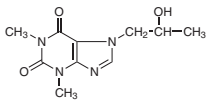

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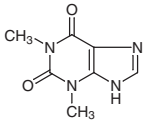

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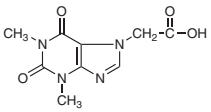

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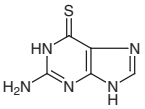

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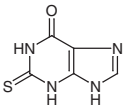

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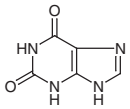

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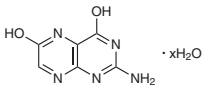
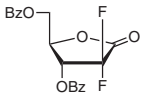
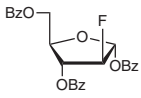
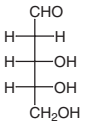
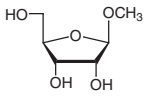
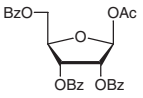
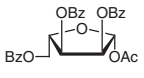
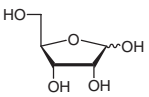
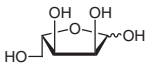
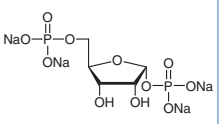
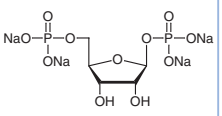
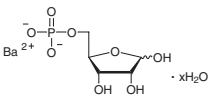
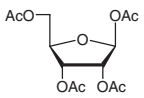
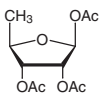
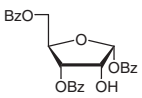


●Riboses and 2'-Deoxyriboses

D- and L-Riboses and 2'-deoxyriboses, and their protected derivatives are shown below.

Product No.	Product Name	Unit Size	
D4207	2-Deoxy-2,2-difluoro-D-*erythro*-pentonic Acid γ-Lactone 3,5-Dibenzoate	1g	5g
D4594	2-Deoxy-2-fluoro-1,3,5-tri-*O*-benzoyl-α-D-arabinofuranose	1g	5g
D0059	2-Deoxy-D-ribose	5g	25g
M1965	Methyl β-D-Ribofuranoside	1g	5g
R0067	β-D-Ribofuranose 1-Acetate 2,3,5-Tribenzoate	5g	25g
R0080	β-L-Ribofuranose 1-Acetate 2,3,5-Tribenzoate		1g
R0025	D-(-)-Ribose	25g	250g
R0068	L-Ribose	1g 5g	25g
R0082	α-D-Ribose 1,5-Bis(phosphate) Tetrasodium Salt		5mg
R0083	β-D-Ribose 1,5-Bis(phosphate) Tetrasodium Salt	Price on request	
R0026	Ribose-5-phosphate Barium Salt Hydrate	100mg	1g
R0066	Tetra-*O*-acetyl-β-D-ribofuranose	5g	25g
T2607	1,2,3-Tri-*O*-acetyl-5-deoxy-β-D-ribofuranose	5g	25g
T2641	1,3,5-Tri-*O*-benzoyl-α-D-ribofuranose	5g	25g

D4207 	D4594 	D0059 	M1965 	R0067 
R0080 	R0025 	R0068 	R0082 	R0083 
R0026 	R0066 	T2607 	T2641 	

Nucleic Acid Synthetic Agents

Silylation converts insoluble nucleobases into lipophilic trimethylsilyled derivatives, which are readily soluble in organic solvents, permitting homogenous chemical reactions. The trimethylsilylated nucleobases react with protected sugars to afford nucleosides. The procedure is commonly referred to as the Hilbert-Johnson reaction modified by Vorbrüggen *et al*.

Phosphorylating and phosphorothioating agents, condensing agents and protecting agents for hydroxy and amino groups are of importance in the synthesis of DNA and RNA chains. Active research on chemical synthesis of DNA and RNA is being conducted, and a variety of synthetic methods using these agents are being developed. The dicyclohexylcarbodiimide (DCC) method exemplified by the Khorana group, the phosphotriester method and phosphitetriester method by the team of Letsinger and the phosphoramidite method by the Caruthers group are examples of the various synthetic methods. Recently, the phosphoramidite method has been used frequently in tandem with the penetration of DNA synthesizers, thus 2-cyanoethyl *N*,*N*,*N*',*N*'-tetraisopropylphosphordiamidite has been the reagent of frequent choice for the phosphitylation due to its ease in handling and safety.[3] 1,2,4-Triazole and 1*H*-tetrazole are also used for chemical conversion of uridines into cytidines.

Chemically synthesized DNA is becoming important as a primer for the PCR method, an antisense molecule, or an element of the DNA computer.

Protecting Agents for Hydroxyl and Amino Groups

Product No.	Product Name	Unit Size		
A0082	Acetyl Chloride		100g	500g
B1151	1,3-Benzodithiolylium Tetrafluoroborate			5g
B0078	Benzoic Anhydride	25g	100g	500g
B0105	Benzoyl Chloride		25mL	500mL
B0511	BSA		10mL	100mL
B1223	*tert*-Butyldiphenylchlorosilane	5mL	25mL	100mL
C0832	4-Chlorophenoxyacetyl Chloride		25g	500g
C0306	Chlorotrimethylsilane	25mL	100mL	500mL
D2504	2-Chlorotrityl Chloride			25g
D2469	Di-*tert*-butyldichlorosilane			5g
D3135	Di-*tert*-butylsilyl Bis(trifluoromethanesulfonate)		1g	5g
D1608	1,3-Dichloro-1,1,3,3-tetraisopropyldisiloxane		5g	25g
D2334	1,3-Dichloro-1,1,3,3-tetramethyldisiloxane		5g	25g
D1612	4,4'-Dimethoxytrityl Chloride		5g	25g
D1293	*N*,*N*-Dimethylformamide Dimethyl Acetal	25mL	100mL	500mL
H0089	HMDS	25mL	100mL	500mL

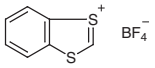
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name			Unit Size
I0115	Isobutyryl Chloride	25g	100g	500g
M0721	4-Methoxybenzoyl Chloride	25g	100g	500g
M0790	4-Methoxytrityl Chloride		25g	250g
N0404	2-Nitrobenzyl Bromide		5g	25g
P0113	Phenoxyacetyl Chloride		25g	500g
P0677	Pivaloyl Chloride		25mL	500mL
B0995	TBSCl	5g	25g	100g
T0459	2,4,6-Triisopropylbenzenesulfonyl Chloride		25g	500g
T0871	Trimethylsilyl Trifluoromethanesulfonate	5g	25g	250g
T1071	4,4',4"-Tris(benzoyloxy)trityl Bromide		5g	25g
T1526	4,4',4"-Tris(4,5-dichlorophthalimido)trityl Bromide			1g
T0512	Trityl Bromide		25g	100g
C0308	Trityl Chloride	25g	100g	500g

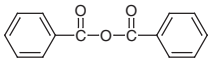
A0082



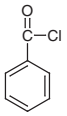
B1151



B0078



B0105



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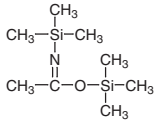
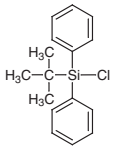


B1223



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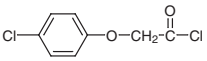

C0306



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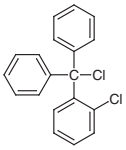

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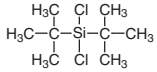

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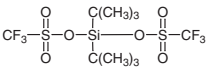

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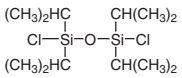

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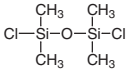

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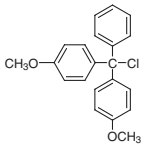

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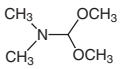

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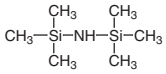

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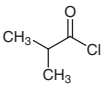

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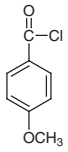

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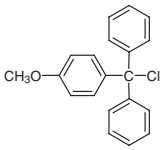

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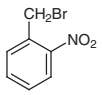

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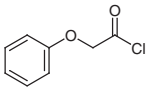

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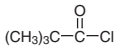

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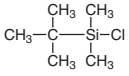

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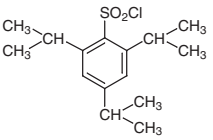

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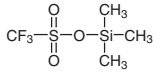

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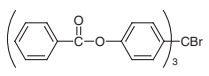

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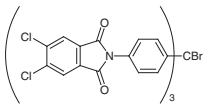

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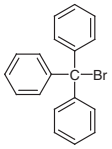

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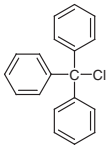
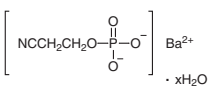


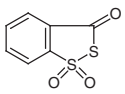
Phosphorylating and Phosphorothioating Agents

Product No.	Product Name	Unit Size		
C0978	Barium 2-Cyanoethylphosphate Hydrate		5g	25g
B3125	3*H*-1,2-Benzodithiol-3-one 1,1-Dioxide		1g	5g
B4075	Bis(2-cyanoethyl) *N,N*-Diisopropylphosphoramidite		1g	5g
B3623	Bis(phenylacetyl) Disulfide		5g	25g
C1210	2-Chloro-4*H*-1,3,2-benzodioxaphosphorin-4-one		5g	25g
C1215	2-Chloro-1,3,2-dioxaphospholane			25g
C1250	2-Chloro-2-oxo-1,3,2-dioxaphospholane		5g	25g
C0976	2-Chlorophenyl Phosphorodichloridate		5g	25g
C0977	4-Chlorophenyl Phosphorodichloridate		5g	25g
C2228	2-Cyanoethyl *N,N,N'*,*N'*-Tetraisopropylphosphordiamidite		1g	5g
D2624	Dibenzyl *N,N*-Diisopropylphosphoramidite			5g
D4252	Di-*tert*-butyl *N,N*-Diethylphosphoramidite			1g
D4211	Di-*tert*-butyl *N,N*-Diisopropylphosphoramidite		1g	5g
D0624	Diethyl Chlorothiophosphate		25g	500g
D0764	Dimethyl Chlorothiophosphate			25g
D1059	Diphenyl Chlorophosphate	25g	100g	500g
D2883	Diphosphoryl Chloride			25g
M0905	Methyl Dichlorophosphite			10g
M0904	Methyl Phosphorodichloridate	5g	25g	100g
P0209	Phenyl Dichlorophosphate		25g	500g
P1223	Tetrabenzyl Pyrophosphate			1g

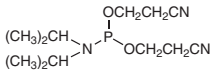
C0978



B3125



B4075



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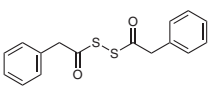
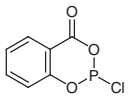


C1210



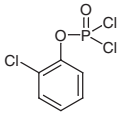
C1215



C1250



C0976



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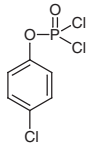
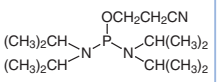


C2228



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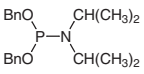
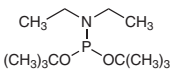
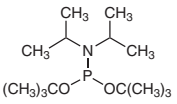


D4252



D4211



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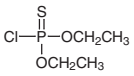

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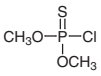
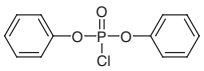


D1059



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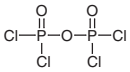
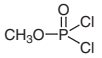


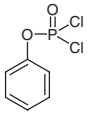
M0905



M0904

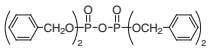


P0209



The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

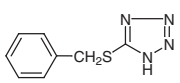
P1223



Condensing Agents

Product No.	Product Name		Unit Size	
B3020	5-(Benzylthio)-1*H*-tetrazole			25g
C2325	1,1'-Carbonyldi(1,2,4-triazole)		5g	25g
C2421	1-(Cyanomethyl)piperidinium Tetrafluoroborate			5g
D2026	4,5-Dicyanoimidazole		25g	250g
D0436	*N*,*N*'-Dicyclohexylcarbodiimide		25g	400g
D3792	*N*,*N*'-Dicyclohexyl-4-morpholinecarboxamidine			25g
E0670	5-(Ethylthio)-1*H*-tetrazole		1g	5g
M1186	2,4-Mesitylenedisulfonyl Dichloride		5g	25g
M0071	2-Mesitylenesulfonyl Chloride		25g	500g
M0625	1-(2-Mesitylenesulfonyl)imidazole			1g
N0477	3-Nitro-1,2,4-triazole			5g
P0677	Pivaloyl Chloride		25mL	500mL
T1562	2,4,5,6-Tetramethylbenzenedisulfonyl Dichloride			5g
T1017	1*H*-Tetrazole		5g	25g
T1985	1-(*p*-Toluenesulfonyl)imidazole		5g	25g
T0340	1,2,4-Triazole	25g	100g	500g
T0459	2,4,6-Triisopropylbenzenesulfonyl Chloride		25g	500g
T1410	1-(2,4,6-Triisopropylbenzenesulfonyl)imidazole		5g	25g
T2951	1-(2,4,6-Triisopropylbenzenesulfonyl)-1,2,4-triazole		1g	5g

B3020



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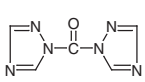
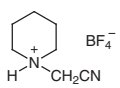


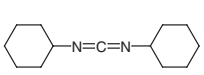
C2421



D2026



D0436



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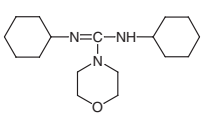
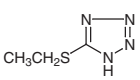
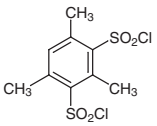


E0670



M1186



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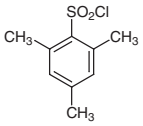

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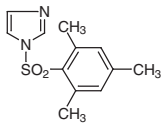

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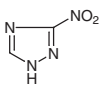

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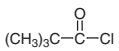

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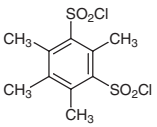

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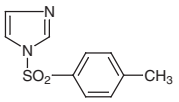

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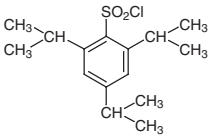

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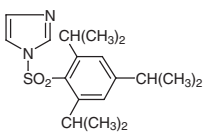

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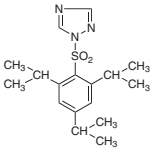

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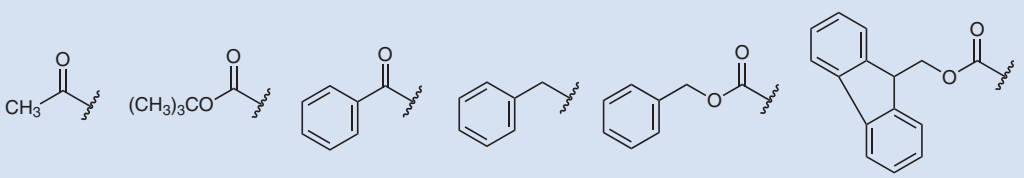
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Amino Acids

Amino acids are molecules which contain both amino and carboxyl groups. In a generic sense the term refers to α-amino acids which are the constituents of proteins. The stereochemistry of amino acids is defined by D and L enantiomers. The 20 proteinogenic amino acids are L-isomers, and their enantiomeric D-isomers are rarely found in nature. The estimated 100,000 or more different proteins in life consist from the twenty different L-α-amino acids connected by peptide bonds between the carbonyl and amino groups of amino acid residues. Although the so-called 20 proteinogenic amino acids are found in all forms of life, D-amino acids and peptides containing them have been discovered to play an important part in a range of biochemical systems.

Amino acids and their *N*-protected derivatives, e.g. Boc and Fmoc amino acids, have vital roles in technology since they are utilized to synthesize various bioactive substances from other molecules, for example peptide sweeteners, nutritional supplements, cosmetic materials, surfactants, and synthetic precursors of pharmaceuticals like insulin. Typical amino acids, their protected and biologically-modified reagents, and non-proteinogenic amino acids are shown as follows.

We use the following abbreviations of the *N*-protective groups for the structures which appear in this section.



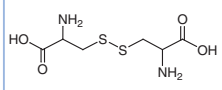
Ac (Acetyl) | **Boc** (*t*-Butoxycarbonyl) | **Bz** (Benzoyl) | **Bzl** (Benzyl) | **Cbz, Z** (Carbobenzoxy) | **Fmoc** (9-Fluorenylmethoxycarbonyl)

α-Amino Acids

Product No.	Product Name	Unit Size		
C0518	Cystine (DL- and *meso*- mixture)		1g	5g
A0178	H-DL-Ala-OH		25g	500g
A0177	H-D-Ala-OH		5g	25g
A0179	H-Ala-OH		25g	250g
A1029	H-D-Arg-OH		1g	5g
A0526	H-Arg-OH	25g	100g	500g
A0527	H-DL-Arg-OH・HCl	1g	5g	25g
A0528	H-Arg-OH・HCl		25g	500g
A0541	H-DL-Asn-OH Monohydrate		25g	500g
A0543	H-D-Asn-OH Monohydrate			25g
A0542	H-Asn-OH Monohydrate		25g	250g
A0544	H-DL-Asp-OH		25g	500g
A0545	H-D-Asp-OH			25g
A0546	H-Asp-OH		25g	500g
C0515	H-Cys-OH	25g	100g	500g
C0519	$(H\text{-}Cys\text{-}OH)_2$		25g	500g
C0520	$(H\text{-}Cys\text{-}OH)_2 \cdot 2HCl$			25g
C0516	H-DL-Cys-OH・HCl Monohydrate			25g
C1329	H-D-Cys-OH・HCl Monohydrate		5g	25g
C0517	H-Cys-OH・HCl Monohydrate		25g	500g
G0062	H-DL-Gln-OH		1g	10g
G0278	H-D-Gln-OH		1g	5g
G0063	H-Gln-OH		25g	500g
G0058	H-DL-Glu-OH		25g	500g
G0057	H-D-Glu-OH		25g	250g
G0059	H-Glu-OH		25g	500g
G0060	H-Glu-OH・HCl		25g	500g
G0188	H-Glu-OH.Na Monohydrate		25g	500g

Product No.	Product Name	Unit Size		
G0099	H-Gly-OH		25g	500g
G0103	H-Gly-OH・HCl		25g	500g
G0424	H-Gly-OH.1/3H_2SO_4		5g	25g
H0148	H-DL-His-OH		1g	25g
H0998	H-D-His-OH		5g	25g
H0149	H-His-OH		25g	250g
H0150	H-His-OH・HCl Monohydrate		25g	500g
I0180	H-DL-Ile-OH (mixture of 4 stereoisomers)		5g	25g
I0181	H-Ile-OH		25g	500g
L0028	H-DL-Leu-OH			25g
L0027	H-D-Leu-OH		5g	25g
L0029	H-Leu-OH	25g	100g	500g
L0129	H-Lys-OH		5g	25g
L0070	H-DL-Lys-OH・HCl		25g	100g
L0128	H-D-Lys-OH・HCl		5g	25g
L0071	H-Lys-OH・HCl		25g	500g
L0130	H-DL-Lys-OH・2HCl			25g
L0131	H-Lys-OH・2HCl			25g
M0463	H-DL-Met-OH		25g	500g
M0102	H-D-Met-OH	1g	5g	25g
M0099	H-Met-OH	25g	100g	500g
O0063	H-DL-Orn-OH・HCl			1g
O0064	H-Orn-OH・HCl		25g	250g
O0089	H-Orn-OH・2HCl		1g	5g
P0136	H-DL-Phe-OH		25g	250g
P0135	H-D-Phe-OH		5g	25g
P0134	H-Phe-OH		25g	250g
P0480	H-DL-Pro-OH		1g	25g
P0994	H-D-Pro-OH		5g	25g
P0481	H-Pro-OH		25g	250g
S0034	H-DL-Ser-OH		25g	500g
S0033	H-D-Ser-OH		5g	25g
S0035	H-Ser-OH	5g	25g	250g
T0229	H-DL-Thr-OH			25g
T0228	H-D-Thr-OH		25g	500g
T0230	H-Thr-OH	25g	100g	500g
T0540	H-DL-Trp-OH			25g
T0539	H-D-Trp-OH		5g	25g
T0541	H-Trp-OH			25g
T0549	H-DL-Tyr-OH		5g	25g
T1141	H-D-Tyr-OH		5g	25g
T0550	H-Tyr-OH		25g	500g
T1423	H-Tyr-OH.2Na Hydrate			25g
V0013	H-DL-Val-OH		25g	500g
V0012	H-D-Val-OH		1g	25g
V0014	H-Val-OH	25g	100g	500g
O0440	L-Ornithine L-Aspartate			25g
S0900	L-Selenocystine Monohydrate			250mg

C0518



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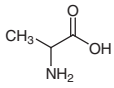

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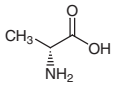

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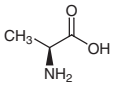

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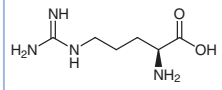

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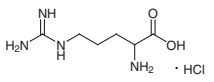

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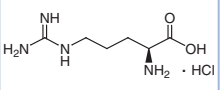

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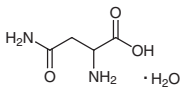

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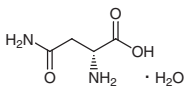

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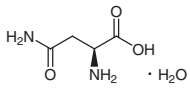
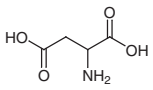
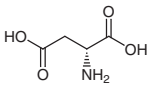
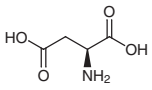
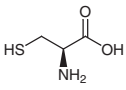
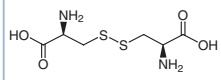
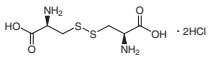
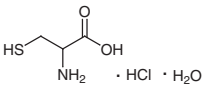
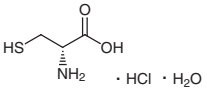
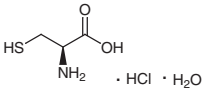
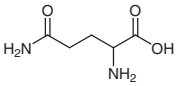
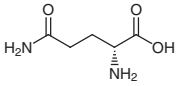
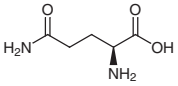
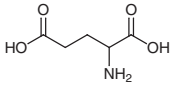
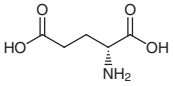
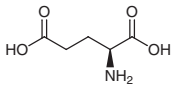
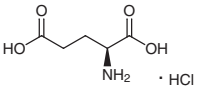
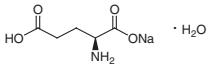
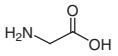
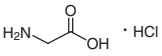
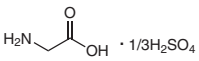
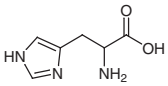
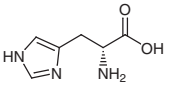
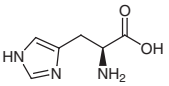
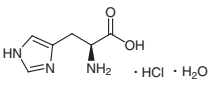
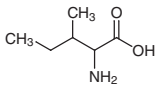
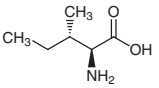
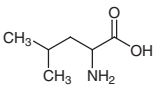
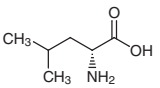
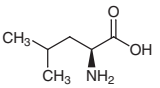
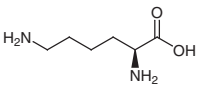
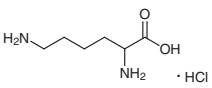
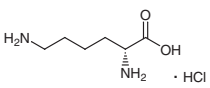
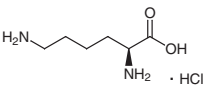
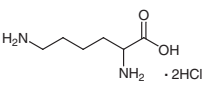
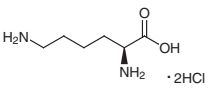
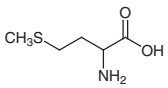
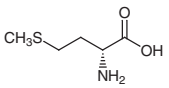
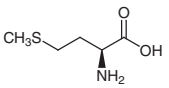
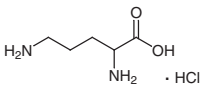
A0542 	A0544 	A0545 	A0546 	C0515 
C0519 	C0520 	C0516 	C1329 	C0517 
G0062 	G0278 	G0063 	G0058 	G0057 
G0059 	G0060 	G0188 	G0099 	G0103 
G0424 	H0148 	H0998 	H0149 	H0150 
I0180 	I0181 	L0028 	L0027 	L0029 
L0129 	L0070 	L0128 	L0071 	L0130 
L0131 	M0463 	M0102 	M0099 	O0063 

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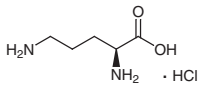

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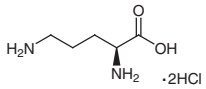

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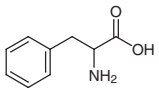

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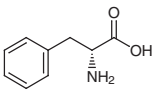

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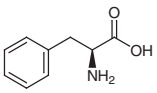

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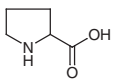

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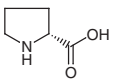

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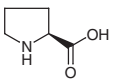

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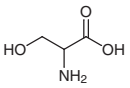

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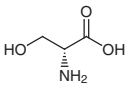

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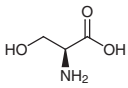

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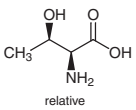
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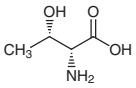

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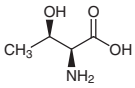

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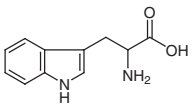

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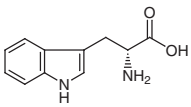

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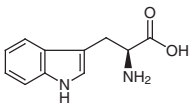

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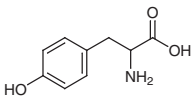

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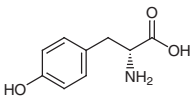

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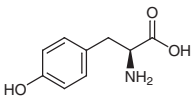

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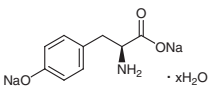

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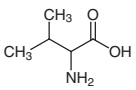

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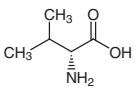

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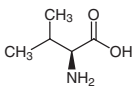

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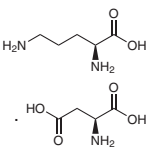

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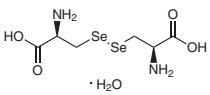


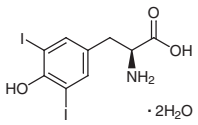
Biologically-modified Amino Acids

Product No.	Product Name	Unit Size	
D0612	3,5-Diiodo-L-tyrosine Dihydrate		25g
D0728	*N*,*N*-Dimethylglycine Hydrochloride		25g
D0599	DL-DOPA		1g
G0167	Glycocyamine	25g	500g
M1365	H-Arg(Me)-OH.AcOH		100mg
H1169	H-*cis*-Hyp-OH	100mg	1g
H1358	H-D-*cis*-Hyp-OH	1g	5g
H0296	H-Hyp-OH	5g	25g
A2213	H-Lys(Ac)-OH・HCl		1g
M0101	H-DL-Met(*O*)-OH		5g

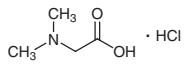
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name	Unit Size	
G0061	H-DL-Pyr-OH	25g	500g
P1354	H-D-Pyr-OH	5g	25g
P0573	H-Pyr-OH	25g	500g
M0452	H-DL-Trp(5-Me)-OH	100mg	1g
H0531	H-Trp(5-OH)-OH	1g	5g
I0075	H-Tyr(3-I)-OH	1g	5g
D0600	Levodopa	5g	25g
M0777	Me-DL-Ala-OH		100mg
M1360	Me-D-Asp-OH		100mg
M0778	Me-DL-Glu-OH		100mg
S0841	Me-Gly-OEt・HCl	5g	25g
M0332	Me-Gly-OH	25g 100g	500g
M0256	Me-Gly-ONa (*ca.* 40% in Water)	25mL	500mL
M0100	DL-Methionine Sulfone	1g	5g
P0772	DL-*O*-Phosphoserine	Price on request	
P0773	L-*O*-Phosphoserine	5g	25g
P0255	*O*-Phospho-DL-threonine		1g
P0959	*O*-Phospho-L-tyrosine		100mg
S0462	DL-Selenomethionine		1g
S0442	L-Selenomethionine	1g	5g
T0219	L-Thioproline	25g	500g
T0241	DL-Thyronine		100mg
T0242	DL-Thyroxine	Price on request	
T0245	L-Thyroxine Sodium Salt Pentahydrate	100mg	1g
T0453	3,3',5-Triiodo-L-thyronine		100mg
M0644	*S*-Methylmethioninesulfonium Chloride	25g	500g

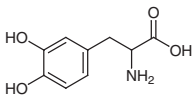
D0612



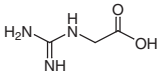
D0728



D0599



G0167



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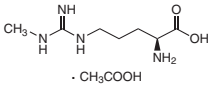
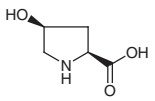


H1169



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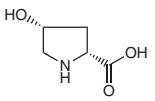

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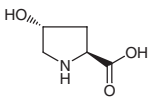
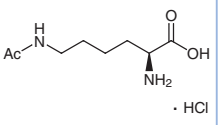
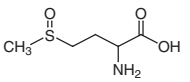


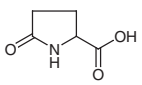
A2213



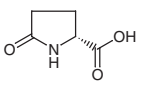
M0101



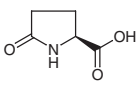
G0061



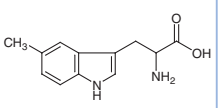
P1354



P0573



M0452



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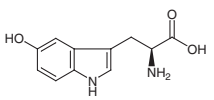
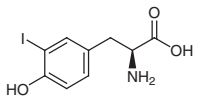
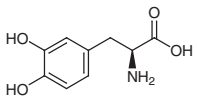


I0075



D0600



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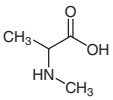

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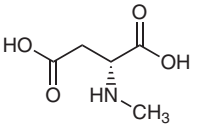

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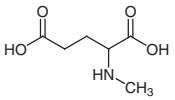

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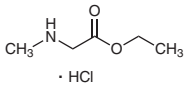

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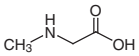

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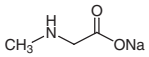

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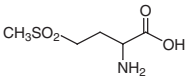

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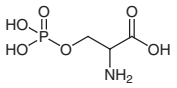

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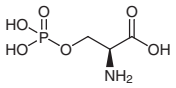

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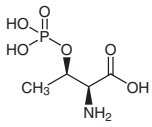
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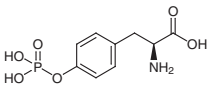

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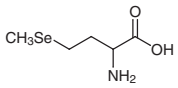

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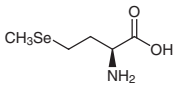

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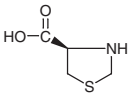
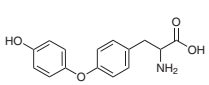


T0241


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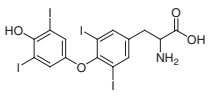

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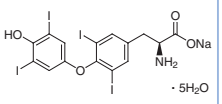
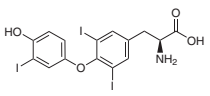
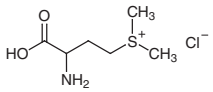


T0453


M0644


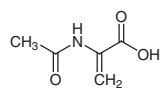
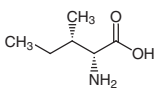
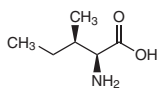
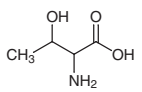
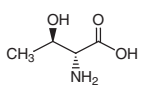
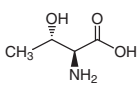
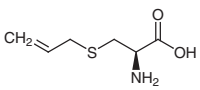
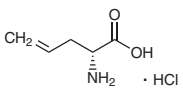
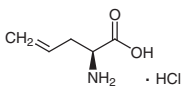
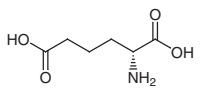
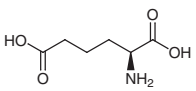
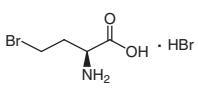
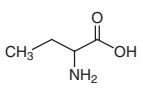
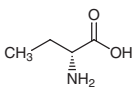
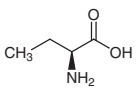
non-Proteinorganic Amino Acids

Product No.	Product Name			Unit Size
A1443	2-Acetamidoacrylic Acid			5g
A0212	D-Alloisoleucine			1g
A2214	L-Alloisoleucine		200mg	1g
A0214	DL-Allothreonine (contains Threonine)		100mg	1g
A1518	D-Allothreonine		100mg	1g
A1519	L-Allothreonine		100mg	1g
A1468	*S*-Allyl-L-cysteine			5g
A1647	D-2-Allylglycine Hydrochloride		200mg	1g
A1648	L-2-Allylglycine Hydrochloride	200mg	1g	5g
A2153	D-2-Aminoadipic Acid		1g	5g
A1457	L-2-Aminoadipic Acid		1g	5g
A1450	(*S*)-(+)-2-Amino-4-bromobutyric Acid Hydrobromide		1g	5g
A0280	DL-2-Aminobutyric Acid			25g
A1377	(*R*)-(-)-2-Aminobutyric Acid		1g	5g
A0826	(*S*)-(+)-2-Aminobutyric Acid		1g	5g
A2032	1-Aminocyclobutanecarboxylic Acid Hydrochloride			5g
A1068	1-Aminocyclohexanecarboxylic Acid		25g	100g
A1063	1-Aminocyclopentanecarboxylic Acid	1g	5g	25g
A1178	1-Aminocyclopropanecarboxylic Acid		100mg	1g
A0382	DL-2-Amino-*n*-octanoic Acid	1g	5g	25g
A0404	DL-2-Aminopimelic Acid			1g
A1279	DL-2-Aminosuberic Acid			5g
A1367	2-Amino-4,4,4-trifluorobutyric Acid Hydrochloride		100mg	1g
A0497	Anthranilic Acid	25g	100g	500g
A1043	L-Azetidine-2-carboxylic Acid [Antagonist of L-Proline]		100mg	1g
A1646	Azetidine-3-carboxylic Acid			100mg
C0018	L-Canavanine Sulfate Hydrate			100mg
C2781	*S*-(2-Carboxyethyl)-L-cysteine			100mg

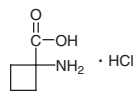
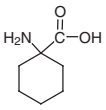
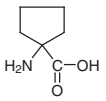
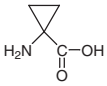
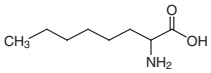
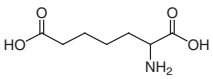
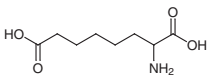
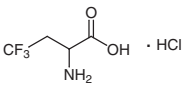
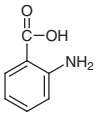
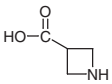
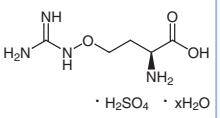
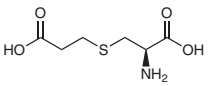
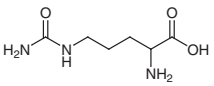
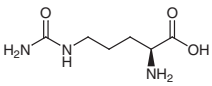
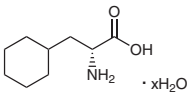
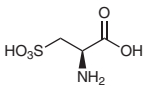
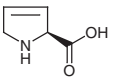
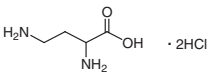
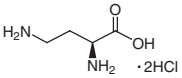
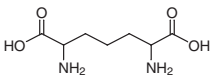
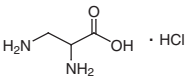
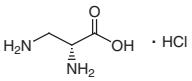
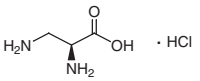
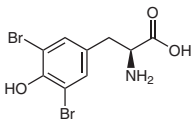
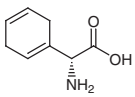
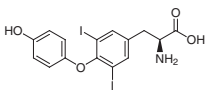
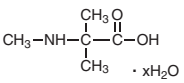
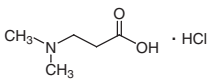
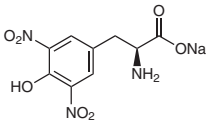
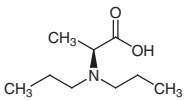
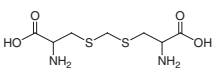
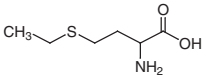
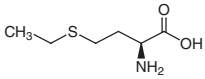
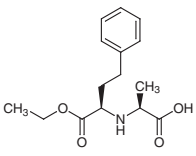
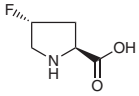
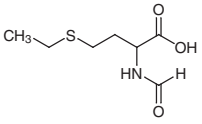
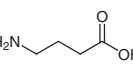
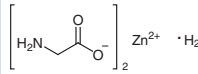
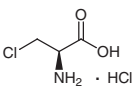
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

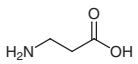
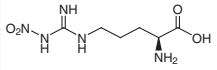
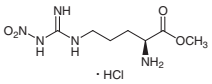
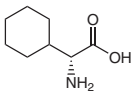
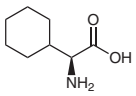
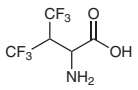
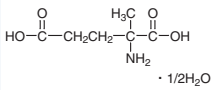
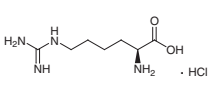
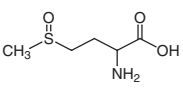
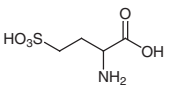
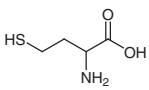
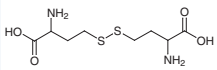
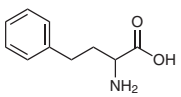
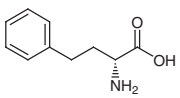
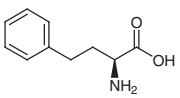
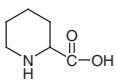
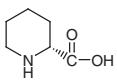
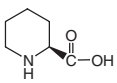
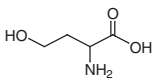
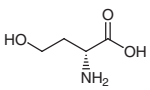
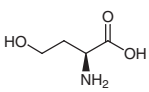
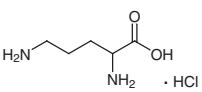
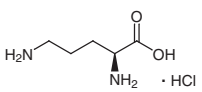
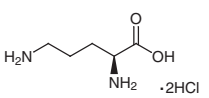
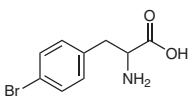
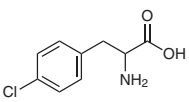
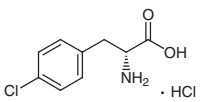
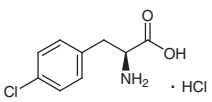
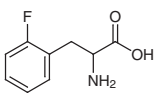
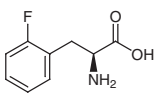
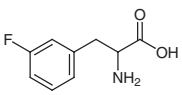
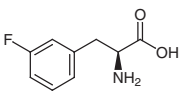
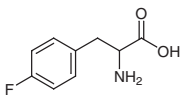
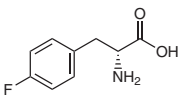
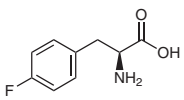
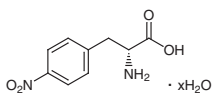
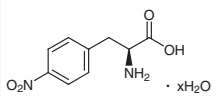
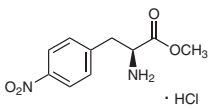
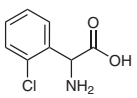
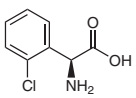
Product No.	Product Name	Unit Size		
C0371	DL-Citrulline			1g
C0372	L-Citrulline		25g	250g
C2659	3-Cyclohexyl-D-alanine Hydrate		1g	5g
C0514	L-Cysteic Acid		1g	25g
D3825	3,4-Dehydro-L-proline		100mg	1g
D1175	DL-2,4-Diaminobutyric Acid Dihydrochloride	1g	5g	25g
D0083	(*S*)-(+)-2,4-Diaminobutyric Acid Dihydrochloride			1g
D0112	2,6-Diaminopimelic Acid		1g	5g
D0438	DL-2,3-Diaminopropionic Acid Hydrochloride	1g	5g	25g
D1573	(*R*)-(-)-2,3-Diaminopropionic Acid Hydrochloride		100mg	1g
D1377	(*S*)-(+)-2,3-Diaminopropionic Acid Hydrochloride		100mg	1g
D0213	3,5-Dibromo-L-tyrosine		1g	5g
D2539	D-(-)-2-(2,5-Dihydrophenyl)glycine		5g	25g
D1119	3,5-Diiodo-L-thyronine	100mg	1g	5g
M1388	*N*,2-Dimethylalanine Hydrate		1g	5g
D2690	*N*,*N*-Dimethyl-*β*-alanine Hydrochloride		5g	25g
D3379	3,5-Dinitro-L-tyrosine Sodium Salt			1g
D2224	*N*,*N*-Dipropyl-L-alanine			1g
D0961	Djenkolic Acid			1g
E0038	DL-Ethionine		5g	25g
E0039	L-Ethionine			100mg
E0530	*N*-[(*S*)-1-Ethoxycarbonyl-3-phenylpropyl]-L-alanine		5g	25g
F0818	*trans*-4-Fluoro-L-proline			50mg
F0120	*N*-Formyl-DL-ethionine		100mg	1g
A0282	GABA	25g	100g	500g
G0215	Glycine Zinc Salt Monohydrate		5g	25g
C1612	H-Ala(3-Cl)-OH・HCl		1g	5g
A0180	H-*β*-Ala-OH		25g	500g
N0660	H-Arg(NO_2)-OH		5g	25g
N0661	H-Arg(NO_2)-OMe・HCl		5g	25g
C2673	H-D-Chg-OH			1g
C2569	H-Chg-OH		1g	5g
H1427	4,4,4,4',4',4'-Hexafluoro-DL-valine			200mg
M0229	H-DL-Glu(2-Me)-OH Hemihydrate		100mg	1g
H1172	H-HomoArg-OH・HCl		1g	5g
M0101	H-DL-Met(*O*)-OH			5g
H0158	DL-Homocysteic Acid		1g	5g
H0159	DL-Homocysteine		1g	5g
H0160	DL-Homocystine			25g
H1329	DL-Homophenylalanine		1g	5g
H0984	D-Homophenylalanine		100mg	1g
H0985	L-Homophenylalanine		100mg	1g
P0442	DL-Homoproline		25g	250g
P1830	D-Homoproline		5g	25g
P1404	L-Homoproline		1g	5g
A0319	DL-Homoserine		1g	5g
H1224	D-Homoserine		1g	5g
H1030	L-Homoserine		1g	5g
O0063	H-DL-Orn-OH・HCl			1g
O0064	H-Orn-OH・HCl		25g	250g
O0089	H-Orn-OH・2HCl		1g	5g
B4245	H-DL-Phe(4-Br)-OH		1g	5g
C0253	H-DL-Phe(4-Cl)-OH		1g	25g
C2016	H-D-Phe(4-Cl)-OH・HCl			1g
C1709	H-Phe(4-Cl)-OH・HCl		1g	5g
F0170	H-DL-Phe(2-F)-OH		1g	5g
F0273	H-Phe(2-F)-OH		100mg	1g
F0169	H-DL-Phe(3-F)-OH		1g	5g
F0272	H-Phe(3-F)-OH			100mg
F0106	H-DL-Phe(4-F)-OH			1g
F0901	H-D-Phe(4-F)-OH		1g	5g
F0274	H-Phe(4-F)-OH			100mg
N0849	H-D-Phe(4-NO_2)-OH Hydrate		1g	5g
N0682	H-Phe(4-NO_2)-OH Hydrate		1g	5g
N0878	H-Phe(4-NO_2)-OMe・HCl		1g	5g
C2579	H-DL-Phg(2-Cl)-OH		5g	25g
C2431	H-Phg(2-Cl)-OH		1g	5g
C1401	H-DL-Phg(4-Cl)-OH		1g	5g

Product No.	Product Name			Unit Size
F0863	H-D-Phg(4-F)-OH		1g	5g
F0862	H-Phg(4-F)-OH		1g	5g
P0326	H-DL-Phg-OH		25g	500g
P0820	H-D-Phg-OH		25g	500g
P1288	H-Phg-OH		25g	100g
H0758	H-D-Phg(4-OH)-OH		25g	500g
H1389	H-Phg(4-OH)-OH		5g	25g
L0157	H-D-Tle-OH		1g	5g
L0147	H-Tle-OH	1g	5g	25g
F0201	H-Tyr(3-F)-OH			100mg
N0905	H-Tyr(3-NO_2)-OH		5g	25g
I0256	Isonipecotic Acid	25g	100g	500g
K0016	L-Kynurenine Hydrate			100mg
L0010	Lanthionine (DL- and *meso*- mixture)			100mg
A0323	2-Methylalanine	25g	100g	500g
D1817	*α*-Methyl-L-DOPA Sesquihydrate		5g	25g
N0665	3-(2-Naphthyl)-D-alanine		1g	5g
N0646	3-(2-Naphthyl)-L-alanine		1g	5g
N0772	3-(1-Naphthyl)-D-alanine Hydrochloride		1g	5g
N0773	3-(1-Naphthyl)-L-alanine Hydrochloride		1g	5g
N0683	3-(2-Naphthyl)-L-alanine Hydrochloride		1g	5g
N0420	Nipecotic Acid		25g	500g
N0302	DL-Norleucine			25g
N0327	D-Norleucine		1g	10g
N0303	L-Norleucine	100mg	1g	5g
N0304	DL-Norvaline			25g
N0673	D-Norvaline	1g	5g	25g
N0686	L-Norvaline		1g	5g
O0440	L-Ornithine L-Aspartate			25g
P0025	DL-Penicillamine			1g
P0147	D-Penicillamine		5g	25g
P1370	L-Penicillamine		1g	5g
P2085	Pentafluoro-L-phenylalanine		200mg	1g
A2480	*β*-Phenylalanine		5g	25g
P0180	*N*-Phenylglycine		25g	500g
P0179	*N*-Phenylglycine Potassium Salt		25g	500g
T0954	L-Theanine		1g	5g
T0787	DL-*m*-Tyrosine		1g	5g

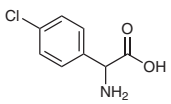
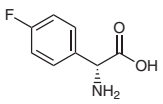
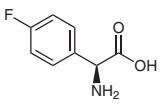
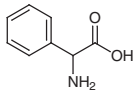
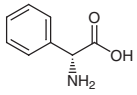
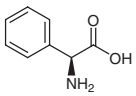
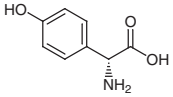
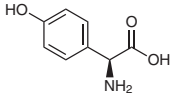
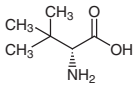
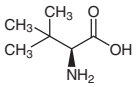
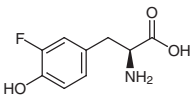
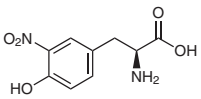
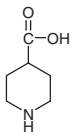
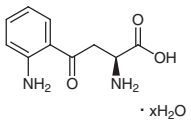
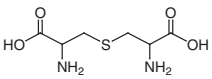
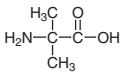
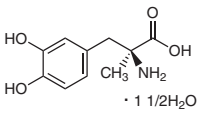
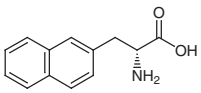
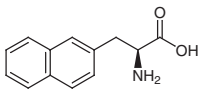
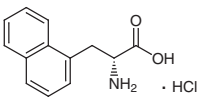
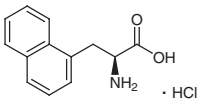
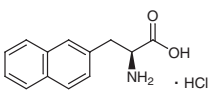
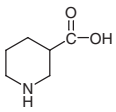
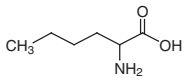
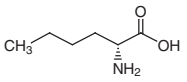
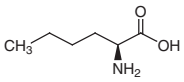
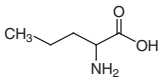
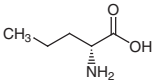
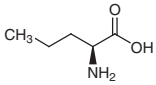
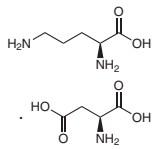
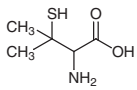
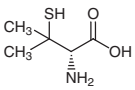
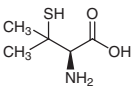
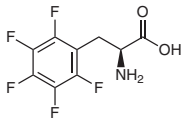
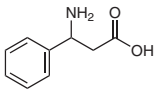
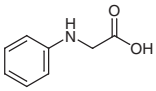
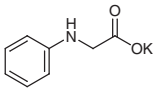
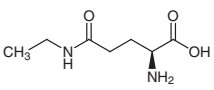
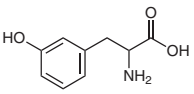
A1443 	A0212 	A2214 	A0214 	A1518 
A1519 	A1468 	A1647 	A1648 	A2153 
A1457 	A1450 	A0280 	A1377 	A0826 

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2032 	A1068 	A1063 	A1178 	A0382 
A0404 	A1279 	A1367 	A0497 	A1043 
A1646 	C0018 	C2781 	C0371 	C0372 
C2659 	C0514 	D3825 	D1175 	D0083 
D0112 	D0438 	D1573 	D1377 	D0213 
D2539 	D1119 	M1388 	D2690 	D3379 
D2224 	D0961 	E0038 	E0039 	E0530 
F0818 	F0120 	A0282 	G0215 	C1612 

A0180 	N0660 	N0661 	C2673 	C2569 
H1427 	M0229 	H1172 	M0101 	H0158 
H0159 	H0160 	H1329 	H0984 	H0985 
P0442 	P1830 	P1404 	A0319 	H1224 
H1030 	O0063 	O0064 	O0089 	B4245 
C0253 	C2016 	C1709 	F0170 	F0273 
F0169 	F0272 	F0106 	F0901 	F0274 
N0849 	N0682 	N0878 	C2579 	C2431 

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

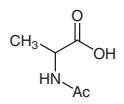
C1401 	F0863 	F0862 	P0326 	P0820 
P1288 	H0758 	H1389 	L0157 	L0147 
F0201 	N0905 	I0256 	K0016 	L0010 
A0323 	D1817 	N0665 	N0646 	N0772 
N0773 	N0683 	N0420 	N0302 	N0327 
N0303 	N0304 	N0673 	N0686 	O0440 
P0025 	P0147 	P1370 	P2085 	A2480 
P0180 	P0179 	T0954 	T0787 	

N-Protected Amino Acids

Ac-Amino Acids

Product No.	Product Name	Unit Size		
A0072	Ac-DL-Ala-OH			10g
A0730	Ac-DL-Cys(Bzl)-OH			1g
A0740	Ac-D-Cys(Bzl)-OH			100mg
A0905	Ac-Cys-OH		25g	250g
P0607	Ac-DL-Cys(Ph)-OH			5g
A0014	α-Acetamidocinnamic Acid			25g
A0853	*N*-Acetyl-DL-2-aminobutyric Acid		5g	25g
A0078	*N*-Acetylanthranilic Acid			25g
A0087	*N*-Acetyl-3,5-diiodo-L-tyrosine			100mg
A0784	Ac-Gln-OH			25g
A0693	Ac-Glu-OH		25g	250g
A0094	Ac-Gly-OEt		1g	25g
A0093	Ac-Gly-OH	25g	100g	500g
A0698	Ac-DL-His-OH Monohydrate		1g	5g
A0873	Ac-His-OH Monohydrate		1g	25g
A2265	Ac-Hyp-OH (*cis*- and *trans*- mixture)		5g	25g
A0097	Ac-DL-Leu-OH		5g	25g
A0713	Ac-D-Leu-OH			1g
A0098	Ac-Leu-OH		5g	25g
A2171	Ac-Lys-OH		1g	5g
A0100	Ac-DL-Met-OH		25g	500g
A2056	Ac-Met-OH			25g
A0750	Ac-DL-Nle-OH		1g	25g
A0105	Ac-D-Phe-OH		1g	5g
A1541	Ac-Phe-OH		5g	25g
A0122	Ac-Trp-OEt			1g
A0120	Ac-DL-Trp-OH		1g	25g
A0119	Ac-D-Trp-OH		1g	5g
A0121	Ac-Trp-OH		1g	25g
A0118	Ac-Tyr-OEt Monohydrate		1g	5g
A1409	Ac-Tyr-OH			25g
A0125	Ac-DL-Val-OH			25g
A0678	Ac-D-Val-OH			1g
A2366	Ac-Val-OH		5g	25g

A0072



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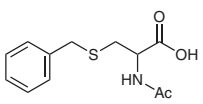

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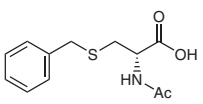

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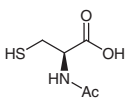

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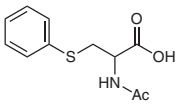

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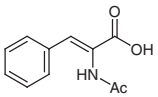

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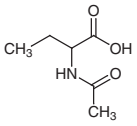

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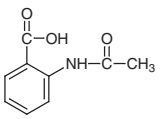

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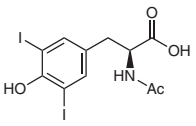

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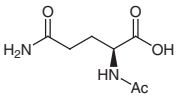

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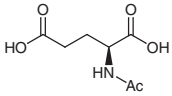

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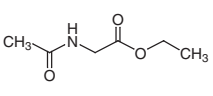

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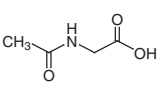

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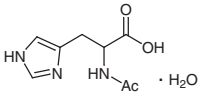

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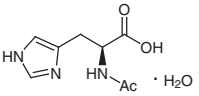
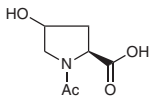
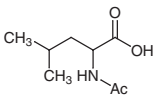
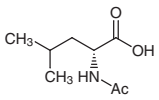
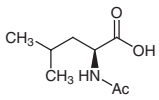
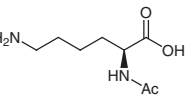
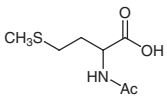
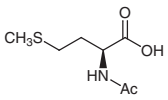
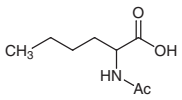
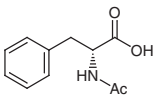
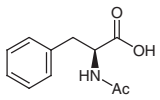
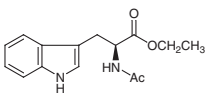
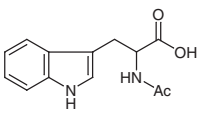
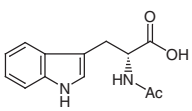
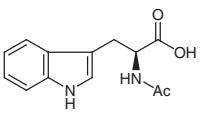
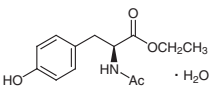
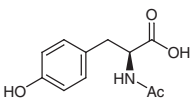
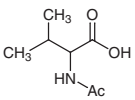
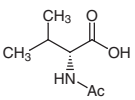
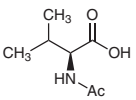


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2265 	A0097 	A0713 	A0098 	A2171 
A0100 	A2056 	A0750 	A0105 	A1541 
A0122 	A0120 	A0119 	A0121 	A0118 
A1409 	A0125 	A0678 	A2366 	

Boc-Amino Acids

Product No.	Product Name	Unit Size	
B4292	Boc-7-Ahp-OH	1g	5g
B3323	Boc-Aib-OH	5g	25g
B4044	Boc-Ala(3-I)-OMe	1g	5g
B4282	Boc-DL-Ala-OH	5g	25g
B2175	Boc-D-Ala-OH	5g	25g
B1184	Boc-Ala-OH	5g	25g
B2176	Boc-β-Ala-OH	5g	25g
B2204	Boc-D-Arg-OH・HCl Monohydrate	1g	5g
B1626	Boc-Arg-OH・HCl Monohydrate	5g	25g
B1497	Boc-Arg-*p*NA・HCl		100mg
B3766	Boc-Arg(Tos)-OH		5g
B2964	Boc-D-Asn-OH	5g	25g
B1627	Boc-Asn-OH		10g
B3915	Boc-Asn-ONp		5g
B3789	Boc-Asn(Trt)-OH	5g	25g
B3935	Boc-Asp(O*t*Bu)-OH	1g	5g
B1628	Boc-Asp(OBzl)-OH	5g	25g
B2965	Boc-D-Asp-OH		5g
B2270	Boc-Asp-OH		5g
B3540	1-Boc-azetidine-3-carboxylic Acid	1g	5g
B2293	Boc-(Boc-3-aminopropyl)Gly-OH		200mg
B3839	Boc-Chg-OH	1g	5g
B3831	*N*-Boc-cycloleucine	1g	5g
A2553	Boc-Cys(Acm)-OH		5g
B1666	Boc-Cys(Bzl)-OH		5g
A2515	Boc-Dab-OH	1g	5g
A2470	Boc-Dap-OH	1g	5g
B4202	*N*-Boc-4,4-difluoro-L-proline	200mg	1g
B3178	*N*-Boc-*cis*-4-fluoro-L-proline	200mg	1g
B3177	*N*-Boc-*trans*-4-fluoro-L-proline	200mg	1g

Product No.	Product Name	Unit Size	
B4291	Boc-GABA-OH	5g	25g
B1649	Boc-Gln-OH	10g	25g
B1864	Boc-Glu-OBzl	5g	25g
B1633	Boc-Glu(OBzl)-OH	5g	25g
B2987	Boc-D-Glu-OH	5g	25g
B2177	Boc-Glu-OH		25g
B4156	Boc-Gly-O*t*Bu	1g	5g
B1185	Boc-Gly-OH	5g	25g
B3975	Boc-Gly-OMe	5g	25g
B1634	Boc-His-OH	5g	25g
B2066	Boc-His(Tos)-OH	5g	25g
B1635	Boc-Hyp-OH		5g
B3987	Boc-*cis*-Hyp-OMe	1g	5g
B3843	Boc-Hyp-OMe	1g	5g
B1186	Boc-Ile-OH Hemihydrate	5g	25g
B3007	Boc-D-Leu-OH Hydrate	5g	25g
B1187	Boc-Leu-OH Monohydrate	5g	25g
B2178	Boc-Lys(Boc)-OH・DCHA	5g	25g
B3083	Boc-D-Lys-OH	1g	5g
B1669	Boc-Lys-OH		5g
B1632	Boc-Lys(Z)-OH	5g	25g
B3650	Boc-*N*-Me-D-Ala-OH	1g	5g
B3651	Boc-*N*-Me-Ala-OH	5g	25g
B2967	Boc-D-Met-OH	5g	25g
B1636	Boc-Met-OH		10g
B3433	Boc-Met-OSu		5g
B3615	*N*-Boc-3-(1-naphthyl)-D-alanine	1g	5g
B3616	*N*-Boc-3-(2-naphthyl)-D-alanine	1g	5g
B3617	*N*-Boc-3-(2-naphthyl)-L-alanine	1g	5g
B3376	1-Boc-nipecotic Acid	5g	25g
B2253	Boc-Orn(Z)-OH	5g	25g
B4141	*N*-Boc-4-oxo-L-proline	1g	5g
B3945	Boc-D-Phe(4-Br)-OH	1g	5g
B3613	Boc-D-Phe(4-Cl)-OH	1g	5g
B3614	Boc-Phe(4-Cl)-OH	1g	5g
B4367	Boc-Phe(3-F)-OH	1g	5g
B3303	Boc-D-Phe(4-F)-OH	1g	5g
B3304	Boc-Phe(4-F)-OH	1g	5g
B3626	Boc-D-Phe(3,4-F)-OH	1g	5g
B3627	Boc-Phe(3,4-F)-OH		1g
A2130	Boc-D-Phe(4-NH_2)-OH	1g	5g
A2131	Boc-Phe(4-NH_2)-OH	1g	5g
B3668	Boc-D-Phe(4-NO_2)-OH	1g	5g
B2232	Boc-Phe(4-NO_2)-OH	1g	5g
B2989	Boc-D-Phe-OH	5g	25g
B1332	Boc-Phe-OH	5g	25g
B4259	Boc-Phe-OMe	5g	25g
B3230	Boc-D-Phg-OH	1g	5g
B3211	Boc-Phg-OH	5g	25g
B4011	*N*-Boc-2-phosphonoglycine Trimethyl Ester	1g	5g
B3644	Boc-DL-Pip-OH	5g	25g
B3700	Boc-Pip-OH	1g	5g
B2977	Boc-D-Pro-OH	5g	25g
B1188	Boc-Pro-OH	5g	25g
B3414	Boc-D-Pro-OSu	1g	5g
B4007	Boc-propargyl-Gly-OH		1g
B4293	Boc-3-(2-pyridyl)-Ala-OH	1g	5g
B4324	Boc-3-(3-pyridyl)-Ala-OH	1g	5g
E0940	Boc-D-Pyr-OEt	1g	5g
B4083	Boc-Pyr-OH	5g	25g
B1863	Boc-D-Ser(Bzl)-OH	1g	5g
B1629	Boc-Ser(Bzl)-OH		5g
B2205	Boc-Ser(Bzl)-OSu	1g	5g
B2258	Boc-D-Ser-OH	1g	5g
B1637	Boc-Ser-OH	5g	25g
B2073	Boc-Ser-OMe	5g	25g
B1630	Boc-Thr(Bzl)-OH		5g
B2990	Boc-D-Thr-OH		5g

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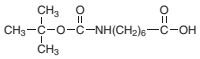
Product No.	Product Name	Unit Size	
B1638	Boc-Thr-OH		10g
B3995	Boc-D-Tle-OH	1g	5g
B3754	Boc-Tle-OH	5g	25g
B2260	Boc-Trp(For)-OH		5g
B2259	Boc-D-Trp-OH	1g	5g
B1639	Boc-Trp-OH		25g
B3435	Boc-Trp-OSu		5g
B3485	Boc-Tyr(*t*Bu)-OH	1g	5g
B1631	Boc-Tyr(Bzl)-OH	5g	25g
B2963	Boc-D-Tyr-OH	1g	5g
B1640	Boc-Tyr-OH	10g	25g
B2005	Boc-Tyr-OMe	5g	25g
B2991	Boc-D-Val-OH	5g	25g
B1333	Boc-Val-OH	5g	25g
C2535	4-Cyclohexyl *N*-Boc-L-aspartate	5g	25g
B2179	5-Cyclohexyl *N*-Boc-L-glutamate		5g

B4292



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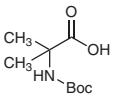

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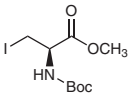

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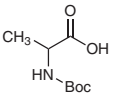

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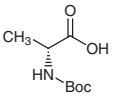

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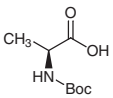

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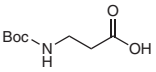

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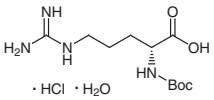

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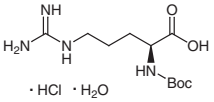

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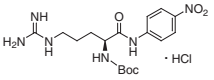

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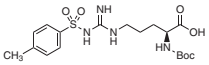

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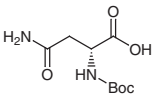

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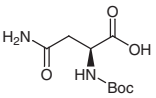

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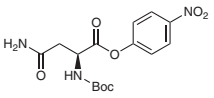

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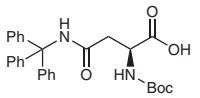

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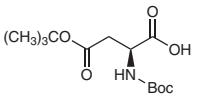

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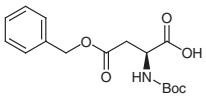

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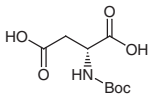

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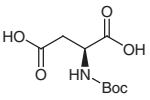

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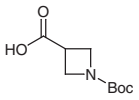

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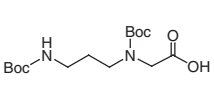

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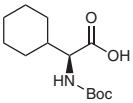

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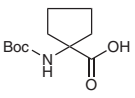

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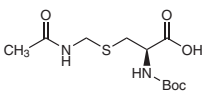

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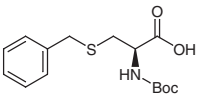
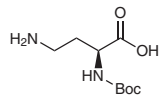
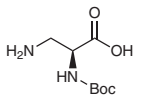
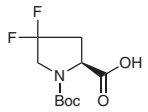
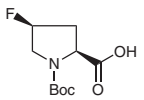
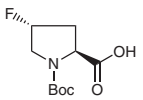
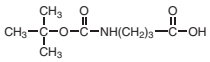
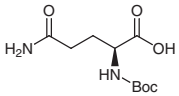
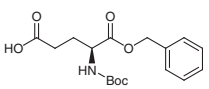
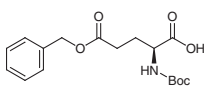
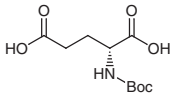
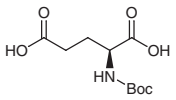
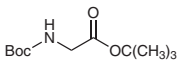
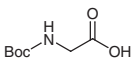
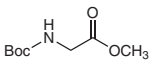
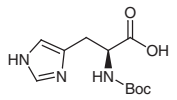
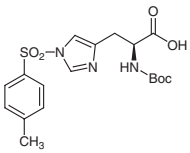
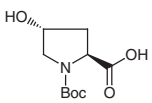
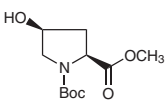
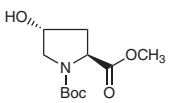
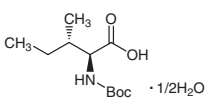
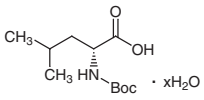
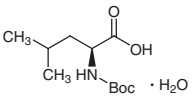
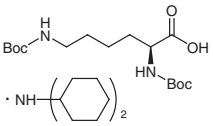
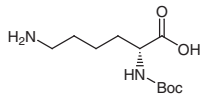
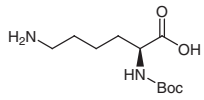
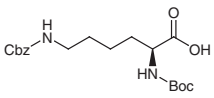
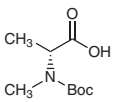
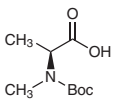
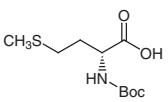
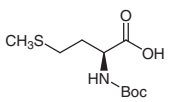
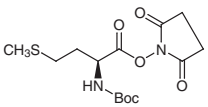
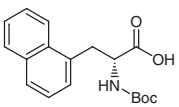
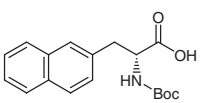
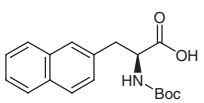
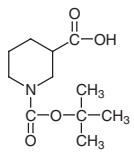
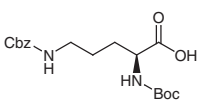
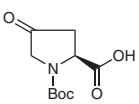
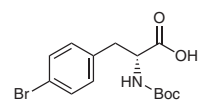
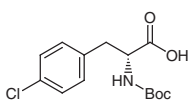
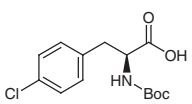
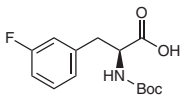
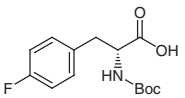
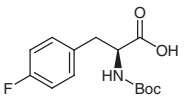
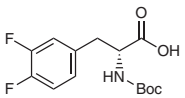
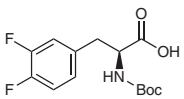
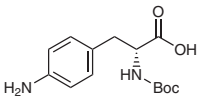
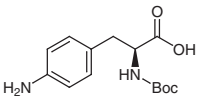
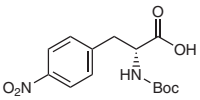
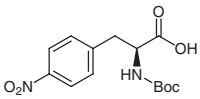
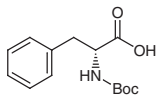
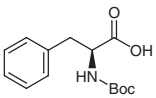
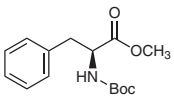
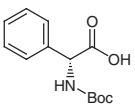
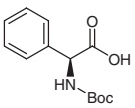
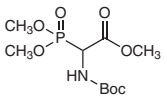
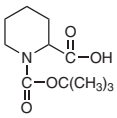
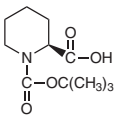
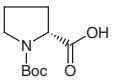
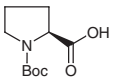
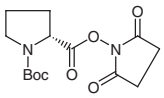
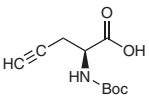
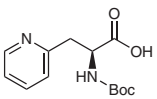
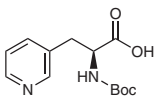
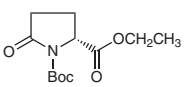
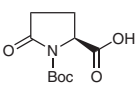
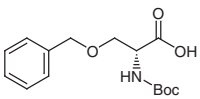
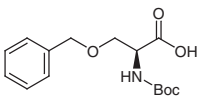
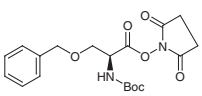
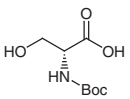
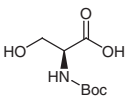
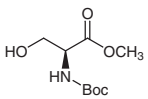
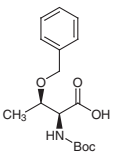
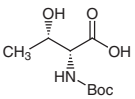
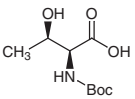
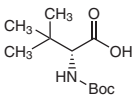
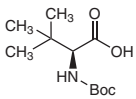
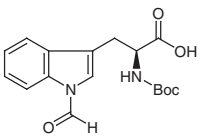
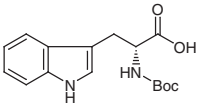
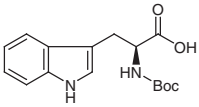
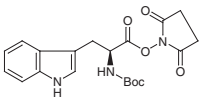


A2515 	A2470 	B4202 	B3178 	B3177 
B4291 	B1649 	B1864 	B1633 	B2987 
B2177 	B4156 	B1185 	B3975 	B1634 
B2066 	B1635 	B3987 	B3843 	B1186 
B3007 	B1187 	B2178 	B3083 	B1669 
B1632 	B3650 	B3651 	B2967 	B1636 
B3433 	B3615 	B3616 	B3617 	B3376 
B2253 	B4141 	B3945 	B3613 	B3614 

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

B4367 	B3303 	B3304 	B3626 	B3627 
A2130 	A2131 	B3668 	B2232 	B2989 
B1332 	B4259 	B3230 	B3211 	B4011 
B3644 	B3700 	B2977 	B1188 	B3414 
B4007 	B4293 	B4324 	E0940 	B4083 
B1863 	B1629 	B2205 	B2258 	B1637 
B2073 	B1630 	B2990 	B1638 	B3995 
B3754 	B2260 	B2259 	B1639 	B3435 

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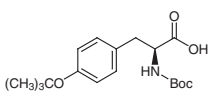

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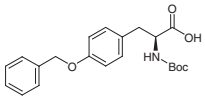

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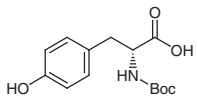

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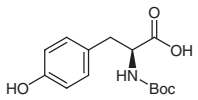

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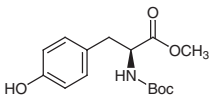

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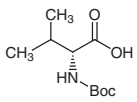

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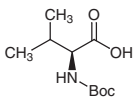

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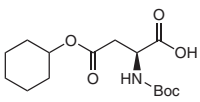

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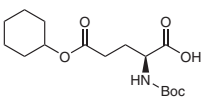
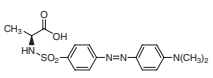


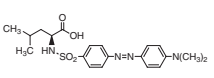
Dbs-Amino Acids

Product No.	Product Name	Unit Size
D1454	Dbs-Ala-OH	100mg
D1456	Dbs-Leu-OH	100mg
D1457	Dbs-Met-OH	100mg
D1458	Dbs-Pro-OH	100mg
D1459	Dbs-Trp-OH	100mg
D1460	Dbs-Val-OH	100mg

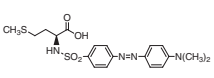
D1454



D1456



D1457



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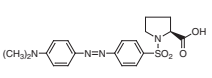

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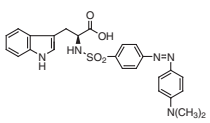

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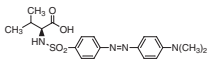
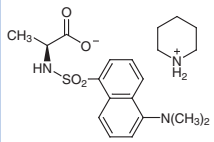


Dns-Amino Acids

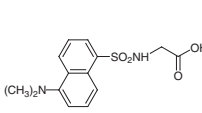
Product No.	Product Name	Unit Size	
D1496	Dns-Ala-OH・Piperidinium		1g
D1501	Dns-Gly-OH	1g	5g
D1497	Dns-Ile-OH	100mg	1g
D1498	Dns-Leu-OH		1g
D1500	Dns-Phe-OH	1g	5g
D1502	Dns-Pro-OH・Piperidinium	1g	5g
D1503	Dns-Ser-OH・Piperidinium		1g
D1504	Dns-Thr-OH・Piperidinium		1g
D1505	Dns-Val-OH		1g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

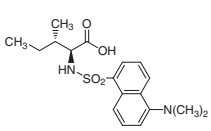
D1496



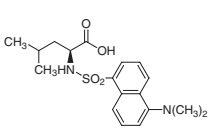
D1501



D1497



D1498



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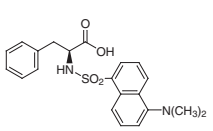
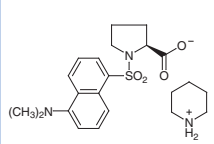
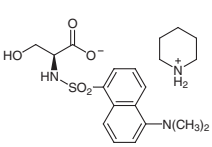


D1502



D1503



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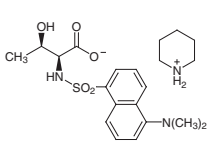
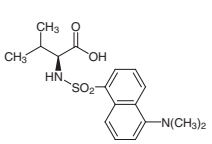


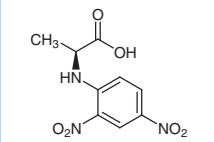
D1505



Dnp-Amino Acids

Product No.	Product Name	Unit Size	
D1031	Dnp-Ala-OH		1g
D2135	Dnp-Ala-OMe		1g
D1040	Dnp-Arg-OH		1g
D1032	Dnp-Gly-OH	100mg	1g
D1033	Dnp-Leu-OH	100mg	1g
D1051	Dnp-Lys(Dnp)-OH	100mg	1g
D1034	Dnp-Met-OH・DCHA		1g
D1035	Dnp-Phe-OH	100mg	1g
D1036	Dnp-Pro-OH	100mg	1g
D1037	Dnp-Ser-OH	100mg	1g
D1039	Dnp-DL-Thr-OH		100mg
D1043	Dnp-Val-OH	100mg	1g

D1031



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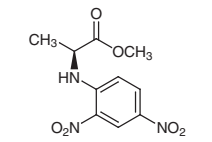

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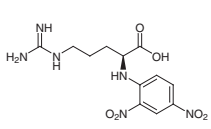

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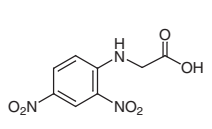

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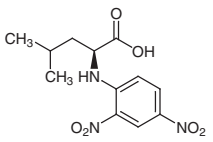

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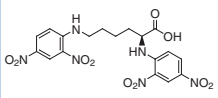

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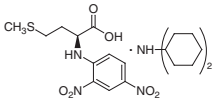

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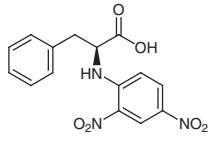

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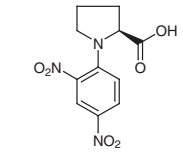

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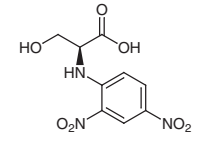

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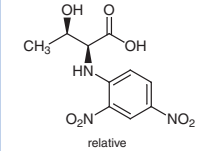

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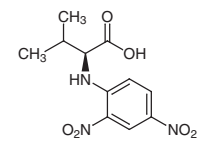
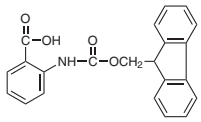
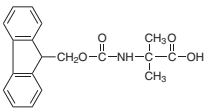
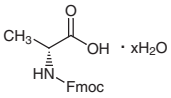
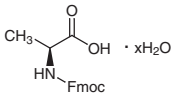
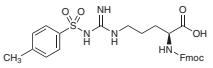
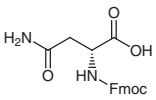
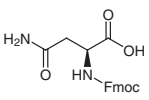
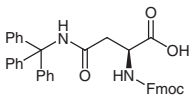
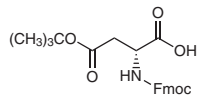
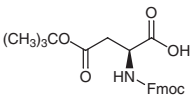
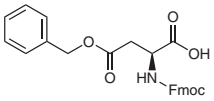
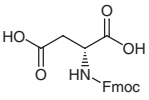
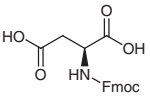
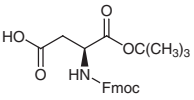
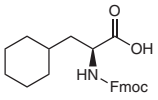
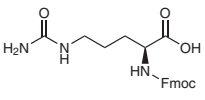
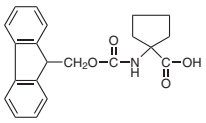
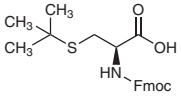
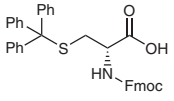
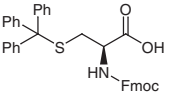
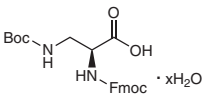
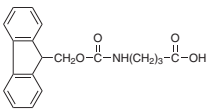
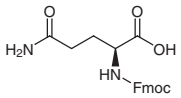
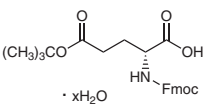
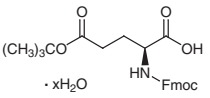
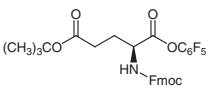
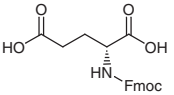
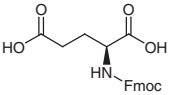
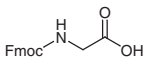
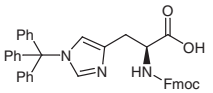
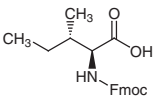
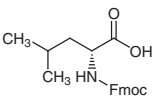
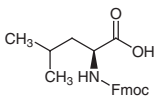
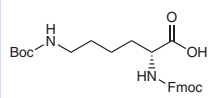
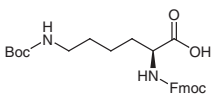
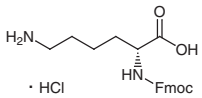
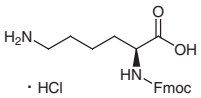
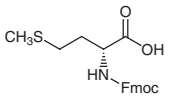
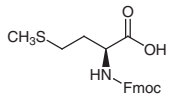
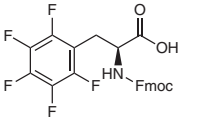


Fmoc-Amino Acids

Product No.	Product Name	Unit Size	
F0923	Fmoc-2-Abz-OH		5g
F0888	Fmoc-Aib-OH		5g
F0596	Fmoc-D-Ala-OH Hydrate	5g	25g
F0305	Fmoc-Ala-OH Hydrate	5g	25g

Product No.	Product Name	Unit Size		
F0883	Fmoc-Arg(Tos)-OH		1g	5g
F0591	Fmoc-D-Asn-OH		1g	5g
F0306	Fmoc-Asn-OH	1g	5g	25g
F0508	Fmoc-Asn(Trt)-OH	1g	5g	25g
B4619	Fmoc-D-Asp(O*t*Bu)-OH		1g	5g
B3150	Fmoc-Asp(O*t*Bu)-OH		5g	25g
B3887	Fmoc-Asp(OBzl)-OH		5g	25g
F0592	Fmoc-D-Asp-OH		1g	5g
F0452	Fmoc-Asp-OH	1g	5g	25g
F0503	Fmoc-Asp(OH)-O*t*Bu		1g	5g
F0857	Fmoc-Cha-OH		1g	5g
F0626	N^{α}-Fmoc-L-citrulline		1g	5g
F0866	Fmoc-cycloleucine		1g	5g
F0972	Fmoc-Cys(*t*Bu)-OH		1g	5g
F0752	Fmoc-D-Cys(Trt)-OH		1g	5g
F0652	Fmoc-Cys(Trt)-OH		5g	25g
B4174	Fmoc-Dap(Boc)-OH Hydrate		1g	5g
F0911	Fmoc-GABA-OH		5g	25g
F0308	Fmoc-Gln-OH		1g	5g
B3669	Fmoc-D-Glu(O*t*Bu)-OH Hydrate		1g	5g
B3167	Fmoc-Glu(O*t*Bu)-OH Hydrate		5g	25g
B3318	Fmoc-Glu(O*t*Bu)-OPfp		1g	5g
F0600	Fmoc-D-Glu-OH		5g	25g
F0453	Fmoc-Glu-OH		1g	5g
F0293	Fmoc-Gly-OH		5g	25g
F0653	Fmoc-His(Trt)-OH		5g	25g
F0294	Fmoc-Ile-OH	1g	5g	25g
F0603	Fmoc-D-Leu-OH		1g	5g
F0295	Fmoc-Leu-OH	1g	5g	25g
B3071	Fmoc-D-Lys(Boc)-OH		1g	5g
B3072	Fmoc-Lys(Boc)-OH		5g	25g
F0604	Fmoc-D-Lys-OH・HCl		1g	5g
F0586	Fmoc-Lys-OH・HCl		1g	5g
F0594	Fmoc-D-Met-OH		1g	5g
F0296	Fmoc-Met-OH	1g	5g	25g
F0900	*N*-Fmoc-pentafluoro-L-phenylalanine		200mg	1g
F0902	Fmoc-Phe(4-F)-OH		1g	5g
F0443	Fmoc-Phe(4-NO_2)-OH		1g	5g
F0605	Fmoc-D-Phe-OH		5g	25g
F0297	Fmoc-Phe-OH		5g	25g
F0669	Fmoc-Phg-OH		1g	5g
F0606	Fmoc-D-Pro-OH			5g
F0298	Fmoc-Pro-OH	1g	5g	25g
F0927	Fmoc-3-(4-pyridyl)-Ala-OH		1g	5g
B3168	Fmoc-Ser(*t*Bu)-OH		5g	25g
A1833	Fmoc-Ser[$GalN_3$[46Bzd]-α]-O*t*Bu			100mg
F0516	Fmoc-Ser-O*t*Bu		1g	5g
F0607	Fmoc-D-Ser-OH		1g	5g
F0454	Fmoc-Ser-OH Hydrate		1g	5g
F0505	Fmoc-Thr(*t*Bu)-OH	1g	5g	25g
A1832	Fmoc-Thr[$GalN_3$[46Bzd]-α]-O*t*Bu			100mg
F0517	Fmoc-Thr-O*t*Bu		1g	5g
F0608	Fmoc-D-Thr-OH		1g	5g
F0455	Fmoc-Thr-OH Monohydrate	1g	5g	25g
F0507	Fmoc-Trp(Boc)-OH		5g	25g
F0609	Fmoc-D-Trp-OH		5g	25g
F0307	Fmoc-Trp-OH	1g	5g	25g
F0772	Fmoc-D-Tyr(*t*Bu)-OH		1g	5g
F0506	Fmoc-Tyr(*t*Bu)-OH	1g	5g	25g
F0456	Fmoc-Tyr-OH		1g	5g
F0610	Fmoc-D-Val-OH		5g	25g
F0299	Fmoc-Val-OH		5g	25g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

F0923 	F0888 	F0596 	F0305 	F0883 
F0591 	F0306 	F0508 	B4619 	B3150 
B3887 	F0592 	F0452 	F0503 	F0857 
F0626 	F0866 	F0972 	F0752 	F0652 
B4174 	F0911 	F0308 	B3669 	B3167 
B3318 	F0600 	F0453 	F0293 	F0653 
F0294 	F0603 	F0295 	B3071 	B3072 
F0604 	F0586 	F0594 	F0296 	F0900 

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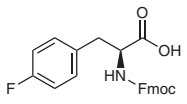

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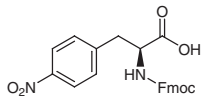

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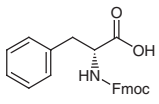

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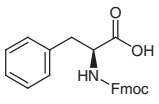

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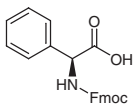

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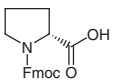

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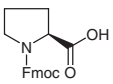

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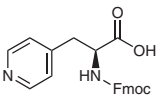

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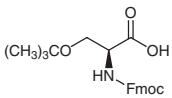

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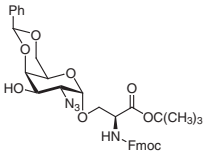

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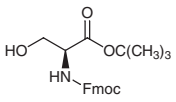

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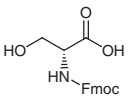

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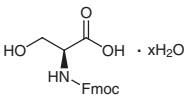

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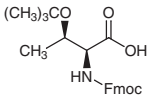

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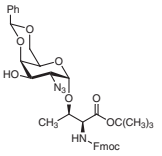

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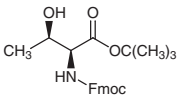

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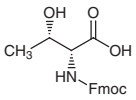

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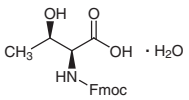

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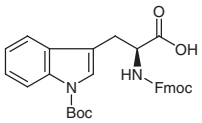

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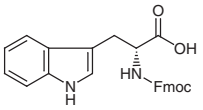

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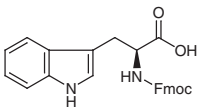

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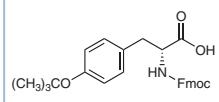

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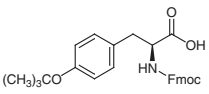

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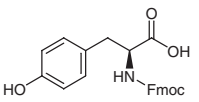

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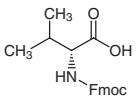

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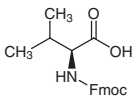
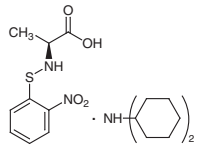
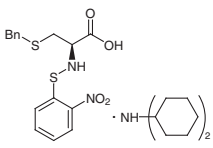
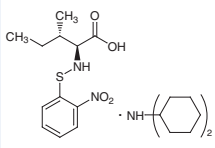
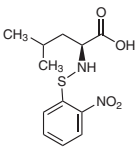
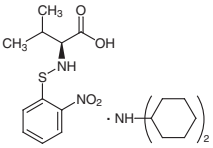


Nps-Amino Acids

Product No.	Product Name	Unit Size	
N0414	Nps-Ala-OH・DCHA		1g
N0361	Nps-Cys(Bzl)-OH・DCHA	1g	5g
N0240	Nps-Ile-OH・DCHA		1g
N0415	Nps-Leu-OH		1g
N0164	Nps-Val-OH・DCHA		5g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

N0414	N0361	N0240	N0415	N0164
				

PTH-Amino Acids

Product No.	Product Name	Unit Size	
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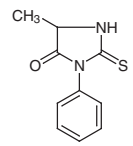
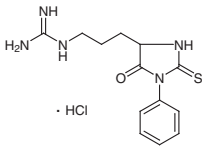
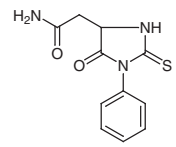
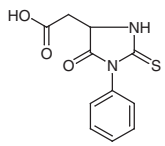
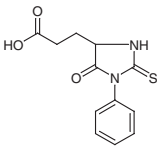
P0731	PTH-arginine Hydrochloride		100mg
P0732	PTH-asparagine		Price on request
P0364	PTH-aspartic Acid	100mg	1g
P0375	PTH-glutamic Acid	100mg	1g
P0376	PTH-glycine	100mg	1g
P0365	PTH-isoleucine (contains PTH-alloisoleucine)		100mg
P0377	PTH-leucine	100mg	1g
P0366	PTH-methionine	100mg	1g
P0756	PTH-norleucine		100mg
P0367	PTH-phenylalanine	100mg	1g
P0729	PTH-proline	100mg	1g
P0625	PTH-(N^{ε}-PTC)-lysine	100mg	1g
P0370	PTH-Δ-threonine	100mg	1g
P0378	PTH-tryptophan	100mg	1g
P0368	PTH-tyrosine	100mg	1g
P0379	PTH-valine		100mg

P0374	P0731	P0732	P0364	P0375
				
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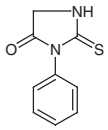	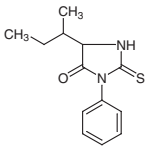	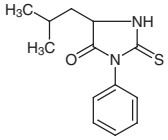	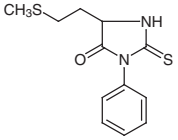	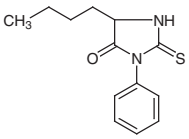
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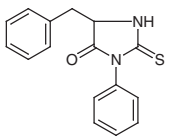	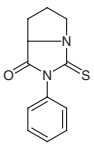	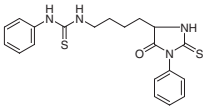	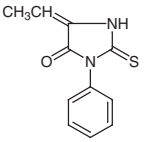	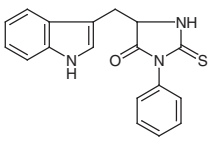
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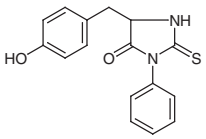
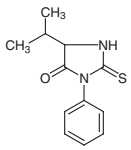
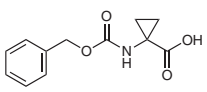
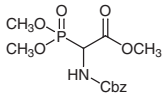
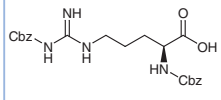
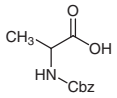
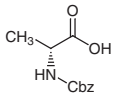
				

Z-Amino Acids

Product No.	Product Name	Unit Size		
C2680	1-(Cbz-amino)cyclopropanecarboxylic Acid		1g	5g
C2440	*N*-Cbz-2-phosphonoglycine Trimethyl Ester		1g	5g
D1179	α,ω-Di-Z-Arg-OH			1g
C0632	Z-DL-Ala-OH			10g
C0664	Z-D-Ala-OH	1g	5g	25g
C0633	Z-Ala-OH		10g	25g
C0640	Z-β-Ala-OH		1g	10g
C2131	Z-D-Arg-OH			5g
C0757	Z-Arg-OH		1g	25g
T0755	Z-Arg(Z)$_2$-OH			1g
C0661	Z-DL-Asn-OH		1g	10g
C0666	Z-D-Asn-OH	100mg	1g	5g
C0573	Z-Asn-OH		1g	10g
B3903	Z-Asp(OBzl)-OH		5g	25g
C0631	Z-DL-Asp-OH		1g	10g
C0689	Z-D-Asp-OH		1g	5g
C0629	Z-Asp-OH		5g	25g
C2614	Z-Cys(Bzl)-OH		5g	25g
D1197	(Z-Cys-OH)$_2$	1g	5g	25g
C2180	Z-Cys(Ph)-OH			25g
A2471	Z-Dap-OH		1g	5g
C0753	Z-GABA-OH		1g	25g
C0574	Z-Gln-OH		5g	25g
C1715	Z-Glu(O*t*Bu)-OH			5g
B4281	Z-D-Glu-OBzl			5g
B3989	Z-Glu-OBzl		5g	25g
B3902	Z-Glu(OBzl)-OH		5g	25g
C0663	Z-D-Glu-OH	100mg	5g	25g
C0734	Z-Glu-OH		25g	100g
M1961	Z-Glu-OMe		1g	5g
M2269	Z-Glu(OMe)-OH		5g	25g
C0575	Z-Gly-OH		25g	500g
C2838	Z-Gly-OMe		5g	25g
C0333	Z-Gly-ONp			1g
C2133	Z-D-His-OH		1g	5g
B0265	Z-His-OH	1g	5g	25g
C2681	Z-2-hydroxyglycine		1g	5g
C2506	Z-Hyp-OH		5g	25g
C1354	Z-Ile-OH		10g	25g
C0759	Z-Ile-OH・DCHA			1g
C0642	Z-DL-Leu-OH	1g	5g	25g
C0739	Z-Leu-OH		5g	25g
C2135	Z-D-Leu-OH・DCHA		1g	5g
C2353	Z-Leu-OSu			5g
B1862	Z-Lys(Boc)-OH		5g	25g
C2136	Z-D-Lys-OH		1g	5g
C1728	Z-Lys-OH			5g
C2848	Z-*N*-Me-Gly-OH		5g	25g
C2468	Z-*N*-Me-Phe-OH		1g	5g
C0630	Z-DL-Met-OH		1g	10g
C0665	Z-D-Met-OH	100mg	5g	25g
C0737	Z-Met-OH		5g	25g
C0760	Z-DL-Nle-OH			1g
C0752	Z-DL-Nva-OH		5g	25g
C0643	Z-DL-Phe-OH		10g	25g
C0662	Z-D-Phe-OH	1g	5g	25g
C0660	Z-Phe-OH		5g	25g
C2566	Z-D-Phg-OH		1g	5g
C2567	Z-Phg-OH		1g	5g
C2773	Z-D-Phg(4-OH)-OH		5g	25g
C1764	Z-Pro-O*t*Bu			5g
C1730	Z-D-Pro-OH		5g	25g
C0713	Z-Pro-OH		5g	25g
C1381	Z-Ser(*t*Bu)-OH		1g	5g
B1732	Z-Ser(*t*Bu)-OMe			5g
C2873	Z-Ser-OBzl		5g	25g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Product No.	Product Name	Unit Size
C0637	Z-DL-Ser-OH	10g
C2137	Z-D-Ser-OH	1g 5g
C0635	Z-Ser-OH	5g 25g
C1403	Z-Ser-OMe	5g 25g
C2285	Z-Thr-OBzl	5g
C2138	Z-D-Thr-OH	1g 5g
C1351	Z-Thr-OH	10g
C0641	Z-DL-Trp-OH	1g 5g
C2130	Z-D-Trp-OH	1g 5g
C0638	Z-Trp-OH	5g 25g
C2124	Z-D-Tyr-OH	1g 5g
C1729	Z-Tyr-OH	5g 25g
C0634	Z-DL-Val-OH	1g 10g
C2139	Z-D-Val-OH	5g 25g
C0761	Z-Val-OH	5g 25g
C2334	Z-Val-OSu	5g

C2680	C2440	D1179	C0632	C0664
				
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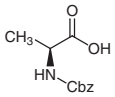	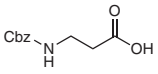	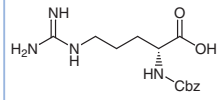	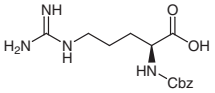	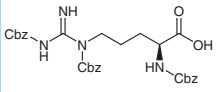
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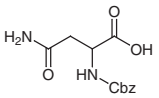	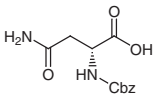	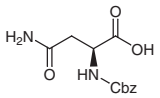	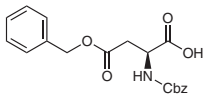	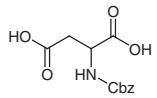
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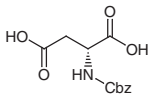	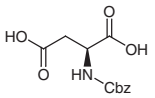	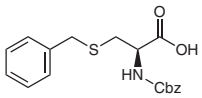	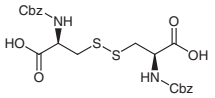	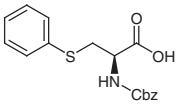
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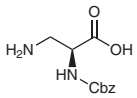
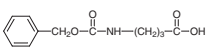
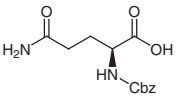
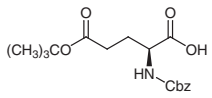
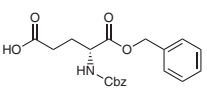
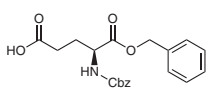
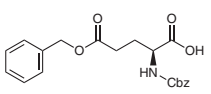
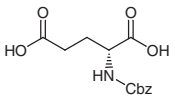
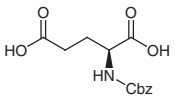
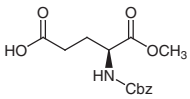
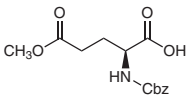
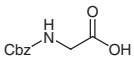
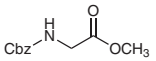
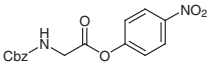
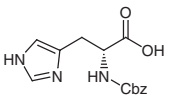
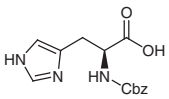
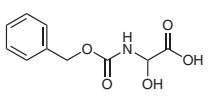
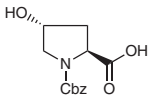
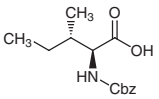
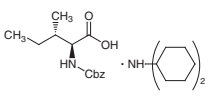
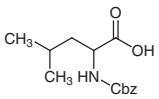
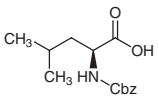
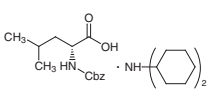
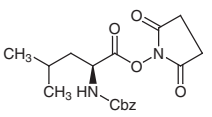
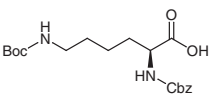
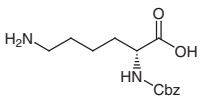
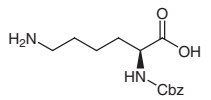
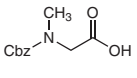
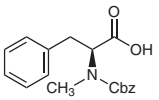
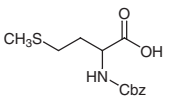
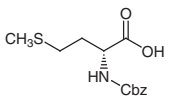
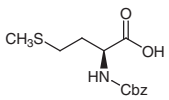
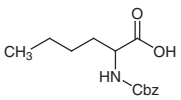
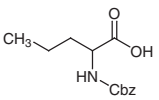
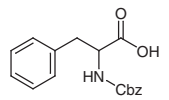
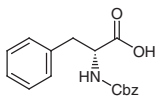
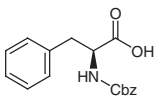
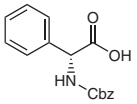
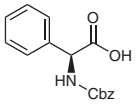
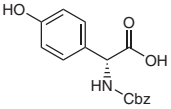
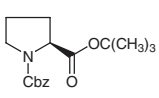
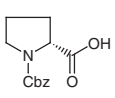
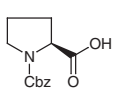
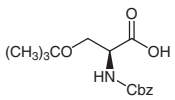
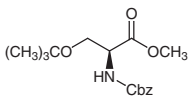
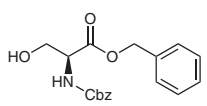
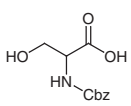
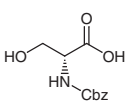
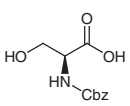
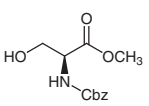
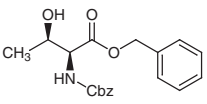
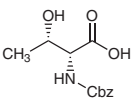
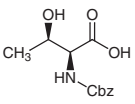
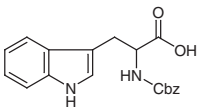
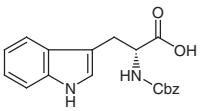
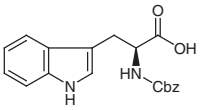
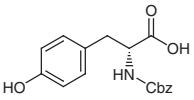
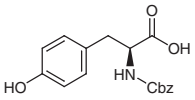
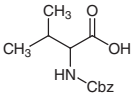
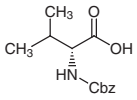
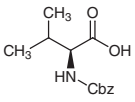
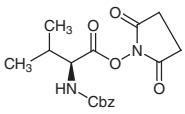
				

B3989 	B3902 	C0663 	C0734 	M1961 
M2269 	C0575 	C2838 	C0333 	C2133 
B0265 	C2681 	C2506 	C1354 	C0759 
C0642 	C0739 	C2135 	C2353 	B1862 
C2136 	C1728 	C2848 	C2468 	C0630 
C0665 	C0737 	C0760 	C0752 	C0643 
C0662 	C0660 	C2566 	C2567 	C2773 
C1764 	C1730 	C0713 	C1381 	B1732 

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

C2873 	C0637 	C2137 	C0635 	C1403 
C2285 	C2138 	C1351 	C0641 	C2130 
C0638 	C2124 	C1729 	C0634 	C2139 
C0761 	C2334 			

C-Protected Amino Acids

Amino Acid Methyl Esters

Product No.	Product Name	Unit Size		
B4044	Boc-Ala(3-I)-OMe		1g	5g
B3975	Boc-Gly-OMe		5g	25g
B3987	Boc-*cis*-Hyp-OMe		1g	5g
B3843	Boc-Hyp-OMe		1g	5g
B4259	Boc-Phe-OMe		5g	25g
B4011	*N*-Boc-2-phosphonoglycine Trimethyl Ester		1g	5g
C2440	*N*-Cbz-2-phosphonoglycine Trimethyl Ester		1g	5g
C2475	*N*-(2'-Cyanobiphenyl-4-ylmethyl)-L-valine Methyl Ester Hydrochloride			25g
M2351	Cycloleucine Methyl Ester Hydrochloride		1g	5g
A2446	H-DL-Ala-OMe・HCl		5g	25g
A2011	H-D-Ala-OMe・HCl		5g	25g
A1466	H-Ala-OMe・HCl		5g	25g
N0661	H-Arg(NO_2)-OMe・HCl		5g	25g
A2016	H-D-Arg-OMe・2HCl		1g	5g
A2017	H-Arg-OMe・2HCl		5g	25g
M1859	H-Asp-OMe		1g	5g
M2024	H-Asp(OMe)-OH・HCl		5g	25g
A1506	H-Asp(OMe)-OMe・HCl		5g	25g
A0997	H-Asp-Phe-OMe		1g	25g
C2174	H-D-Cys-OMe・HCl	1g	5g	25g
C0577	H-Cys-OMe・HCl	5g	25g	500g
B3670	H-Glu(O*t*Bu)-OMe・HCl		1g	5g
M1861	H-Glu-OMe		5g	25g
D3305	H-DL-Glu(OMe)-OMe・HCl		5g	25g
D3560	H-D-Glu(OMe)-OMe・HCl		5g	25g
D3353	H-Glu(OMe)-OMe・HCl		5g	25g
G0246	H-Gly-OMe・HCl		25g	500g
H1213	H-D-His-OMe・2HCl		1g	5g

Product No.	Product Name	Unit Size	
H0977	H-His-OMe · 2HCl	5g	25g
I0522	H-Ile-OMe · HCl	1g	5g
L0198	H-D-Leu-OMe · HCl	1g	5g
L0155	H-Leu-OMe · HCl		25g
L0201	H-D-Lys-OMe · 2HCl	5g	25g
L0202	H-Lys-OMe · 2HCl	5g	25g
M0853	H-Met-OMe · HCl	5g	25g
P1725	H-D-Phe-OMe · HCl	5g	25g
P1278	H-Phe-OMe · HCl		25g
P1730	H-D-Pro-OMe · HCl	1g	5g
P0342	H-Pro-OMe · HCl	5g	25g
M2198	H-Pyr-OMe	25g	100g
B1736	H-Ser(*t*Bu)-OMe · HCl		5g
B1450	H-Ser(Bzl)-OMe · HCl	1g	5g
S0576	H-DL-Ser-OMe · HCl	5g	25g
B0267	H-Ser-OMe · HCl	5g	25g
L0255	H-Tle-OMe	200mg	1g
L0188	H-Tle-OMe · HCl	1g 5g	25g
T2442	H-D-Trp-OMe · HCl	5g	25g
T1657	H-Trp-OMe · HCl	5g	25g
T2736	H-Tyr-OMe	5g	25g
T1108	H-Tyr-OMe · HCl	5g	25g
V0094	H-D-Val-OMe · HCl	1g	5g
V0056	H-Val-OMe · HCl	5g	25g
A0893	Methyl DL-2-Aminobutyrate Hydrochloride	5g	25g
M2521	Methyl Azetidine-3-carboxylate Hydrochloride	1g	5g
T0330	Tos-Arg-OMe · HCl	1g	25g
T2500	Trt-DL-Ser-OMe	5g	25g
T2870	Trt-Ser-OMe	5g	25g
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C2838	Z-Gly-OMe	5g	25g

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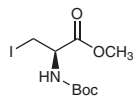

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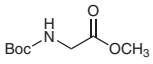

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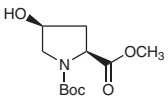

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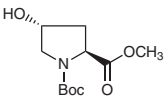

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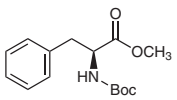

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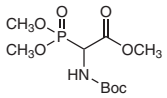

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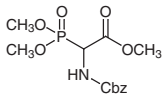

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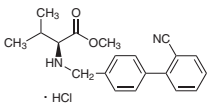

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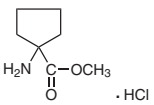

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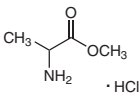

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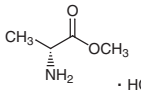

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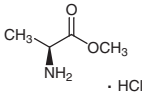

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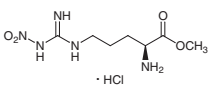

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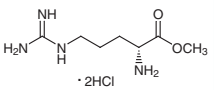

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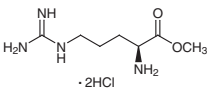

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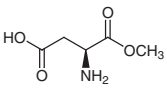

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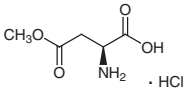

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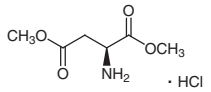

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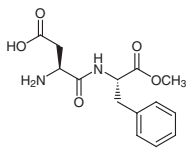

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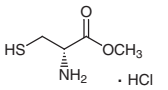
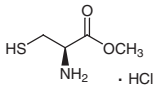
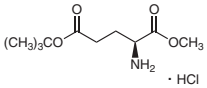
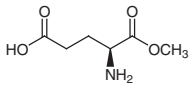
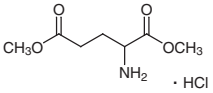
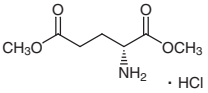
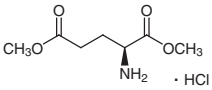
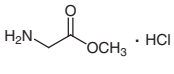
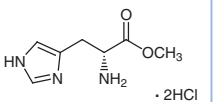
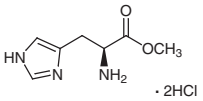
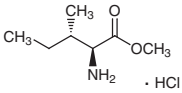
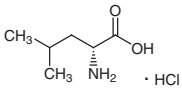
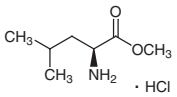
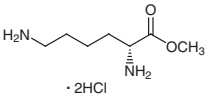
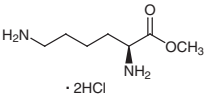
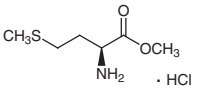
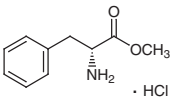
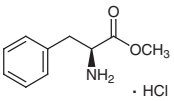
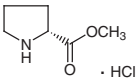
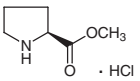
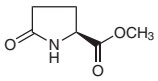
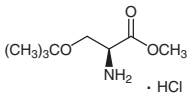
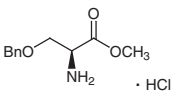
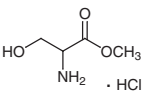
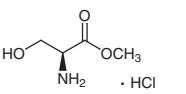
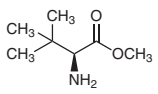
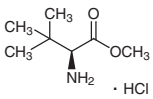
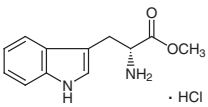
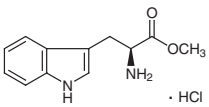
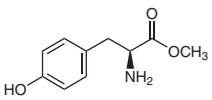
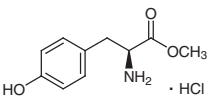
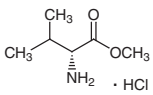
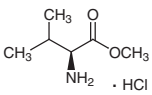
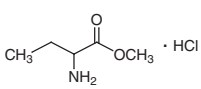
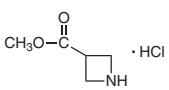
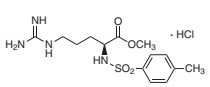
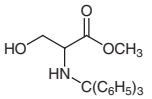
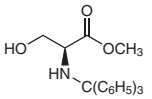
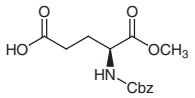
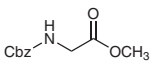


Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

C0577 	B3670 	M1861 	D3305 	D3560 
D3353 	G0246 	H1213 	H0977 	I0522 
L0198 	L0155 	L0201 	L0202 	M0853 
P1725 	P1278 	P1730 	P0342 	M2198 
B1736 	B1450 	S0576 	B0267 	L0255 
L0188 	T2442 	T1657 	T2736 	T1108 
V0094 	V0056 	A0893 	M2521 	T0330 
T2500 	T2870 	M1961 	C2838 	

Amino Acid Ethyl Esters

Product No.	Product Name	Unit Size	
A1240	4-Abz-Glu(OEt)-OEt		25g
A0094	Ac-Gly-OEt	1g	25g
A0122	Ac-Trp-OEt		1g
A0118	Ac-Tyr-OEt Monohydrate	1g	5g
E0940	Boc-D-Pyr-OEt	1g	5g
B0853	Bz-Arg-OEt・HCl	5g	25g
B2273	Bzl-Gly-OEt	5g	25g
B1140	Bz-Tyr-OEt	1g	5g
D3165	Di-Bzl-Gly-OEt	5g	25g
D0726	Di-Me-Gly-OEt	25g	500g
E0924	Ethyl 4-Aminobutyrate Hydrochloride	5g	25g
E0937	Ethyl 1-Aminocyclopropanecarboxylate Hydrochloride	1g	5g
E0469	Et-D-Pro-OEt	1g	5g
E0450	Et-Pro-OEt	1g	5g
F0421	For-Gly-OEt		25g
A2494	H-Ala-OEt・HCl	5g	25g
C0996	H-Cys-OEt・HCl	25g	500g
G0179	H-Glu(OEt)-OEt・HCl		25g
G0102	H-Gly-OEt・HCl	25g	500g
L0123	H-Leu-OEt・HCl	25g	250g
T0754	H-DL-Trp-OEt・HCl		5g
T2981	H-Trp-OEt・HCl	5g	25g
T0551	H-Tyr-OEt	1g	5g
T0982	H-Tyr-OEt・HCl		25g
S0841	Me-Gly-OEt・HCl	5g	25g
N0898	L-Norvaline Ethyl Ester Hydrochloride	5g	25g
P1781	*N*-Phenylglycine Ethyl Ester	5g	25g
P1194	*N*-(2-Pyridylmethyl)glycine Ethyl Ester	1g	5g

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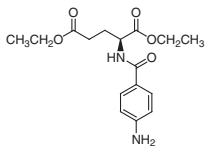

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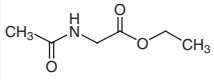

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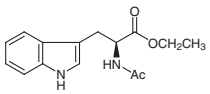

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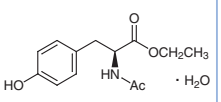

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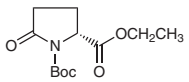

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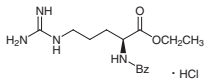

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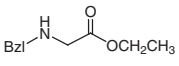

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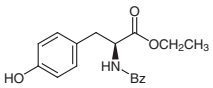

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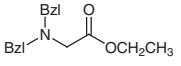

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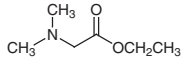

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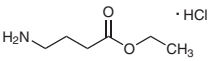

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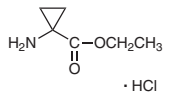

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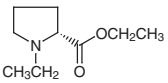

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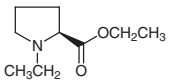

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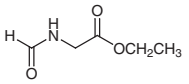

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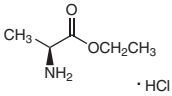

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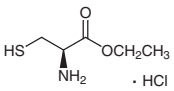

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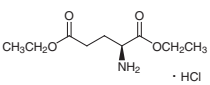

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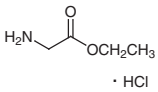

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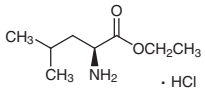
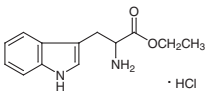


Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

T0754



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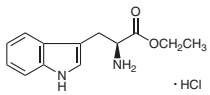
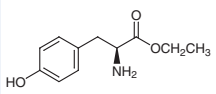


T0551



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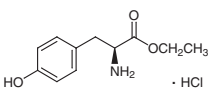

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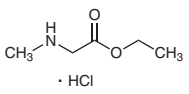

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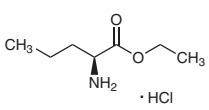

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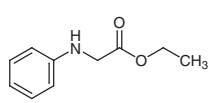

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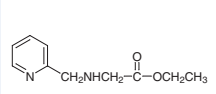

Amino Acid *tert*-Butyl Esters

Product No.	Product Name	Unit Size	
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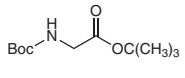
F0503	Fmoc-Asp(OH)-O*t*Bu	1g	5g
F0516	Fmoc-Ser-O*t*Bu	1g	5g
F0517	Fmoc-Thr-O*t*Bu	1g	5g
A2009	H-D-Ala-O*t*Bu・HCl	1g	5g
A2010	H-Ala-O*t*Bu・HCl	1g	5g
D4422	H-Asp(O*t*Bu)-O*t*Bu・HCl	5g	25g
G0254	H-Gly-O*t*Bu・HCl	1g	5g 25g
I0685	H-Ile-O*t*Bu・HCl	1g	5g
L0196	H-D-Leu-O*t*Bu・HCl	1g	5g
L0197	H-Leu-O*t*Bu・HCl	1g	5g
P1728	H-D-Pro-O*t*Bu・HCl	1g	5g
P1729	H-Pro-O*t*Bu・HCl	5g	25g
B4026	H-Pyr-O*t*Bu	1g	5g
B3340	H-Thr(*t*Bu)-O*t*Bu	5g	25g
T2435	H-Thr-O*t*Bu・HCl	1g	5g
T2446	H-Tyr-O*t*Bu	5g	25g
V0097	H-Val-O*t*Bu・HCl		5g
C1764	Z-Pro-O*t*Bu		5g

B4156



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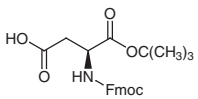

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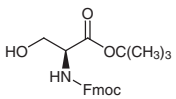

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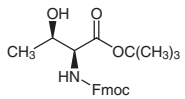

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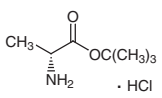

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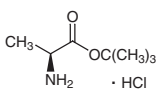

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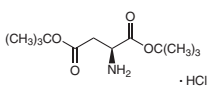

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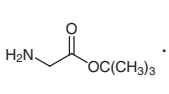

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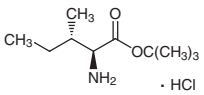

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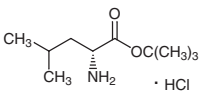

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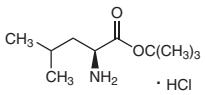

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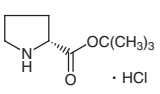

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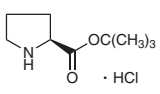

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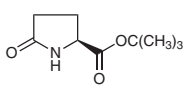

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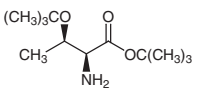

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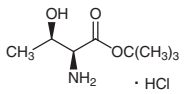	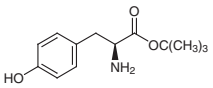	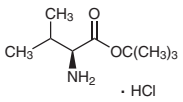	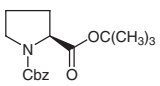

Amino Acid Benzyl Esters

Product No.	Product Name		Unit Size	
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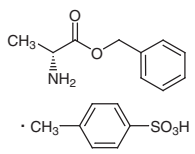
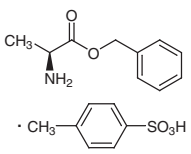
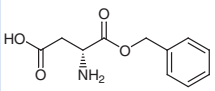
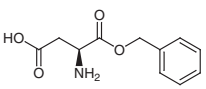
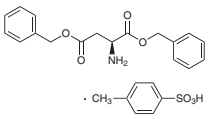
A2005	H-Ala-OBzl・Tos-OH		5g	25g
B2993	H-D-Asp-OBzl		1g	5g
B2994	H-Asp-OBzl		1g	5g
C2711	H-Asp(OBzl)-OBzl・Tos-OH		5g	25g
B3209	H-Asp(OBzl)-OH			5g
B2995	H-D-Glu-OBzl		1g	5g
B2996	H-Glu-OBzl		1g	5g
B0266	H-Gly-OBzl・Tos-OH			25g
L0194	H-D-Leu-OBzl・Tos-OH			5g
L0195	H-Leu-OBzl・Tos-OH		5g	25g
P1718	H-Phe-OBzl・HCl		5g	25g
P1722	H-D-Phe-OBzl・Tos-OH		5g	25g
P1726	H-D-Pro-OBzl・HCl	1g	5g	25g
P1727	H-Pro-OBzl・HCl		5g	25g
S0550	H-Ser-OBzl・HCl			5g
T2788	H-D-Thr-OBzl・HCl		1g	5g
T2677	H-Thr-OBzl・HCl		1g	5g
T2438	H-D-Trp-OBzl・HCl		1g	5g
T2443	H-Tyr-OBzl・Tos-OH		5g	25g
V0078	H-Val-OBzl・HCl			5g
V0095	H-D-Val-OBzl・Tos-OH		1g	5g
B4281	Z-D-Glu-OBzl			5g
B3989	Z-Glu-OBzl		5g	25g
C2873	Z-Ser-OBzl		5g	25g
C2285	Z-Thr-OBzl			5g

A2004	A2005	B2993	B2994	C2711
				
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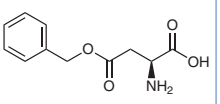	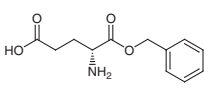	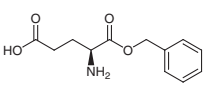	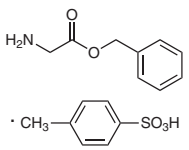	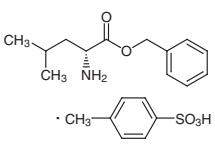
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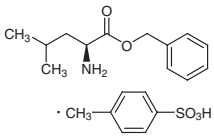
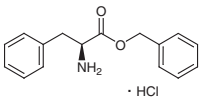
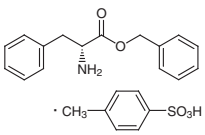
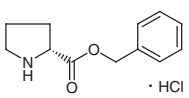
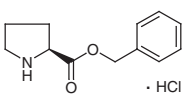
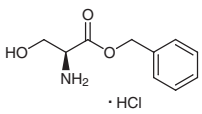
				

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

S0550



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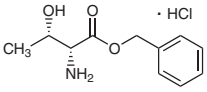

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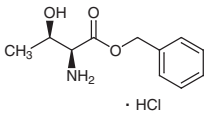

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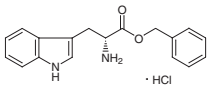

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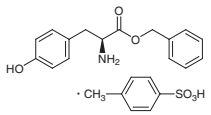

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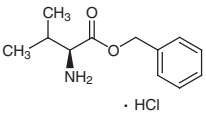
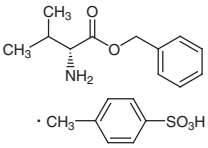


V0095



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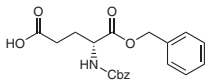

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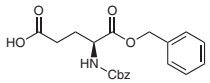

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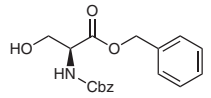

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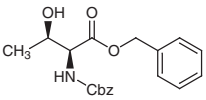
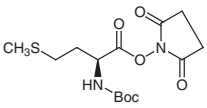


Amino Acid Succinimidyl Esters

Product No.	Product Name	Unit Size
B3433	Boc-Met-OSu	5g
B3414	Boc-D-Pro-OSu	1g 5g
B2205	Boc-Ser(Bzl)-OSu	1g 5g
B3435	Boc-Trp-OSu	5g
C2353	Z-Leu-OSu	5g
C2334	Z-Val-OSu	5g

B3433



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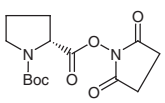

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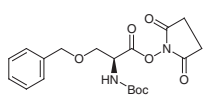

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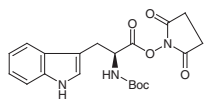

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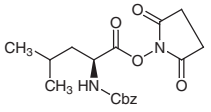

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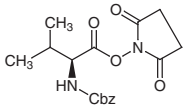
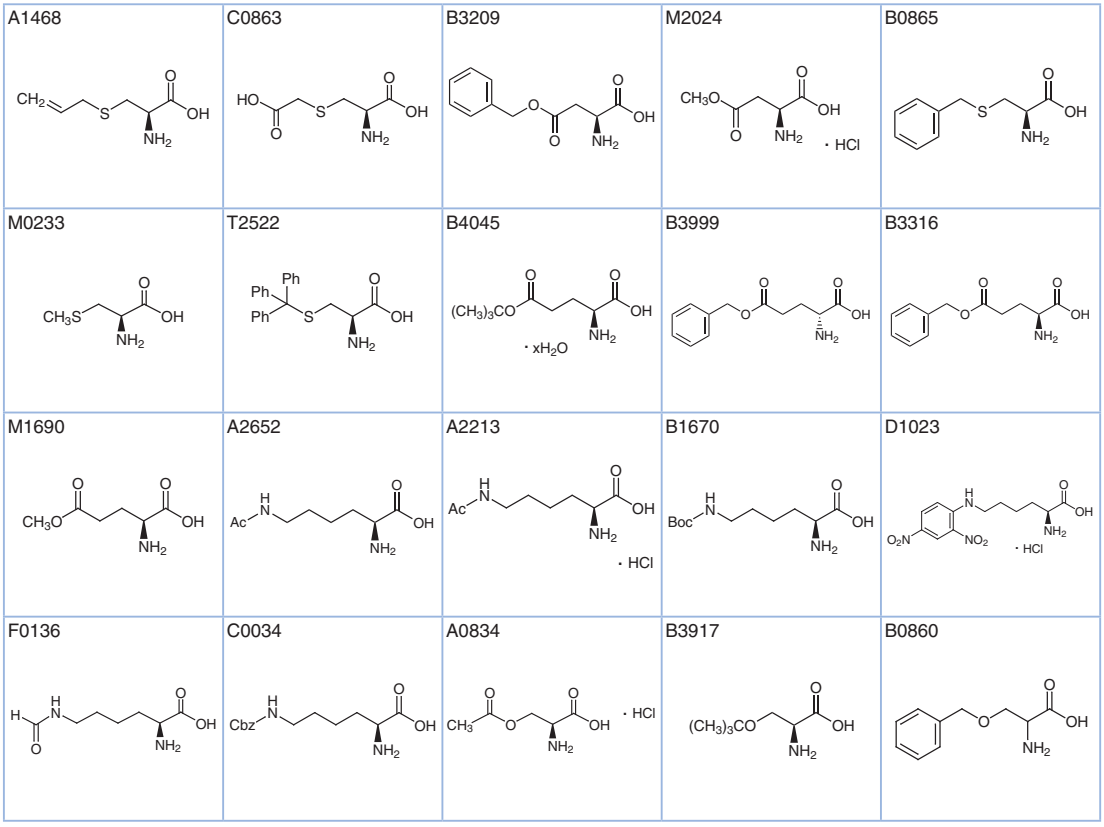


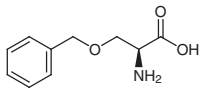
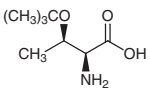
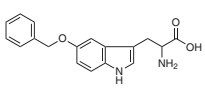
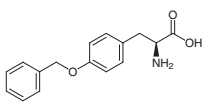
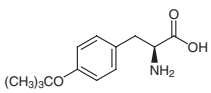
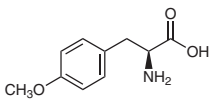
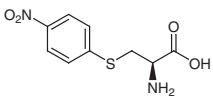
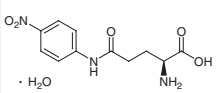
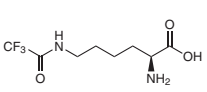
Side Chain Protected Amino Acids (*N*, *C*-termini Free)

Product No.	Product Name	Unit Size
A1468	*S*-Allyl-L-cysteine	5g
C0863	*S*-(Carboxymethyl)-L-cysteine	25g

Product No.	Product Name	Unit Size		
B3209	H-Asp(OBzl)-OH			5g
M2024	H-Asp(OMe)-OH・HCl		5g	25g
B0865	H-Cys(Bzl)-OH	1g	5g	25g
M0233	H-Cys(Me)-OH			5g
T2522	H-Cys(Trt)-OH			5g
B4045	H-Glu(O*t*Bu)-OH Hydrate		1g	5g
B3999	H-D-Glu(OBzl)-OH		1g	5g
B3316	H-Glu(OBzl)-OH			5g
M1690	H-Glu(OMe)-OH		5g	25g
A2652	H-Lys(Ac)-OH			1g
A2213	H-Lys(Ac)-OH・HCl			1g
B1670	H-Lys(Boc)-OH		1g	5g
D1023	H-Lys(Dnp)-OH・HCl		100mg	1g
F0136	H-Lys(For)-OH			1g
C0034	H-Lys(Z)-OH		5g	25g
A0834	H-Ser(Ac)-OH・HCl		100mg	1g
B3917	H-Ser(*t*Bu)-OH		1g	5g
B0860	H-DL-Ser(Bzl)-OH		1g	10g
B0861	H-Ser(Bzl)-OH		1g	5g
B3398	H-Thr(*t*Bu)-OH		1g	5g
B0430	H-DL-Trp(5-OBzl)-OH			100mg
B3210	H-Tyr(Bn)-OH			5g
B3212	H-Tyr(*t*Bu)-OH		1g	5g
M2276	H-Tyr(Me)-OH			1g
N0612	*S*-(4-Nitrophenyl)-L-cysteine			100mg
G0065	$N^{(\omega)}$-(4-Nitrophenyl)-L-glutamine Monohydrate		1g	5g
T2815	ε-TFA-lysine		5g	25g



Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

B0861 	B3398 	B0430 	B3210 	B3212 
M2276 	N0612 	G0065 	T2815 	

Peptides

Peptides have important roles in physiological processes. Although only a small amount of peptides can be obtained from an organism, a sufficient amount of natural peptides or unnatural peptides with designed sequences can be produced by the use of chemical peptide synthesis. The absolute configuration of constituent amino acids in peptides is significant for expressing their biological activity. However, in the peptide synthesis, there is a serious obstacle of the loss of chiral integrity of amino acid moieties occurring by an epimerization in their activation step. Therefore, a number of peptide coupling reagents have been developed for suppressing racemization.[1)] Moreover, *N*-protected amino acids with a carbamate type *N*-protecting group such as the *t*-butoxycarbonyl (Boc) and the 9-fluorenylmethyloxycarbonyl (Fmoc) group have been widely used for preventing racemizations. The peptide synthesis can be divided into two main synthetic routes, the liquid phase peptide synthesis and the solid phase peptide synthesis. The related condensing reagents for the former route have been developed accordingly to the progress of its synthetic method. Similarly, these reagents are applied to solid phase peptide synthesis.

Oligopeptides

Product No.	Product Name	Unit Size	
A1476	*N*-Acetyl-*S*-(4-nitrophenyl)cysteinylglycine		100mg
A0222	*β*-Alanyl-L-histidine	1g	5g
B0203	Bz-Gly-Gly-OH		1g
C2930	Colistin Sulfate (mixture)	5g	25g
C2408	Cyclosporin A	100mg	1g
D4257	DAPT		25mg
D4229	Daptomycin		100mg
G0115	Glycyl-4-aminobutyric Acid		1g
G0114	*N*-Glycyl-DL-2-aminobutyric Acid		1g
G0138	Glycylsarcosine	1g	5g
G0074	GSH reduced form	1g	10g
G0073	GSSG oxidized form		1g
A0672	H-DL-Ala-Ala-OH		100mg
A0181	H-DL-Ala-DL-Ala-OH		1g
A1261	H-Ala-Gln-OH		1g
A0184	H-DL-Ala-Gly-Gly-OH Dihydrate		100mg
A0183	H-DL-Ala-Gly-OH		1g
A0185	H-DL-Ala-DL-Leu-OH		100mg
A0187	H-DL-Ala-DL-Met-OH		100mg
A0223	H-DL-Ala-DL-Phe-OH		1g
A1495	H-Ala-Pro-OH		5g
A1262	H-Ala-Trp-OH		1g
A1263	H-Ala-Tyr-OH		1g
A0192	H-DL-Ala-DL-Val-OH		100mg
A0997	H-Asp-Phe-OMe	1g	25g
G0112	H-Gly-DL-Ala-OH		1g
G0113	H-Gly-Ala-OH	1g	5g
G0117	H-Gly-DL-Asn-OH		1g
G0116	H-Gly-D-Asn-OH		1g
G0118	H-Gly-Asn-OH		1g
G0120	H-Gly-DL-Asp-OH		100mg
G0121	H-Gly-Asp-OH Monohydrate		1g
G0251	H-Gly-Gln-OH Monohydrate		1g
G0123	H-Gly-Glu-OH	100mg	1g
G0127	H-Gly-Gly-Gly-Gly-OH	100mg	1g
G0126	H-Gly-Gly-Gly-OH	5g	25g
G0427	H-Gly-Gly-OBzl・Tos-OH		5g
G0124	H-Gly-Gly-OH	25g	500g
G0125	H-Gly-Gly-OH・HCl Monohydrate		1g
G0129	H-Gly-Ile-OH		1g
G0131	H-Gly-DL-Leu-OH		1g
G0130	H-Gly-D-Leu-OH	100mg	1g
G0181	H-Gly-Leu-OH	1g	10g
G0133	H-Gly-DL-Nle-OH	1g	5g

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Product No.	Product Name	Unit Size	
G0134	H-Gly-DL-Nva-OH		1g
G0135	H-Gly-DL-Phe-OH		1g
G0136	H-Gly-Phe-OH	100mg	1g
G0137	H-Gly-Pro-OH		1g
G0182	H-Gly-DL-Ser-OH Hydrate		1g
G0140	H-Gly-Ser-OH		500mg
G0142	H-Gly-DL-Thr-OH Hydrate		1g
G0141	H-Gly-D-Thr-OH Dihydrate		100mg
G0143	H-Gly-Thr-OH Dihydrate	100mg	1g
G0190	H-Gly-DL-Trp-OH		100mg
G0144	H-Gly-Trp-OH Hydrate	100mg	1g
G0145	H-Gly-Tyr-OH Hydrate	1g	5g
G0146	H-Gly-D-Val-OH		1g
G0148	H-Gly-Val-OH	1g	5g
L0126	H-Leu-Ala-OH Hydrate		100mg
L0033	H-DL-Leu-Gly-Gly-OH	100mg	1g
L0031	H-D-Leu-Gly-Gly-OH		100mg
L0034	H-Leu-Gly-Gly-OH		Price on request
L0030	H-DL-Leu-Gly-OH	100mg	1g
L0032	H-Leu-Gly-OH Hydrate		100mg
L0035	H-DL-Leu-Gly-DL-Phe-OH		100mg
L0103	H-Leu-D-Leu-OH Dihydrate		100mg
L0038	H-DL-Leu-DL-Phe-OH	100mg	1g
L0039	H-D-Leu-Tyr-OH Hydrate		100mg
L0040	H-Leu-Tyr-OH	100mg	1g
L0041	H-DL-Leu-DL-Val-OH	1g	5g
M0250	H-Met-Gly-OH		1g
L0249	Leuprorelin Acetate		25mg
N0177	4-Nitrobenzoylglycylglycine	1g	25g
N0643	*S*-(4-Nitrophenyl)cysteinylglycine Hydrochloride		100mg
C2833	Z-Gly-Gly-OH		5g
C1170	Z-Phe-Phe-OH		1g

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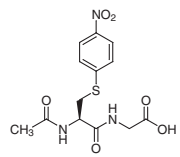	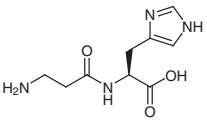	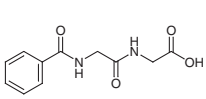	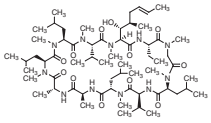	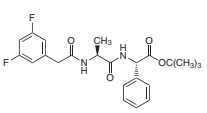
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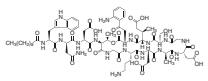	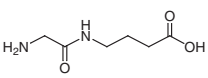	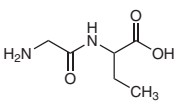	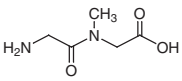	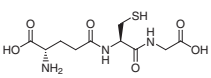
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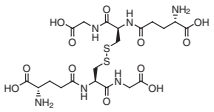	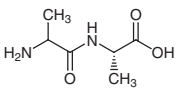	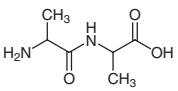	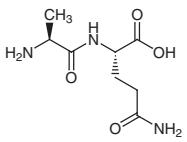	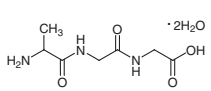
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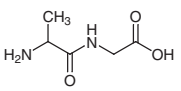
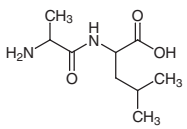
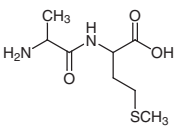
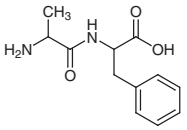
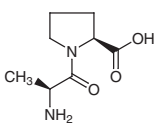
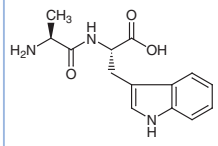
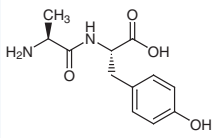
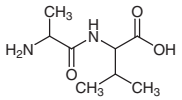
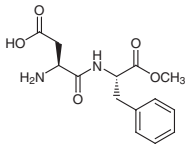
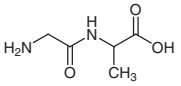
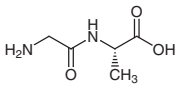
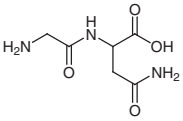
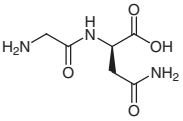
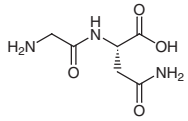
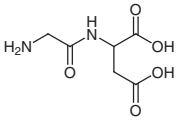
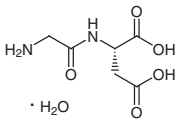
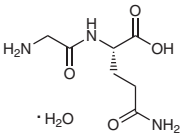
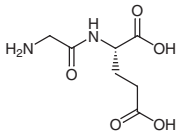
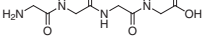
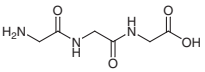
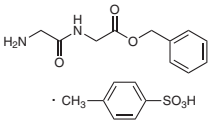
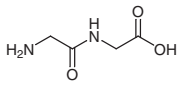
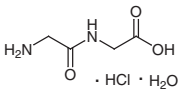
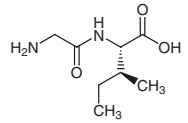
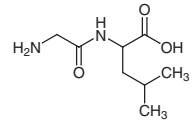
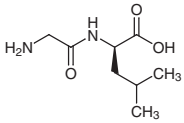
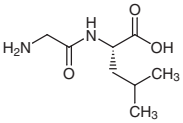
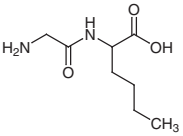
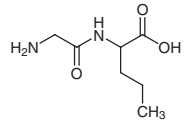
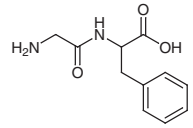
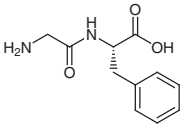
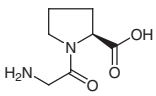
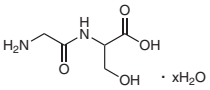
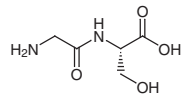
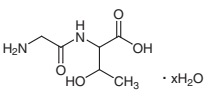
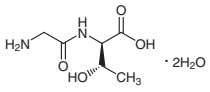
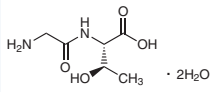
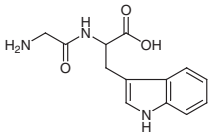
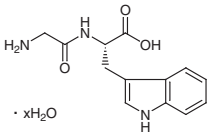
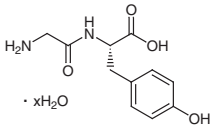
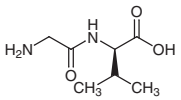
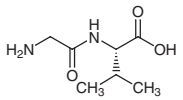
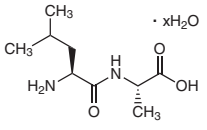
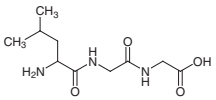
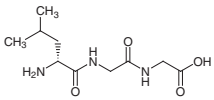
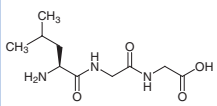
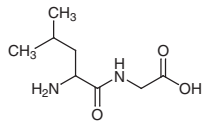
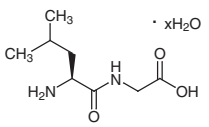
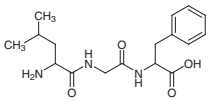
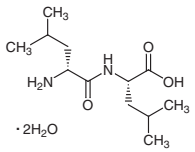
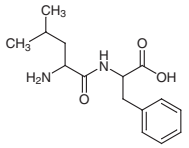
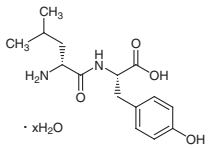
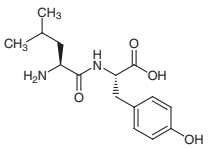
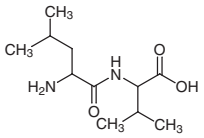
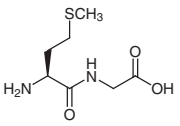
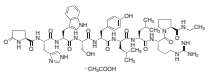
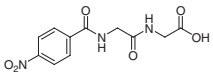
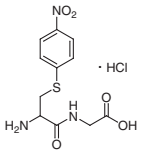
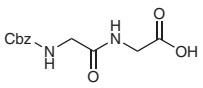
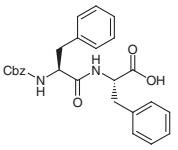
				

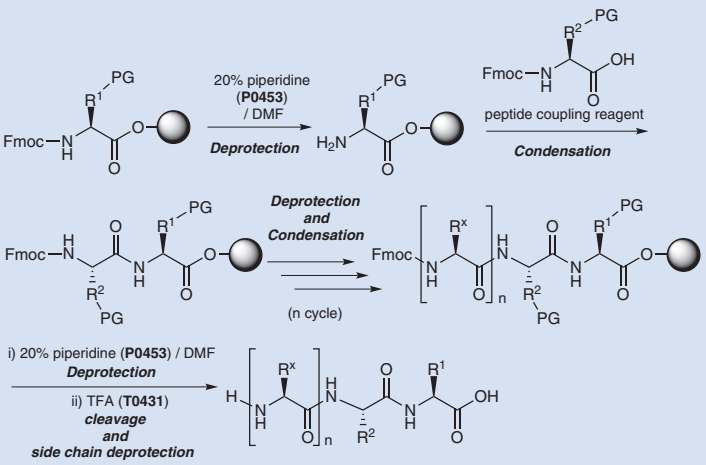
A1262 	A1263 	A0192 	A0997 	G0112 
G0113 	G0117 	G0116 	G0118 	G0120 
G0121 	G0251 	G0123 	G0127 	G0126 
G0427 	G0124 	G0125 	G0129 	G0131 
G0130 	G0181 	G0133 	G0134 	G0135 
G0136 	G0137 	G0182 	G0140 	G0142 
G0141 	G0143 	G0190 	G0144 	G0145 
G0146 	G0148 	L0126 	L0033 	L0031 

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

L0034 	L0030 	L0032 	L0035 	L0103 
L0038 	L0039 	L0040 	L0041 	M0250 
L0249 	N0177 	N0643 	C2833 	C1170 

●Solid phase peptide synthesis (SPPS)

The solid phase peptide synthesis (SPPS) has been developed by Robert B. Merrifield, in which the condensing reaction with *N*-protected amino acids and sequential successive deprotection of protecting groups are performed on an insoluble solid polymer to afford the desired peptides.[2] In SPPS, after the condensation reaction, excess amounts of reagents are easily removed by washing, so the elongated peptide intermediates are continuously applied to the peptide-elongation reaction without any purification. Also, SPPS is classified into two synthetic strategies of the Boc-method and the Fmoc-method according to the kind of using *N*-protection groups. The Fmoc-method is more conventional from the point of view of safety and handling. In a case dependent on peptide sequence, the peptide-elongation reaction can proceed to over 40 amino acid residues by SPPS. Furthermore, peptides with longer length chains can be synthesized by the condensation of two peptide segments previously prepared by SPPS.[3]



A means of the solid phase peptide synthesis (PG: Side-chain protecting group)

Reagents for Solid Phase Peptide Synthesis

Fmoc Amino Acids (Side Chain Protected Type)

Product No.	Product Name			Unit Size
D2672	4-[(2,4-Dimethoxyphenyl)(Fmoc-amino)methyl]phenoxyacetic Acid			5g
F0305	Fmoc-Ala-OH Hydrate		5g	25g
F0875	Fmoc-D-Arg(Pbf)-OH		1g	5g
F0729	Fmoc-Arg(Pbf)-OH		5g	25g
F0883	Fmoc-Arg(Tos)-OH		1g	5g
F0508	Fmoc-Asn(Trt)-OH	1g	5g	25g
B3150	Fmoc-Asp(O*t*Bu)-OH		5g	25g
F0752	Fmoc-D-Cys(Trt)-OH		1g	5g
F0652	Fmoc-Cys(Trt)-OH		5g	25g
B4174	Fmoc-Dap(Boc)-OH Hydrate		1g	5g
B3669	Fmoc-D-Glu(O*t*Bu)-OH Hydrate		1g	5g
B3167	Fmoc-Glu(O*t*Bu)-OH Hydrate		5g	25g
B3318	Fmoc-Glu(O*t*Bu)-OPfp		1g	5g
F0293	Fmoc-Gly-OH		5g	25g
F0653	Fmoc-His(Trt)-OH		5g	25g
F0294	Fmoc-Ile-OH	1g	5g	25g
F0295	Fmoc-Leu-OH	1g	5g	25g
B3071	Fmoc-D-Lys(Boc)-OH		1g	5g
B3072	Fmoc-Lys(Boc)-OH		5g	25g
F0296	Fmoc-Met-OH	1g	5g	25g
F0719	Fmoc-NH-PEG_2-CH_2-COOH			1g
F0297	Fmoc-Phe-OH		5g	25g
F0669	Fmoc-Phg-OH		1g	5g
F0298	Fmoc-Pro-OH	1g	5g	25g
B3168	Fmoc-Ser(*t*Bu)-OH		5g	25g
F0505	Fmoc-Thr(*t*Bu)-OH	1g	5g	25g
F0507	Fmoc-Trp(Boc)-OH		5g	25g
F0772	Fmoc-D-Tyr(*t*Bu)-OH		1g	5g
F0506	Fmoc-Tyr(*t*Bu)-OH	1g	5g	25g
F0299	Fmoc-Val-OH		5g	25g

Condensing, Activating & Fmoc Deprotecting Agents

Product No.	Product Name			Unit Size
A1861	*O*-(7-Azabenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TATU)		1g	5g
B3816	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-bis(pentamethylene)uronium Hexafluorophosphate (HBPipU)		1g	5g
B1774	1*H*-Benzotriazol-1-yloxytripyrrolidinophosphonium Hexafluorophosphate		5g	25g
B1657	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Hexafluorophosphate (HBTU)	5g	25g	100g
B1658	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TBTU)		5g	25g
C1988	*O*-(6-Chlorobenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Hexafluorophosphate (HCTU)		1g	5g
C1926	*O*-(6-Chlorobenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TCTU)		5g	25g
C2733	(1-Cyano-2-ethoxy-2-oxoethylidenaminooxy)dimethylaminomorpholinocarbenium Hexafluorophosphate (This product is only available in Japan.)			5g
D3262	3-(Diethoxyphosphoryloxy)-1,2,3-benzotriazin-4(3*H*)-one (DEPBT)			5g
D3263	*O*-(3,4-Dihydro-4-oxo-1,2,3-benzotriazin-3-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate		5g	25g
E0847	Ethyl Cyano(hydroxyimino)acetate (Oxyma)			25g
E0901	Ethyl 1-Hydroxy-1*H*-1,2,3-triazole-4-carboxylate		1g	5g
H0468	1-Hydroxybenzotriazole (HOBt) Monohydrate	25g	200g	500g
P0453	Piperidine		25mL	500mL

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Cleavage & Work-up Agents

Product No.	Product Name	Unit Size		
A0492	Anisole		25g	500g
B0041	Benzenethiol		25mL	500mL
B1087	Bromotrimethylsilane	5mL	25mL	250mL
B0991	*tert*-Butyl Methyl Ether		25mL	500mL
C0401	*m*-Cresol		25g	500g
D3479	Diethyl Ether Anhydrous (stabilized with BHT)			500mL
D0944	5,5'-Dithiobis(2-nitrobenzoic Acid)	1g	5g	25g
D0970	1-Dodecanethiol		25mL	500mL
E0032	1,2-Ethanedithiol		25g	500g
E0143	Ethyl Methyl Sulfide		25mL	100mL
I0021	Indole	25g	100g	500g
M0093	Methanesulfonic Acid		25g	500g
M0097	Methanol			500mL
M0346	2-Methylindole	25g	100g	500g
P1610	Phenol		25g	500g
T0191	Thioanisole	25mL	100mL	500mL
T0662	Triethylsilane		25mL	250mL
T0431	Trifluoroacetic Acid	25g	100g	500g
T1533	Triisopropylsilane	5mL	25mL	100mL

●Liquid phase peptide synthesis

The Liquid phase peptide synthesis is a classical peptide synthetic method, condensations and consequent deprotection reactions of which are carried out in a solvent like a general organic synthesis. In the liquid peptide synthesis, the elongation of target peptides are limited to about 10 amino acid residues while the purification and the chemical modification of pepide intermediates can be performed during peptide-elongation reactions. In addition, peptides can be synthesized on larger synthetic scales relative to SPPS.

Reagents for Liquid Phase Peptide Synthesis

Protected Amino Acids (see p.28)

Condensation Reagents

Product No.	Product Name	Unit Size	
A1797	*O*-(7-Azabenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Hexafluorophosphate (HATU)	5g	25g
A1861	*O*-(7-Azabenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TATU)	1g	5g
B3816	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-bis(pentamethylene)uronium Hexafluorophosphate (HBPipU)	1g	5g
B1774	1*H*-Benzotriazol-1-yloxytripyrrolidinophosphonium Hexafluorophosphate	5g	25g
B1651	1*H*-Benzotriazol-1-yloxytris(dimethylamino)phosphonium Hexafluorophosphate (BOP)	5g	25g 100g
B1657	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Hexafluorophosphate (HBTU)	5g	25g 100g
B1658	*O*-(Benzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TBTU)	5g	25g
B2771	1,3-Bis(2,2-dimethyl-1,3-dioxolan-4-ylmethyl)carbodiimide (BDDC) (This product is only available in Japan.)		1g
B1213	Bis(2-oxo-3-oxazolidinyl)phosphinic Chloride (BOP-Cl)	5g	25g
B2680	Bromotripyrrolidinophosphonium Hexafluorophosphate	5g	25g
B3838	Bromotris(dimethylamino)phosphonium Hexafluorophosphate (BroP)	1g	5g
C0119	1,1'-Carbonyldiimidazole (CDI)	25g	250g
C1988	*O*-(6-Chlorobenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Hexafluorophosphate (HCTU)	1g	5g
C1926	*O*-(6-Chlorobenzotriazol-1-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TCTU)	5g	25g
C1676	2-Chloro-4,6-dimethoxy-1,3,5-triazine (CDMT)	5g	25g 250g
C1639	2-Chloro-1,3-dimethylimidazolinium Chloride (DMC) (*ca.* 25% in Dichloromethane)		25g
C1408	2-Chloro-1,3-dimethylimidazolinium Chloride (DMC)	5g	25g
C1651	2-Chloro-1,3-dimethylimidazolinium Hexafluorophosphate (CIP)	5g	25g
C0903	2-Chloro-1-methylpyridinium Iodide		25g
C1379	1-(Chloro-1-pyrrolidinylmethylene)pyrrolidinium Hexafluorophosphate (PyClU)	5g	25g
C1375	1-(Chloro-1-pyrrolidinylmethylene)pyrrolidinium Tetrafluoroborate		5g
C2551	Chlorotripyrrolidinophosphonium Hexafluorophosphate (PyClop)	5g	25g
C0793	1-Cyclohexyl-3-(2-morpholinoethyl)carbodiimide Metho-*p*-toluenesulfonate (CMC)	5g	25g
D0437	*N*,*N*'-Dicyclohexylcarbodiimide (DCC) (25% in Pyridine, *ca.* 1.2mol/L)		100mL
D0436	*N*,*N*'-Dicyclohexylcarbodiimide (DCC)	25g	400g
D3262	3-(Diethoxyphosphoryloxy)-1,2,3-benzotriazin-4(3*H*)-one (DEPBT)		5g

Product No.	Product Name	Unit Size		
C1242	Diethyl Cyanophosphonate		5g	25g
D2039	3,4-Dihydro-3-hydroxy-4-oxo-1,2,3-benzotriazine		10g	25g
D3263	*O*-(3,4-Dihydro-4-oxo-1,2,3-benzotriazin-3-yl)-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate		5g	25g
D0254	*N*,*N*'-Diisopropylcarbodiimide (DIC)		25g	250g
D2919	4-(4,6-Dimethoxy-1,3,5-triazin-2-yl)-4-methylmorpholinium Chloride (DMTMM)		5g	25g
D4029	1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide (EDC)		5g	25g
D1601	1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide Hydrochloride (EDC・HCl)	5g	25g	250g
D2159	Dimethylthiophosphinoyl Chloride		1g	5g
C1415	Diphenylphosphinic Chloride		10g	25g
D1672	Diphenylphosphoryl Azide (DPPA)	5g	25g	250g
D2201	4,6-Diphenylthieno[3,4-*d*]-1,3-dioxol-2-one 5,5-Dioxide			5g
D1114	2,2'-Dipyridyl Disulfide	5g	25g	250g
D1662	Di(*N*-succinimidyl) Carbonate (DSC)		5g	25g
E0916	*O*-[(Ethoxycarbonyl)cyanomethyleneamino]-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TOTU)		1g	5g
E0363	1-Ethoxycarbonyl-2-ethoxy-1,2-dihydroquinoline (EEDQ)			25g
E0847	Ethyl Cyano(hydroxyimino)acetate (Oxyma)			25g
E0901	Ethyl 1-Hydroxy-1*H*-1,2,3-triazole-4-carboxylate		1g	5g
F0726	Fluoro-*N*,*N*,*N*',*N*'-tetramethylformamidinium Hexafluorophosphate (TFFH)		1g	5g
H0468	1-Hydroxybenzotriazole (HOBt) Monohydrate	25g	200g	500g
H0528	*N*-Hydroxy-5-norbornene-2,3-dicarboximide		25g	250g
H0395	*N*-Hydroxyphthalimide (NHPI)	25g	100g	500g
B0249	*N*-Hydroxysuccinimide (NHS)			25g
N0220	4-Nitrophenol		25g	500g
N0634	2-(5-Norbornene-2,3-dicarboximido)-1,1,3,3-tetramethyluronium Tetrafluoroborate (TNTU)		5g	25g
O0200	1,1'-Oxalyldiimidazole		1g	5g
O0390	*O*-[2-Oxo-1(2*H*)-pyridyl]-*N*,*N*,*N*',*N*'-tetramethyluronium Tetrafluoroborate (TPTU)		1g	5g
P0919	Pentafluorophenol		10g	25g
P2231	Pentafluorophenyl 4-Nitrobenzenesulfonate		1g	5g
P1320	Propylphosphonic Acid Anhydride (Cyclic Trimer) (48% in *N*,*N*-Dimethylformamide, *ca.* 1.6mol/L)			25g
P1319	Propylphosphonic Acid Anhydride (Cyclic Trimer) (50% in Ethyl Acetate, *ca.* 1.7mol/L)		25g	100g
T2821	*N*,*N*,*N*',*N*'-Tetramethyl-*S*-(1-oxido-2-pyridyl)thiouronium Hexafluorophosphate			5g
T2929	*N*,*N*,*N*',*N*'-Tetramethyl-*O*-(*N*-succinimidyl)uronium Hexafluorophosphate (HSTU)		5g	25g
T2224	*N*,*N*,*N*',*N*'-Tetramethyl-*O*-(*N*-succinimidyl)uronium Tetrafluoroborate (TSTU)		1g	5g

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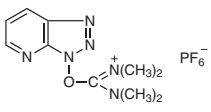

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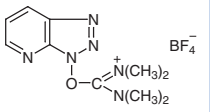

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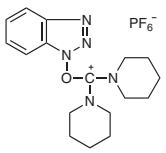

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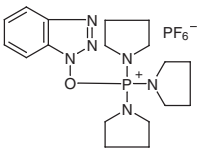

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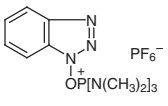

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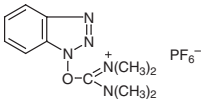

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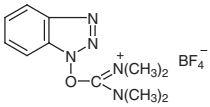

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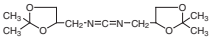

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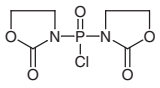

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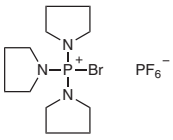

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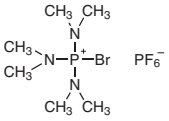

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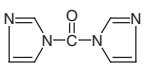

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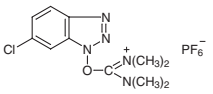

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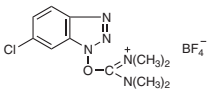

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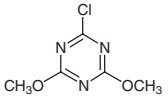
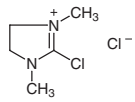
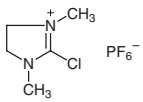
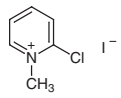
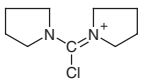
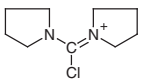
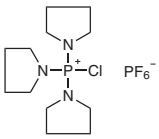
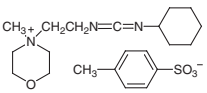
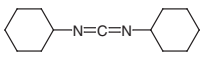
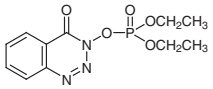
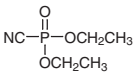
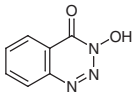
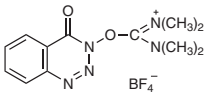
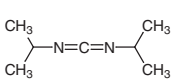
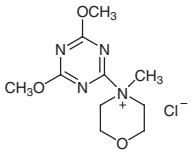
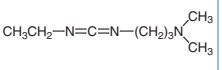
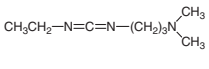
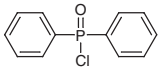
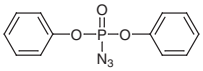
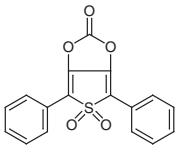
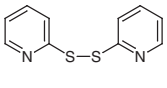
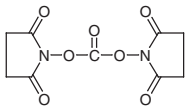
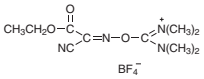
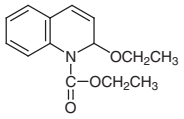
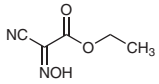
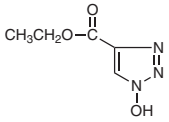
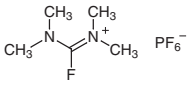
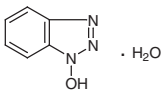
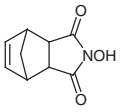
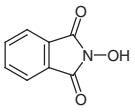
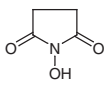
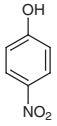
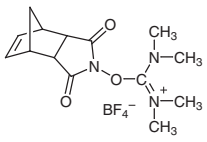
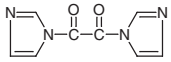
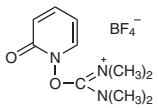
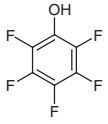
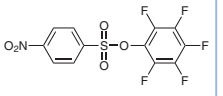
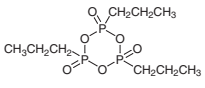
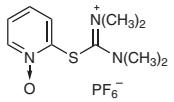
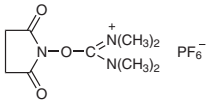


Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

C1639 C1408 	C1651 	C0903 	C1379 	C1375 
C2551 	C0793 	D0437 D0436 	D3262 	C1242 
D2039 	D3263 	D0254 	D2919 	D4029 
D1601 	D2159 	C1415 	D1672 	D2201 
D1114 	D1662 	E0916 	E0363 	E0847 
E0901 	F0726 	H0468 	H0528 	H0395 
B0249 	N0220 	N0634 	O0200 	O0390 
P0919 	P2231 	P1320 P1319 	T2821 	T2929 

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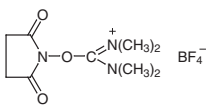
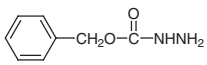


Reagents for Protecting Groups

Product No.	Product Name	Unit Size		
C1564	Benzyl Carbazate		5g	25g
C1591	Benzyl 4-Nitrophenyl Carbonate			5g
C0933	Boc-hydrazine		25g	250g
B0916	*N*-Boc-imidazole			10g
D3878	Boc_2O (*ca.* 30% in Dioxane)		100g	500g
D3879	Boc_2O (*ca.* 30% in Tetrahydrofuran)		100mL	500mL
D3880	Boc_2O (*ca.* 30% in Toluene)		100g	500g
D1547	Boc_2O	25g	100g	500g
B0988	2-Boc-oxyimino-2-phenylacetonitrile		5g	25g
B1089	2-Boc-thio-4,6-dimethylpyrimidine		5g	25g
B1969	1-Boc-1,2,4-triazole		5g	25g
C1574	*tert*-Butyl 2,4,5-Trichlorophenyl Carbonate			5g
C0176	Cbz Chloride (30-35% in Toluene)		25mL	500mL
B3021	Cbz Chloride		25g	250g
C1124	*O*-Cbz-*N*-hydroxysuccinimide		25g	250g
C1131	*N*-(2-Chlorobenzyloxycarbonyloxy)succinimide			10g
P1277	Diallyl Dicarbonate		1g	5g
P1281	Dibenzyl Dicarbonate		5g	25g
D1463	2,4-Dinitrophenylsulfenyl Chloride			5g
C0683	*N*-Ethoxycarbonylphthalimide		25g	500g
F0872	9-Fluorenylmethyl Carbazate			5g
F0936	9-Fluorenylmethyl Pentafluorophenyl Carbonate		1g	5g
F0197	Fmoc-Cl	5g	25g	100g
F0871	1-(Fmoc-oxy)benzotriazole			5g
F0239	*N*-(Fmoc-oxy)succinimide		5g	25g
N0363	2-Nitrophenylsulfenyl Chloride		25g	100g

C1564



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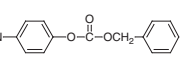

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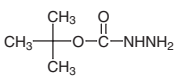

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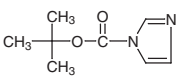

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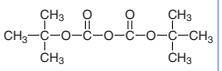

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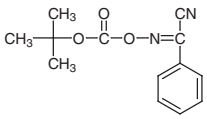

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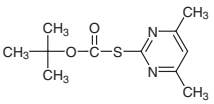

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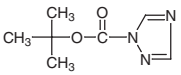

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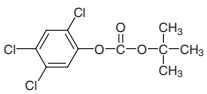

C0176
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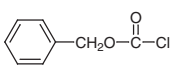
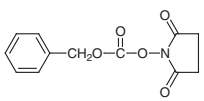
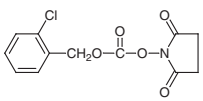


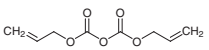
C1124



C1131



P1277



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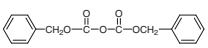
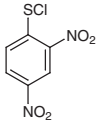
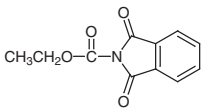
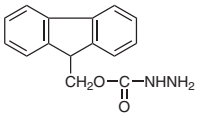
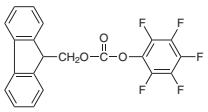
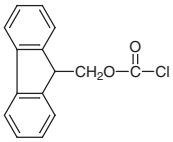
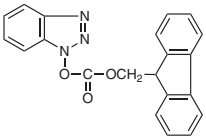
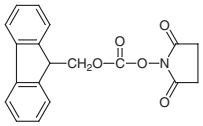


D1463



Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

C0683 	F0872 	F0936 	F0197 	F0871 
F0239 	N0363 			

References

1) A. El-Faham, F. Albericio, *Chem. Rev*. **2011**, *111*, 6557.
2) R. B. Merrifield, *J. Am. Chem. Soc*. **1963**, *85*, 2149.
3) S. B. H. Kent, *Chem. Soc. Rev*. **2009**, *38*, 338.

Enzymes

Oxido-Reductase

Product No.	Product Name	Unit Size
A0200	Alcohol-dehydrogenase from Yeast [for Blood alcohol-test]	10mg
C0052	Catalase from Bovine Liver	1g
G0050	Glucose Oxidase from *Aspergillus niger*	1g
L0059	Lipoxidase from Soybean	100mg
P0073	Peroxidase from Horseradish	100mg 1g

Transferase

Product No.	Product Name	Unit Size
A1651	*endo*-β-*N*-Acetylglucosaminidase (=Endo-M) Recombinant: from *Mucor hiemalis* expressed in *Candida boidinii* [Purity: single band by SDS-PAGE(85KDa)]	100munits
G0365	Glycosynthase (Endo-M-N175Q) Recombinant: from *Mucor hiemalis* expressed in *Escherichia coli*	100munits

Hydrolase

Product No.	Product Name	Unit Size
A1844	*endo*-α-*N*-Acetylgalactosaminidase (=Endo-α) Recombinant: from *Bifidobacterium longum* expressed in *Escherichia coli*	100munits
A1651	*endo*-β-*N*-Acetylglucosaminidase (=Endo-M) Recombinant: from *Mucor hiemalis* expressed in *Candida boidinii* [Purity: single band by SDS-PAGE(85KDa)]	100munits
A0688	Acylase from *Aspergillus genus*	25g
A0148	Acylase from Hog Kidney	100mg 500mg
A0447	α-Amylase diluted with Starch, from *Bacillus subtilis*	25g 500g
A0448	β-Amylase from Soybean	25g
C0057	Cellulase from *Aspergillus niger*	1g 5g 25g
C1238	Cephalosporinase from *Bacillus*	1×10^4units
C0893	Cephalosporinase from *Bacillus*	1×10^6units
C0342	α-Chymotrypsin from Bovine Pancreas (3× recrystallized, salt free from 20% Ethanol, presence of Calcium enhances its activity and stability)	100mg 1g
D1140	Deoxyribonuclease from Bovine Spleen	100mg
F0010	Ficin from Fig Tree Latex	25g
M0035	Glucoamylase from *Rhizopus* (contains 50% Diatomaceous earth)	25g
G0035	β-Glucosidase from Almonds	100mg
G0365	Glycosynthase (Endo-M-N175Q) Recombinant: from *Mucor hiemalis* expressed in *Escherichia coli*	100munits
H0164	Hyaluronidase from Bovine Testes	100mg
L0057	Lipase from Porcine Pancreas	25g
L0072	Lysozyme Chloride from Egg white	1g 25g
P0636	Pancreatin from Porcine Pancreas (Activity,4xJP)	25g 100g
P0026	Pectinase from *Aspergillus niger*	25g
P0913	Penicillinase (=Penicillin amido-β-lactamhydrolase), from *Bacillus cereus*, Lyophilized powder	2.5×10^6units
P1259	Penicillinase (=Penicillin amido-β-lactamhydrolase), from *Bacillus cereus*, Lyophilized powder	5×10^7units
P0310	Penicillinase (1mL will inactivate 120,000 units of Penicillin) (contains 0.25% phenol as preservative substance)	25mL
P0103	Pepsin from Porcine Stomach	25g
P0251	Phosphatase, Acid from Wheat Germ	100mg
P0538	Protease from *Aspergillus oryzae*	25g
R0005	Rennin	25g
U0017	Urease from Jack Bean	100mg 1g

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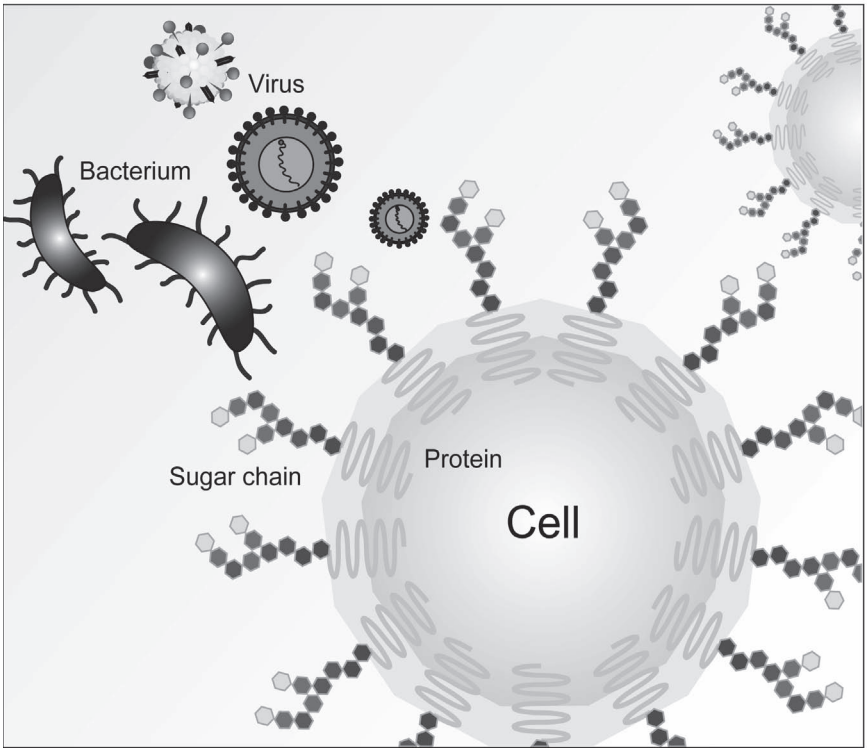
Sugars

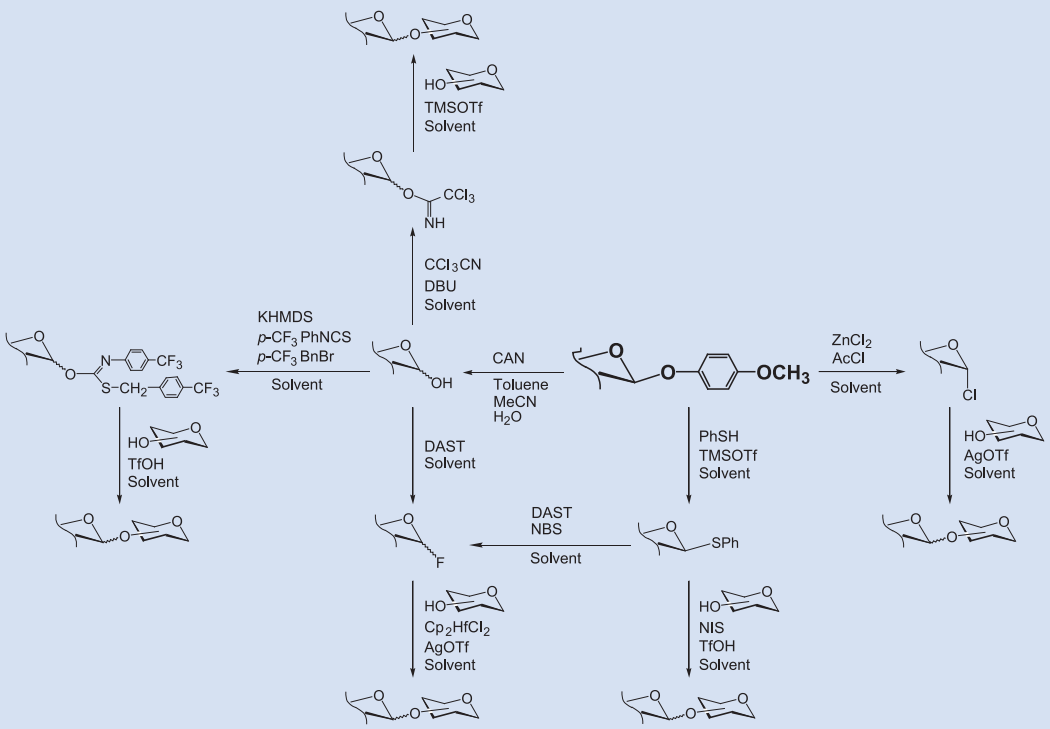


Oligosaccharides are third-order essential biopolymers like nucleic acids and proteins. Oligosaccharides on the cell surface play important roles in biological phenomena such as cell differentiation, aging, immune responses, diseases like cancer, viral infection and inflammation. There are great expectations for the discovery of novel oligosaccharide functions at the molecular level and even greater anticipation of the discovery of applications.

●Building Blocks

The use of versatile intermediates is very important for various oligosaccharide syntheses. Choices of the suitable protective groups are important for regio- and stereo-selective oligosaccharides syntheses. Synthetic strategy often determines whether the synthesis is successful or not. Protective groups must hold up against a variety of reaction conditions to construct an organic molecule but each group must be de-protected selectively for the following reaction. Thus, selective introduction and removal of protective groups are important in organic chemistry.

We have selected *p*-methoxyphenyl glycosides, which can be converted into the corresponding glycosyl donors.



Reaction Examples of *p*-Methoxyphenyl Glycosides

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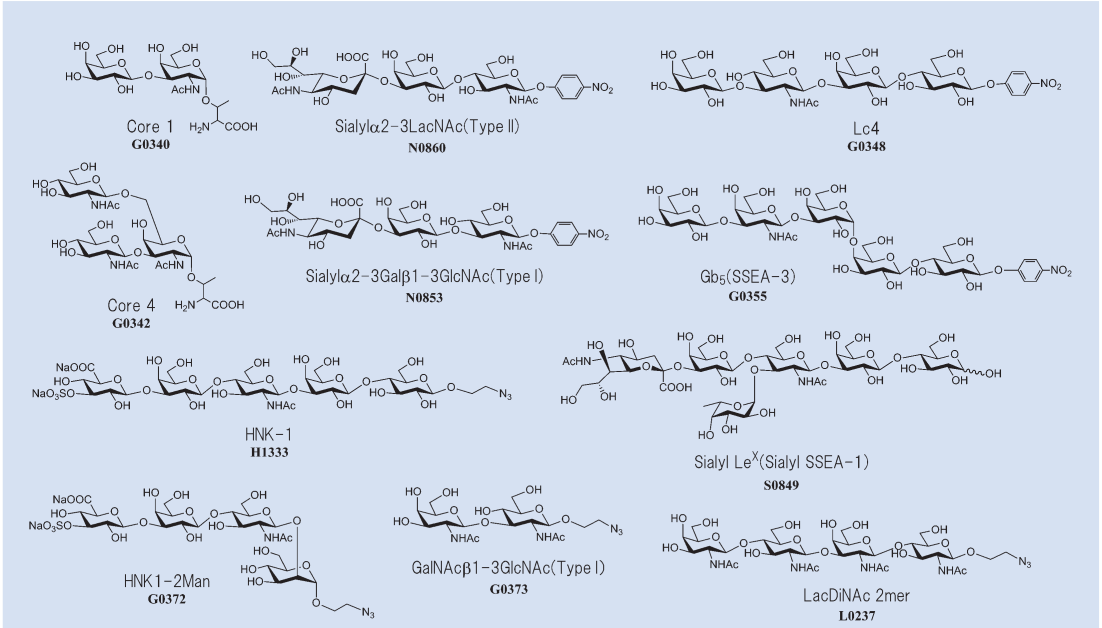
●Functional Saccharides

The participation of sugar chains in various life phenomena has been clarified. In particular, the application of sugar chains to antibody medicines and regenerative medicines has attracted a lot of interest. At our company, mass production of functional sugar chains is supported by employing various building blocks and advanced technology.



Various Functional Saccharides

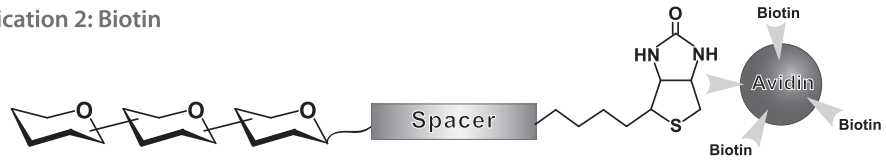
These oligosaccharides can be used in the new field of sugar chains as sugar-conjugates (DDS, analysis of interactions between proteins and oligosaccharides, affinity chromatography, removal of viruses or toxins, etc.).

Application 1: Surface Plasmon Resonance (SPR)



Technique to detect interactions or binding capacity between sugars and viruses or proteins.

Application 2: Biotin



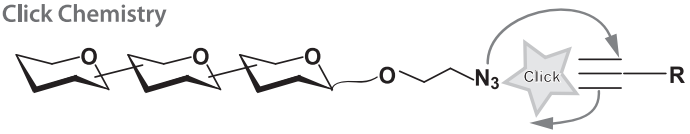
Biochemical and diagonostic reagents of cancer, and missile drugs capable of limited lesion attack.

Application 3: Beads/Resins



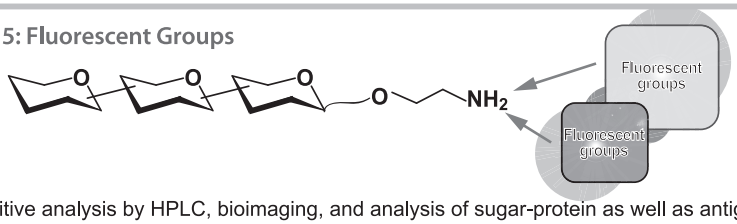
Removal of autoantibodies / viruses / toxins and purification of antibody drugs.

Application 4: Click Chemistry



Convenient synthesis of sugar-conjugates with proteins and saccharides by click chemistry technique.

Application 5: Fluorescent Groups



Highly sensitive analysis by HPLC, bioimaging, and analysis of sugar-protein as well as antigen-antibody interactions.

Applications of Oligosaccharides

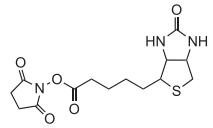
Availability or specification of the listed products are subject to change without prior notice.

TCI products and example of possible assembled sugar-conjugates

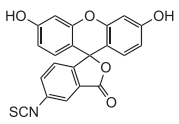
Azido- / Amino-linked Oligosaccharides

Sialyl Lewis A-Lactose Ethylazide : Neu5Acα(2-3)Galβ(1-3)[Fucα(1-4)]GlcNAcβ(1-3)Galβ(1-4)Glcβ-ethylazide	[S0920]
Sialyl Lewis A-Lactose Ethylamine : Neu5Acα(2-3)Galβ(1-3)[Fucα(1-4)]GlcNAcβ(1-3)Galβ(1-4)Glcβ-ethylamine	[S0921]
Sialyl Lewis X-Lactose Ethylazide : Neu5Acα(2-3)Galβ(1-4)[Fucα(1-3)]GlcNAcβ(1-3)Galβ(1-4)Glcβ-ethylazide	[S0922]
Sialyl Lewis X-Lactose Ethylamine : Neu5Acα(2-3)Galβ(1-4)[Fucα(1-3)]GlcNAcβ(1-3)Galβ(1-4)Glcβ-ethylamine	[S0923]
Neu5Acα(2-3)Galβ(1-4)GlcNAc-β-ethylamine	[N0949]
Neu5Acα(2-6)Galβ(1-4)GlcNAc-β-ethylamine	[N0950]
Neu5Acα(2-3)Gal-β-ethylamine	[N0947]
Neu5Acα(2-6)Gal-β-ethylamine	[N0948]
Ganglioside GM_3 (phyto-type) : NeuAcα(2-3)Galβ(1-4)Glc-ceramide	[G0422]
Disialylnonasaccharide β-ethylazide	[D4217]
HNK-1 Ethylazide : GlcA[3S]β(1-3)Galβ(1-4)GlcNAcβ(1-3)Galβ(1-4)Glcβ-Ethylazide	[H1333]
GlcA[3S]β(1-3)Galβ(1-4)GlcNAcβ(1-2)Man β-ethylazide	[G0372]
GlcNAcβ(1-2)Man β-ethylazide	[G0337]
Gb_3-β-ethylamine : Galα(1-4)Galβ(1-4)Glc-β-ethylamine	[G0402]
Gb_3-β-ethylazide : Galα(1-4)Galβ(1-4)Glc-β-ethylazide	[G0403]
LacDiNAc Dimer Ethylazide : GalNAcβ(1-4)GlcNAcβ(1-3)GalNAcβ(1-4)GlcNAc-β-ethylazide	[L0237]
GalNAcβ(1-3)GlcNAc β-Ethylazide	[G0373]
A antigen PEG-trifluoroacetamide : GalNAcα(1-3)[Fucα(1-2)]Gal-β-PEG-trifluoroacetamide	[A2631]
B antigen PEG-trifluoroacetamide : Galα(1-3)[Fucα(1-2)]Gal-β-PEG-trifluoroacetamide	[B4172]
N-GlcNAc-Biotin	[G0297]
2-Azidoethyl 2-Acetamido-2-deoxy-β-D-glucopyranoside	[A2172]
2-Azidoethyl 2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyranoside	[A2377]
2-Azidoethyl 2-Acetamido-2-deoxy-β-D-galactopyranoside	[A2627]

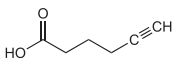
Conjugation Materials



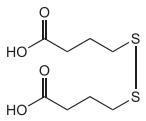
N-Succinimidyl D-Biotinate
[S0491]



Fluorescein 5-Isothiocyanate (isomer I)
[F0026]

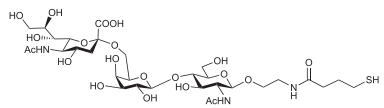


5-Hexynoic Acid
[H0882]

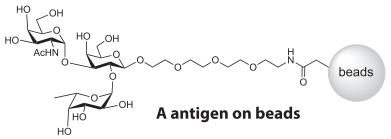


4,4'-Dithiodibutyric Acid
[D1757]

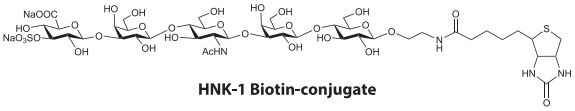
Sugar-Conjugates



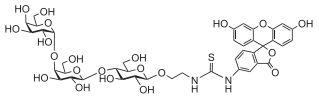
Neu5Acα(2-6)Galβ(1-4)GlcNAc having a thiol group



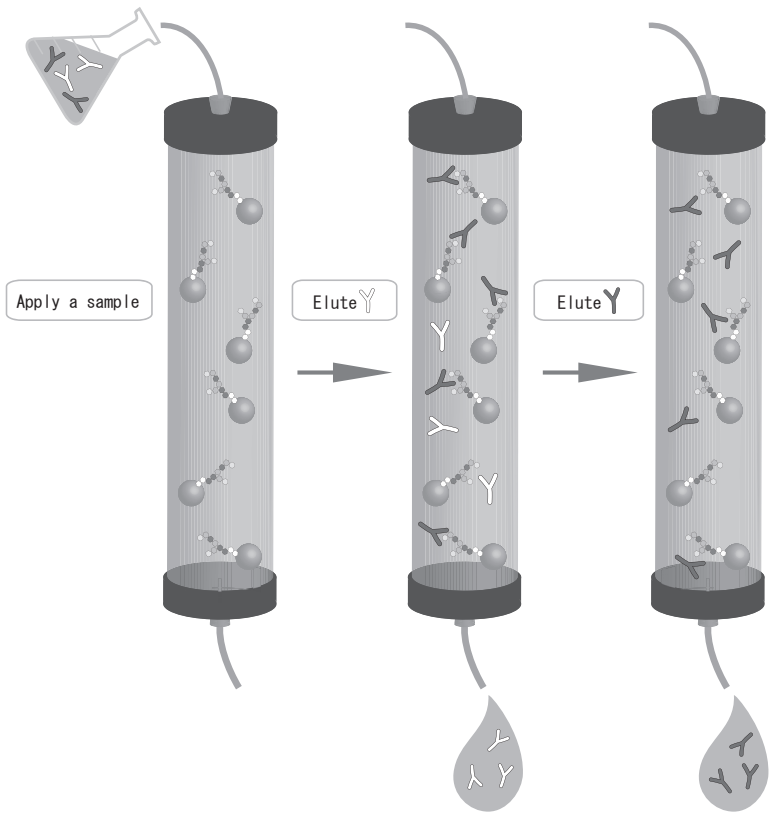
A antigen on beads



HNK-1 Biotin-conjugate



Gb_3 FITC-conjugate



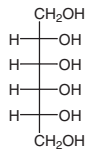
・The removal of an antiA antibody and the antiB antibody
・The study of the antigen seasonal polymorphism
・The ligand density measurement by the lectin combination
・The purification of the plasma sample
・The refinement of the antibody

Glyco affinity chromatography

Allose

Product No.	Product Name	Unit Size	
A1982	Allitol		100mg
A1488	D-(+)-Allose	100mg	1g
D2265	1,2:5,6-Di-*O*-isopropylidene-α-D-allofuranose	1g	5g
F0542	4-Formylphenyl β-D-Allopyranoside		5g

A1982



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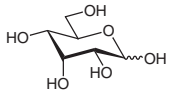
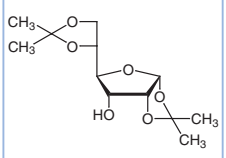


D2265



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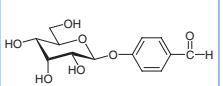

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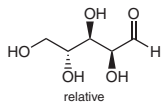
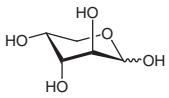
Arabinose

Product No.	Product Name	Unit Size		
A0514	DL-Arabinose		5g	25g
A0513	D-(-)-Arabinose		25g	100g
A0515	L-(+)-Arabinose		25g	250g
A0517	DL-Arabitol			100mg
A0516	D-(+)-Arabitol		1g	25g
A0518	L-(-)-Arabitol	1g	5g	25g
D4594	2-Deoxy-2-fluoro-1,3,5-tri-*O*-benzoyl-*α*-D-arabinofuranose		1g	5g
M1019	Methyl *β*-D-Arabinopyranoside			100mg
T2695	2,3,4-Tri-*O*-acetyl-*β*-L-arabinopyranosyl 2,2,2-Trichloroacetimidate		Price on request	

A0514



A0513



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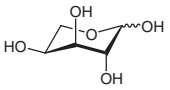
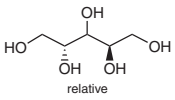


A0517



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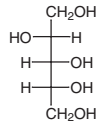

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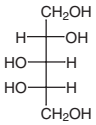
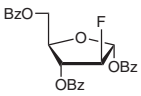
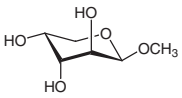


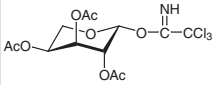
D4594



M1019



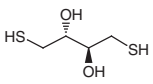
T2695



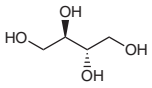
Erythrose

Product No.	Product Name	Unit Size		
D1320	Dithioerythritol		5g	25g
E0021	*meso*-Erythritol		25g	500g
E0455	D-Erythronolactone	1g	5g	25g
I0454	2,3-*O*-Isopropylidene-D-erythronolactone			1g

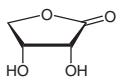
D1320



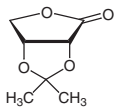
E0021



E0455



I0454

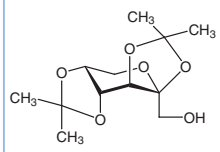


Fructose

Product No.	Product Name	Unit Size	
D3758	2,3:4,5-Di-*O*-isopropylidene-*β*-D-fructopyranose	5g	25g
F0060	D-(-)-Fructose	25g	500g

Product No.	Product Name	Unit Size	
F0317	L-(+)-Fructose	100mg	1g
T2755	Topiramate	1g	5g

D3758



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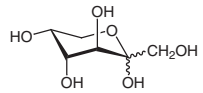

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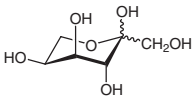
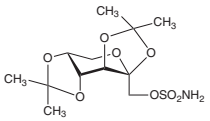


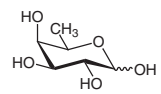
T2755



Fucose

Product No.	Product Name	Unit Size	
D0049	D-(+)-Fucose	1g	5g
F0065	L-(-)-Fucose	1g	10g
M1051	Methyl α-L-Fucopyranoside		1g
M1050	Methyl β-L-Fucopyranoside		1g
M1626	Methyl 2,3,4-Tri-*O*-acetyl-1-thio-β-L-fucopyranoside	1g	5g
M1628	Methyl 2,3,4-Tri-*O*-benzyl-1-thio-β-L-fucopyranoside		1g
N0392	4-Nitrophenyl α-L-Fucopyranoside		10mg
N0774	4-Nitrophenyl β-D-Fucopyranoside		100mg
P1842	Phenyl 2,3,4-Tri-*O*-benzyl-1-thio-β-L-fucopyranoside	1g	5g
T2207	1,2,3,4-Tetra-*O*-acetyl-α-L-fucopyranose	1g	5g

D0049



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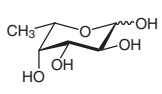

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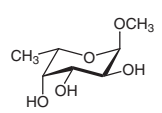

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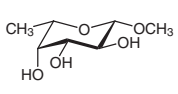

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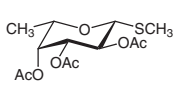

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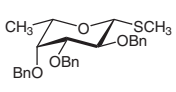
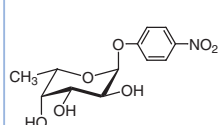


N0392



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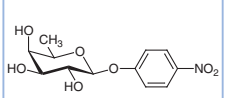

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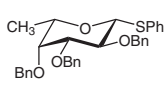

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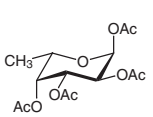


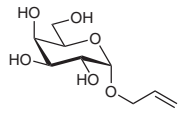
Galactose

Product No.	Product Name	Unit Size	
A2346	Allyl α-D-Galactopyranoside	1g	5g
A1413	4-Aminophenyl β-D-Galactopyranoside		1g
G0257	2-[2-(2-Azidoethoxy)ethoxy]ethyl 2,3,4,6-Tetra-*O*-acetyl-D-galactopyranoside	1g	5g
B3201	5-Bromo-4-chloro-3-indolyl β-D-Galactopyranoside	200mg	1g
B3469	5-Bromo-6-chloro-3-indolyl β-D-Galactopyranoside (contains *ca.* 10% Ethyl Acetate)	20mg	100mg
B3470	5-Bromo-3-indolyl β-D-Galactopyranoside	20mg	100mg
C2371	6-Chloro-3-indolyl β-D-Galactopyranoside	20mg	100mg
D0050	2-Deoxy-D-galactose		1g
D2555	1,2:3,4-Di-*O*-isopropylidene-α-D-galactopyranose	5g	25g
G0273	D-Galactal	1g	5g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size		
G0005	Galactitol		25g	250g
G0008	D-(+)-Galactose Anhydrous		25g	500g
G0267	L-(-)-Galactose		100mg	500mg
G0010	α-D-Galacturonic Acid Hydrate		5g	25g
I0328	Isopropyl 1-Thio-β-D-galactopyranoside		1g	5g
M1620	4-Methoxyphenyl 3-*O*-Allyl-2-*O*-benzyl-4,6-*O*-benzylidene-β-D-galactopyranoside			1g
M1589	4-Methoxyphenyl 3-*O*-Allyl-4,6-*O*-benzylidene-β-D-galactopyranoside		1g	5g
M1590	4-Methoxyphenyl 3-*O*-Allyl-4,6-*O*-benzylidene-2-*O*-(4-methylbenzoyl)-β-D-galactopyranoside			1g
M1482	4-Methoxyphenyl 3-*O*-Allyl-β-D-galactopyranoside			5g
M1725	4-Methoxyphenyl 3-*O*-Benzyl-β-D-galactopyranoside		1g	5g
M1710	4-Methoxyphenyl 4,6-*O*-Benzylidene-β-D-galactopyranoside		Price on request	
M1597	4-Methoxyphenyl 2,6-Bis-*O*-(4-methylbenzoyl)-β-D-galactopyranoside			1g
M1634	4-Methoxyphenyl 2,6-Di-*O*-benzyl-β-D-galactopyranoside			1g
M1633	4-Methoxyphenyl 2,6-Di-*O*-benzyl-3,4-*O*-isopropylidene-β-D-galactopyranoside			1g
M1481	4-Methoxyphenyl β-D-Galactopyranoside		5g	25g
M1596	4-Methoxyphenyl 3,4-*O*-Isopropylidene-2,6-bis-*O*-(4-methylbenzoyl)-β-D-galactopyranoside			1g
M1593	4-Methoxyphenyl 3,4-*O*-Isopropylidene-β-D-galactopyranoside			1g
M1594	4-Methoxyphenyl 3,4-*O*-Isopropylidene-6-*O*-(4-methylbenzoyl)-β-D-galactopyranoside			1g
M1477	4-Methoxyphenyl 2,3,4,6-Tetra-*O*-acetyl-β-D-galactopyranoside		5g	25g
M1588	4-Methoxyphenyl 2,3,4,6-Tetra-*O*-benzyl-β-D-galactopyranoside			5g
M2104	4-Methoxyphenyl 2,3,6-Tri-*O*-benzyl-β-D-galactopyranoside		Price on request	
M1592	4-Methoxyphenyl 2,4,6-Tri-*O*-benzyl-β-D-galactopyranoside			1g
M1047	Methyl α-D-Galactopyranoside Monohydrate		5g	25g
M1035	Methyl β-D-Galactopyranoside		1g	5g
M1933	Methyl 2,3,6-Tri-*O*-benzoyl-α-D-galactopyranoside	5g	25g	250g
N0418	2-Nitrophenyl β-D-Galactopyranoside [Substrate for β-D-Galactosidase]	1g	5g	25g
N0492	4-Nitrophenyl α-D-Galactopyranoside [Substrate for α-D-Galactosidase]		200mg	1g
N0616	4-Nitrophenyl β-D-Galactopyranoside [Substrate for β-Galactosidase]		1g	5g
G0247	Penta-*O*-acetyl-β-D-galactopyranose		25g	250g
P2078	Phenyl 2-*O*-Acetyl-3,4,6-tri-*O*-benzyl-1-thio-β-D-galactopyranoside		Price on request	
P1660	Phenyl 3-*O*-Allyl-2,4,6-tri-*O*-benzyl-1-thio-β-D-galactopyranoside			1g
P1326	Phenyl β-D-Galactopyranoside		1g	5g
P1477	Phenyl 2,3,4,6-Tetra-*O*-acetyl-1-thio-β-D-galactopyranoside		5g	25g
P1679	Phenyl 2,3,4,6-Tetra-*O*-benzyl-1-thio-β-D-galactopyranoside			1g
P1680	Phenyl 2,4,6-Tri-*O*-acetyl-3-*O*-allyl-1-thio-β-D-galactopyranoside			1g
T2295	2,3,4,6-Tetra-*O*-acetyl-α-D-galactopyranosyl 2,2,2-Trichloroacetimidate		1g	5g
T1734	Tri-*O*-acetyl-D-galactal		1g	5g
T1932	3,4,6-Tri-*O*-benzyl-2-deoxy-D-galactopyranose			100mg
T1858	Tri-*O*-benzyl-D-galactal			1g
T1935	6-*O*-(Triisopropylsilyl)-D-galactal			200mg

A2346



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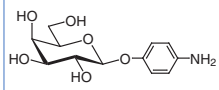

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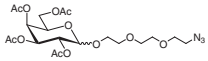

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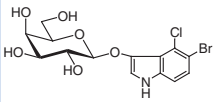

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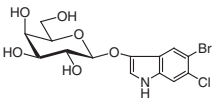

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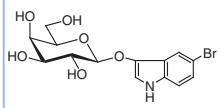

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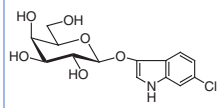

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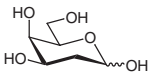

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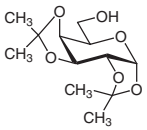

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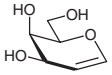

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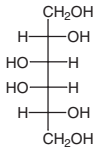

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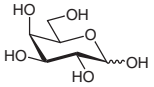

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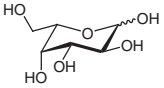

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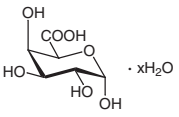

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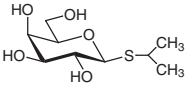

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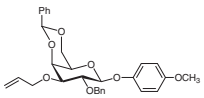

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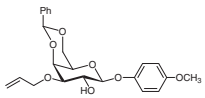

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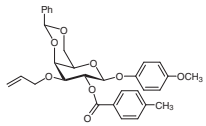

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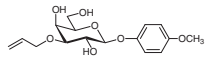

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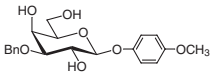

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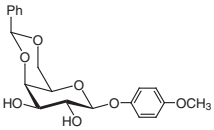

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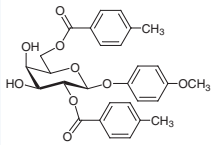

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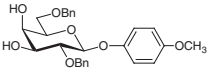

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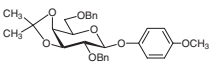

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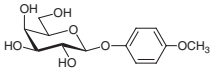

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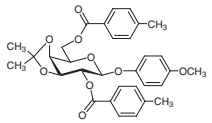

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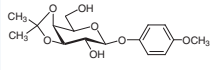

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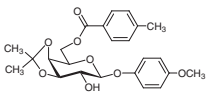

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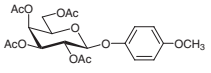

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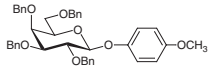

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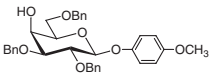

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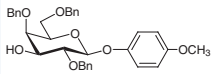

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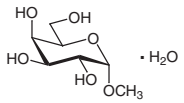

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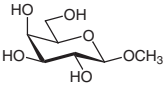

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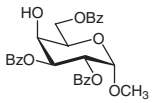

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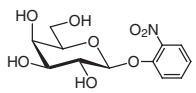

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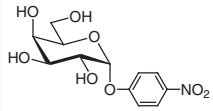

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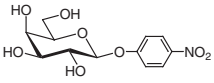

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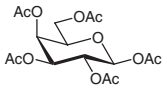

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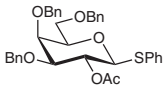

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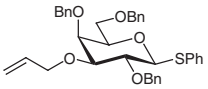

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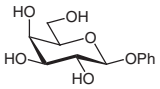

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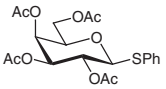

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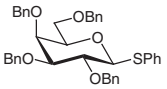

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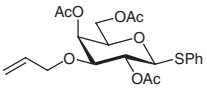

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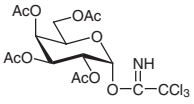

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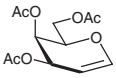

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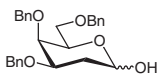

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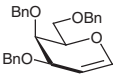

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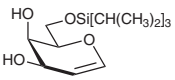


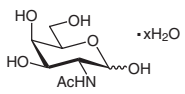
Galactosamine

Product No.	Product Name	Unit Size
A1245	*N*-Acetyl-D-galactosamine Hydrate	1g 5g
A2627	2-Azidoethyl 2-Acetamido-2-deoxy-β-D-galactopyranoside	Price on request

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size
A1833	Fmoc-Ser[GalN$_3$[46Bzd]-α]-O*t*Bu	100mg
A1832	Fmoc-Thr[GalN$_3$[46Bzd]-α]-O*t*Bu	100mg
G0007	D-(+)-Galactosamine Hydrochloride	1g 5g
M1643	4-Methoxyphenyl 3-*O*-Allyl-2-azido-4,6-*O*-benzylidene-2-deoxy-β-D-galactopyranoside	1g
N0865	4-Nitrophenyl 2-Acetamido-2-deoxy-β-D-galactopyranoside	Price on request
P1643	Phenyl 2-Deoxy-1-thio-2-(2,2,2-trichloroethoxyformamido)-β-D-galactopyranoside	Price on request
P1642	Phenyl 3,4,6-Tri-*O*-acetyl-2-deoxy-1-thio-2-(2,2,2-trichloroethoxyformamido)-β-D-galactopyranoside	1g 5g
T1731	1,3,4,6-Tetra-*O*-acetyl-2-azido-2-deoxy-α-D-galactopyranose	100mg

A1245



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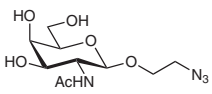

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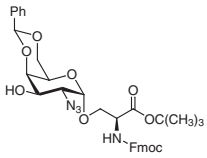

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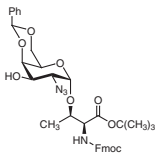

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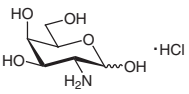

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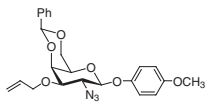

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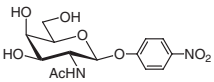

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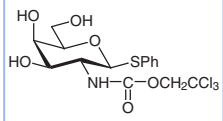
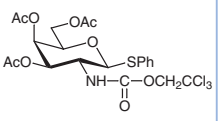
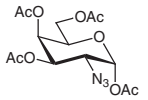


P1642



T1731



Glucose

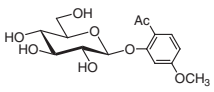
Product No.	Product Name	Unit Size
A2253	2-Acetyl-5-methoxyphenyl β-D-Glucopyranoside	Price on request
A2636	6-*O*-Acetyl-2,3,4-tri-*O*-benzyl-D-glucopyranose	Price on request
A1074	1,6-Anhydro-β-D-glucose	1g 5g
A2637	1,6-Anhydro-2,3,4-tri-*O*-benzyl-β-D-glucopyranose	Price on request
A0522	Arbutin	5g 25g
A2267	2-Azidoethyl β-D-Glucopyranoside	1g
A2377	2-Azidoethyl 2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyranoside	1g 5g
B4170	Benzyl 2,3-Di-*O*-benzyl-4,6-*O*-benzylidene-β-D-glucopyranoside	Price on request
B4171	Benzyl 2,3,4-Tri-*O*-benzyl-β-D-glucopyranoside	Price on request
G0037	Calcium Gluconate Monohydrate	25g 500g
C2548	Capsaicin β-D-Glucopyranoside	200mg
C0543	Carmine	5g 25g
C0782	Carminic Acid (Natural dye)	5g 25g
C0074	α-Chloralose (contains β-isomer)	25g
C2000	β-Chloralose	Price on request
G0275	Copper(II) Gluconate	25g
D3920	Daidzin	25mg
D3023	2-Deoxy-2-fluoro-D-glucopyranose	100mg
D0051	2-Deoxy-D-glucose	1g 5g
D2752	3,4-Di-*O*-acetyl-6-deoxy-L-glucal	1g 5g
D1949	1,2:5,6-Di-*O*-isopropylidene-α-D-glucofuranose	10g 25g
E0024	Esculin Sesquihydrate	5g 25g
E0402	4,6-*O*-Ethylidene-α-D-glucopyranose	1g 5g
E0675	Etoposide	100mg
G0385	Geniposide	100mg 1g
G0274	D-Glucal	1g 5g
G0036	Gluconic Acid (contains Gluconolactone) (45-50% in Water)	25g 500g
G0039	D-(+)-Glucono-1,5-lactone	25g 500g

Product No.	Product Name	Unit Size		
G0339	β-D-Glucopyranose 1-Phosphate Disodium Salt		20mg	100mg
G0048	D-(+)-Glucose		25g	500g
G0226	L-(-)-Glucose		1g	5g
G0047	β-D-Glucose (contains α-D-Glucose)		25g	500g
G0259	D-Glucose Diethyl Mercaptal			1g
G0052	D-Glucose 6-Phosphate Barium Salt Heptahydrate		100mg	1g
G0211	D-Glucose 6-Phosphate Dipotassium Salt Hydrate		Price on request	
G0397	Glucotropaeolin Potassium Salt			10mg
G0223	D-Glucuronamide			25g
G0055	D-Glucurono-6,3-lactone		25g	500g
H0908	Helicin		1g	5g
I0017	Indican Hydrate		100mg	500mg
G0038	Iron(II) Gluconate Hydrate		25g	500g
I0400	1,2-*O*-Isopropylidene-α-D-glucofuranose			25g
I0688	1,2-*O*-Isopropylidene-α-D-glucurono-6,3-lactone			1g
L0268	Loganin		10mg	50mg
G0276	Magnesium(II) Gluconate Hydrate		25g	500g
M2065	4-Methoxyphenyl 2-*O*-Acetyl-3-*O*-allyl-4,6-*O*-benzylidene-β-D-glucopyranoside		1g	5g
M2434	4-Methoxyphenyl 2-*O*-Benzoyl-3,6-di-*O*-benzyl-β-D-glucopyranoside		Price on request	
M1640	4-Methoxyphenyl 3-*O*-Benzyl-4,6-*O*-benzylidene-β-D-glucopyranoside		1g	5g
M1641	4-Methoxyphenyl 3-*O*-Benzyl-β-D-glucopyranoside			1g
M1631	4-Methoxyphenyl β-D-Glucopyranoside		5g	25g
M1630	4-Methoxyphenyl 2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyanoside			5g
M1642	4-Methoxyphenyl 2,4,6-Tri-*O*-acetyl-3-*O*-benzyl-β-D-glucopyranoside		1g	5g
M1125	Methyl 4,6-*O*-Benzylidene-α-D-glucopyranoside		5g	25g
M2013	Methyl 2,3-Di-*O*-benzoyl-4,6-*O*-benzylidene-α-D-glucopyranoside			1g
M0228	Methyl α-D-Glucopyranoside	25g	100g	500g
M0709	Methyl β-D-Glucopyranoside Hemihydrate		5g	25g
M1682	Methyl 2,3,4,6-Tetra-*O*-acetyl-1-thio-β-D-glucopyranoside		1g	5g
M1487	Methyl 2,3,4-Tri-*O*-benzoyl-α-D-glucopyranoside		1g	5g
M1488	Methyl 2,3,4-Tri-*O*-benzyl-α-D-glucopyranoside			1g
N0493	4-Nitrophenyl α-D-Glucopyranoside [Substrate for α-D-Glucosidase]		1g	5g
N0235	4-Nitrophenyl β-D-Glucopyranoside Monohydrate [Substrate for β-D-Glucosidase]		1g	5g
N0909	Nonyl β-D-Glucopyranoside			1g
A2638	6-OAc PtdGlc(di-acyl Chain)		Price on request	
O0355	*n*-Octyl β-D-Glucopyranoside [for Biochemical Research]			1g
O0232	*n*-Octyl β-D-Glucopyranoside		1g	5g
O0405	Ononin			10mg
P1876	Paeoniflorin			100mg
G0225	Penta-*O*-acetyl-α-D-glucopyranose	10g	25g	250g
P0028	Penta-*O*-acetyl-β-D-glucopyranose		100g	500g
P1475	Phenyl 4,6-*O*-Benzylidene-1-thio-β-D-glucopyranoside			5g
P1346	Phenyl α-D-Glucopyranoside			1g
P0178	Phenyl β-D-Glucopyranoside Hydrate		1g	10g
P1476	Phenyl 2,3,4,6-Tetra-*O*-acetyl-1-thio-β-D-glucopyranoside		5g	25g
P1736	Phenyl 2,4,6-Tri-*O*-acetyl-3-*O*-allyl-1-thio-β-D-glucopyranoside			1g
P0248	Phlorizin Hydrate		1g	5g
P1878	Piceid		1g	5g
G0040	Potassium Gluconate		25g	500g
P1886	Puerarin		200mg	1g
S0003	Salicin		5g	25g
S0156	Sinigrin Hydrate			100mg
S0903	Sinigrin			100mg
G0041	Sodium Gluconate		25g	500g
S0065	D-Sorbitol		25g	500g
S0388	L-Sorbitol		100mg	1g
S0897	Swertiamarin			25mg
T3109	Teniposide		20mg	100mg
T2449	1,2,4,6-Tetra-*O*-acetyl-3-*O*-allyl-β-D-glucopyranose			1g
T1961	2,3,4,6-Tetra-*O*-acetyl-α-D-glucopyranosyl Bromide (stabilized with $CaCO_3$)			5g
T1995	2,3,4,6-Tetra-*O*-acetyl-α-D-glucopyranosyl Fluoride			1g
A5514	2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyranosyl Isothiocyanate [for HPLC Labeling]		100mg	1g
T2491	2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyranosyl 2,2,2-Trichloroacetimidate		1g	5g
P2079	2,3,4,6-Tetra-*O*-acetyl-PtdGlc(di-acyl Chain)		Price on request	
P2080	2,3,4,6-Tetra-*O*-acetyl-PtdGlc(mono-acyl Chain)		Price on request	
T2020	2,3,4,6-Tetra-*O*-benzoyl-D-glucopyranose		250mg	1g
A5515	2,3,4,6-Tetra-*O*-benzoyl-β-D-glucopyranosyl Isothiocyanate [for HPLC Labeling]		100mg	1g
T1991	2,3,4,6-Tetra-*O*-benzoyl-α-D-glucopyranosyl *p*-Trifluoromethylbenzylthio-*N*-(*p*-trifluoromethylphenyl)formimidate		200mg	1g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
T1914	2,3,4,6-Tetra-*O*-benzyl-D-glucopyranose	1g	5g
T1971	2,3,4,6-Tetra-*O*-benzyl-D-glucopyranosyl Fluoride		500mg
T1922	2,3,4,6-Tetra-*O*-benzyl-*α*-D-glucopyranosyl Fluoride		500mg
T1923	2,3,4,6-Tetra-*O*-benzyl-*β*-D-glucopyranosyl Fluoride		500mg
T2197	2,3,4,6-Tetra-*O*-benzyl-*α*-D-glucopyranosyl *N,N,N'*,*N'*-Tetramethylphosphorodiamidate (*ca.* 20% in Benzene)		5g
T1999	2,3,4,6-Tetra-*O*-benzyl-*α*-D-glucopyranosyl *p*-Trifluoromethylbenzylthio-*N*-(*p*-trifluoromethylphenyl)formimidate	200mg	1g
T1931	3,4,6-Tri-*O*-acetyl-2-deoxy-D-glucopyranose		100mg
T1596	Tri-*O*-acetyl-D-glucal	5g	25g
T1933	3,4,6-Tri-*O*-benzyl-2-deoxy-D-glucopyranose		100mg
T1859	Tri-*O*-benzyl-D-glucal	1g	5g
T1936	6-*O*-(Triisopropylsilyl)-D-glucal		100mg
G0277	Zinc(II) Gluconate Hydrate	25g	500g

A2253



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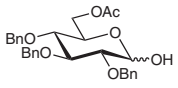

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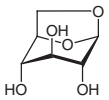

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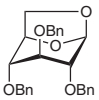

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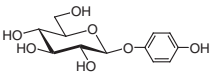

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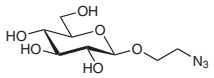

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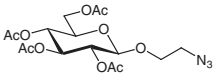

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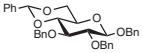

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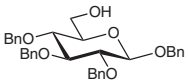

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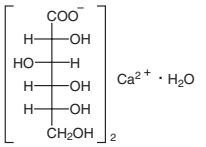

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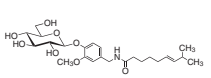

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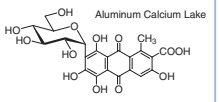

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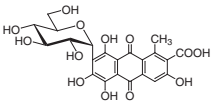

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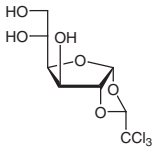

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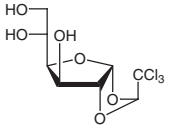

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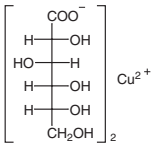

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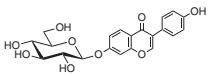

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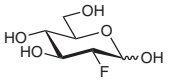

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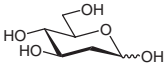

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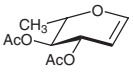

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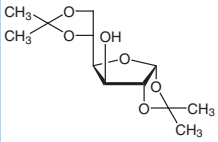

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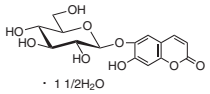

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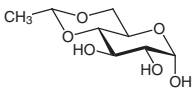

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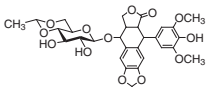

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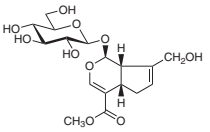

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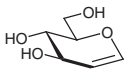

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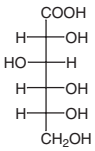

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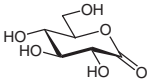

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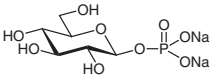

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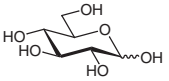

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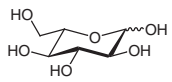

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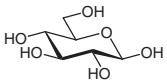

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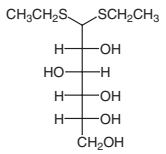

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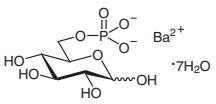

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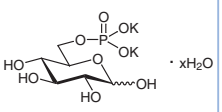

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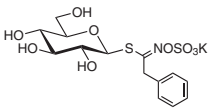

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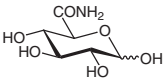

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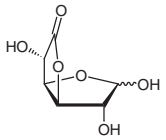

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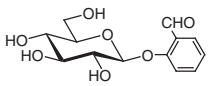

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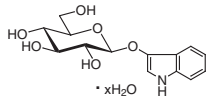

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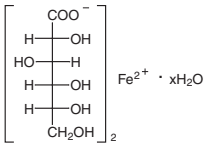

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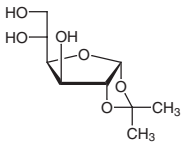

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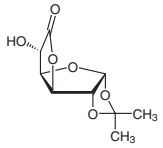

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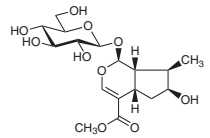

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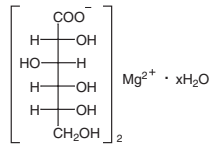

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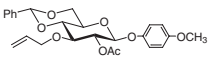

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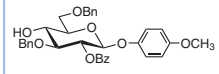

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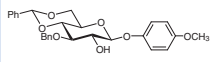

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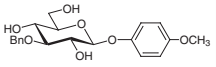

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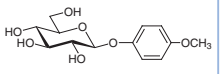

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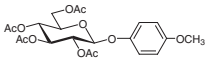

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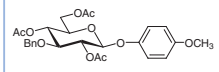

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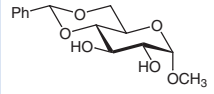

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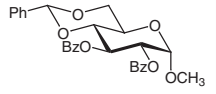

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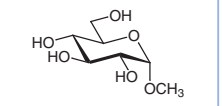

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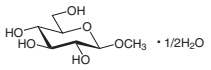

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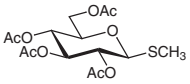

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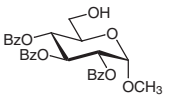

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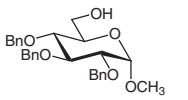

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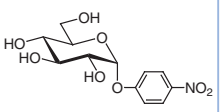

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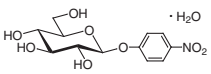

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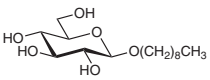

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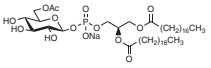

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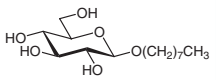

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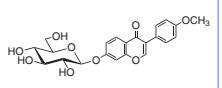

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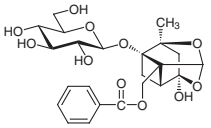

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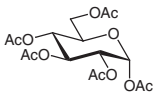

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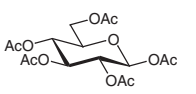

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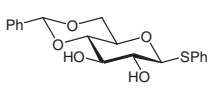

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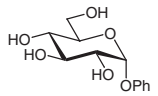

Availability or specification of the listed products are subject to change without prior notice.

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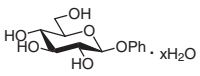

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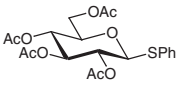

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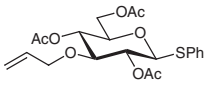

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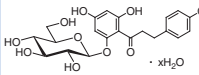

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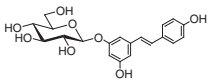

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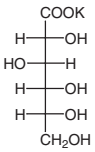

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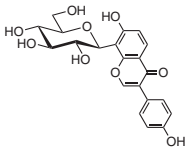

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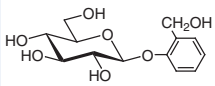

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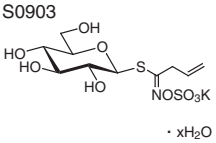

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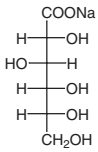

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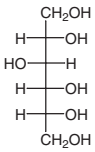

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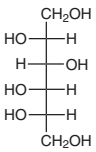

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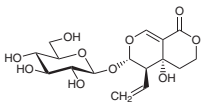

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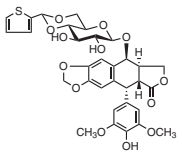

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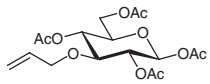

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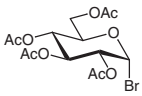

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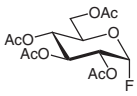

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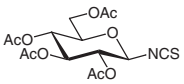

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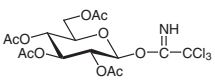

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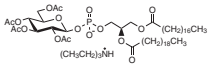

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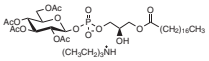

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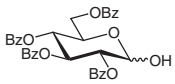

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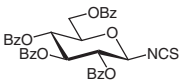

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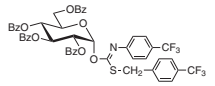

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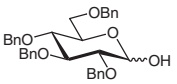

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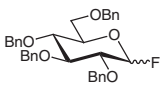

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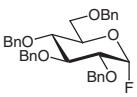

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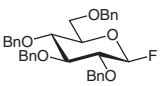

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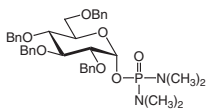

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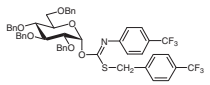

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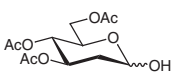

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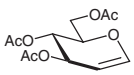

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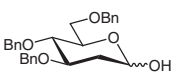

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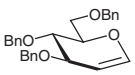

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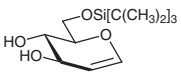

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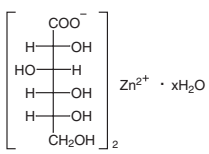
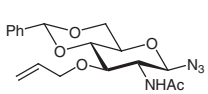


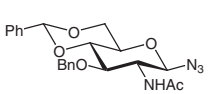
Glucosamine

Product No.	Product Name	Unit Size	
A1812	2-Acetamido-3-*O*-allyl-4,6-*O*-benzylidene-2-deoxy-β-D-glucopyranosyl Azide		1g
A1813	2-Acetamido-3-*O*-benzyl-4,6-*O*-benzylidene-2-deoxy-β-D-glucopyranosyl Azide		1g
A1811	2-Acetamido-4,6-*O*-benzylidene-2-deoxy-β-D-glucopyranosyl Azide	1g	5g
A1614	N^{ω}-(2-Acetamido-2-deoxy-β-D-glucopyranosyl)-N^{α}-(*tert*-butoxycarbonyl)-L-asparagine		100mg
A1459	2-Acetamido-1,3,4,6-tetra-*O*-acetyl-2-deoxy-β-D-glucopyranose	1g	5g
A1616	2-Acetamido-3,4,6-tri-*O*-acetyl-2-deoxy-β-D-glucopyranosyl Azide	1g	5g
A1416	2-Acetamido-3,4,6-tri-*O*-acetyl-2-deoxy-α-D-glucopyranosyl Chloride	1g	5g
A1678	2-Acetamido-3,4,6-tri-*O*-benzyl-2-deoxy-β-D-glucopyranosyl Azide	1g	5g
A1685	N^{ω}-(2-Acetamido-3,4,6-tri-*O*-benzyl-2-deoxy-β-D-glucopyranosyl)-N^{α}-(*tert*-butoxycarbonyl)-L-asparagine Benzyl Ester		100mg
A0092	*N*-Acetyl-D-glucosamine	25g	500g
A2172	2-Azidoethyl 2-Acetamido-2-deoxy-β-D-glucopyranoside		500mg
B0200	*N*-Benzoyl-D-glucosamine		25g
G0297	*N*-GlcNAc-Biotin		50mg
G0042	D-Glucosamic Acid		1g
G0044	D-(+)-Glucosamine Hydrochloride	25g	500g
G0045	D-Glucosamine Oxime Hydrochloride		1g
H0118	*N*-Hexanoyl-D-glucosamine		1g
M1834	4-Methoxyphenyl 4-*O*-Acetyl-3,6-di-*O*-benzyl-2-deoxy-2-phthalimido-β-D-glucopyranoside	1g	5g
M1638	4-Methoxyphenyl 3-*O*-Allyl-2-azido-4,6-*O*-benzylidene-2-deoxy-β-D-glucopyranoside		1g
M1604	4-Methoxyphenyl 3-*O*-Allyl-6-*O*-benzyl-2-deoxy-2-phthalimido-β-D-glucopyranoside	1g	5g
M1598	4-Methoxyphenyl 3-*O*-Allyl-4,6-*O*-benzylidene-2-deoxy-2-phthalimido-β-D-glucopyranoside	1g	5g
M1616	4-Methoxyphenyl 2-Amino-3,6-di-*O*-benzyl-2-deoxy-β-D-glucopyranoside	1g	5g
M1637	4-Methoxyphenyl 2-Azido-4,6-*O*-benzylidene-2-deoxy-β-D-glucopyranoside	1g	5g
M1617	4-Methoxyphenyl 2-Azido-3,6-di-*O*-benzyl-2-deoxy-β-D-glucopyranoside		1g
M1609	4-Methoxyphenyl 3-*O*-Benzyl-4,6-*O*-benzylidene-2-deoxy-2-phthalimido-β-D-glucopyranoside		1g
M1610	4-Methoxyphenyl 3-*O*-Benzyl-2-deoxy-2-phthalimido-β-D-glucopyranoside	Price on request	
M1479	4-Methoxyphenyl 4,6-*O*-Benzylidene-2-deoxy-2-phthalimido-β-D-glucopyranoside		5g
M1615	4-Methoxyphenyl 3,6-Di-*O*-benzyl-2-deoxy-2-phthalimido-β-D-glucopyranoside		1g
M1480	4-Methoxyphenyl 3,4,6-Tri-*O*-acetyl-2-deoxy-2-phthalimido-β-D-glucopyranoside		5g
M1649	Methyl 3,4,6-Tri-*O*-acetyl-2-deoxy-2-phthalimido-1-thio-β-D-glucopyranoside	1g	5g
N0866	4-Nitrophenyl 2-Acetamido-2-deoxy-β-D-glucopyranoside	200mg	1g
P0130	Phenyl *N*-Acetyl-α-D-glucosaminide		100mg
P1762	Phenyl *N*-Benzyl-2-amino-4,6-*O*-benzylidene-2-*N*,3-*O*-carbonyl-2-deoxy-1-thio-β-D-glucopyranoside		1g
P1866	Phenyl 3,4,6-Tri-*O*-acetyl-2-deoxy-1-thio-2-(2,2,2-trichloroethoxyformamido)-β-D-glucopyranoside		5g
T2196	1,3,4,6-Tetra-*O*-acetyl-2-azido-2-deoxy-β-D-glucopyranose	200mg	1g
T2047	1,3,4,6-Tetra-*O*-acetyl-2-deoxy-2-phthalimido-β-D-glucopyranose	5g	25g
T2615	3,4,6-Tri-*O*-acetyl-2-deoxy-2-phthalimido-β-D-glucopyranosyl 2,2,2-Trichloroacetimidate	Price on request	
T0973	*N*-Trifluoroacetyl-D-glucosamine	1g	5g
V0011	*N*-Valeryl-D-glucosamine		1g

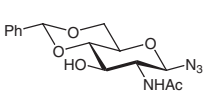
A1812



A1813



A1811



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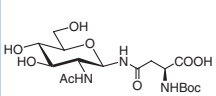

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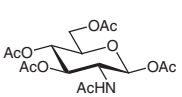

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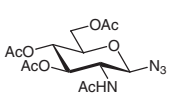

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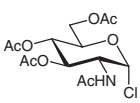

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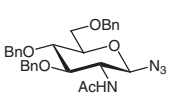

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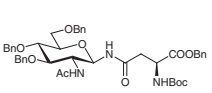

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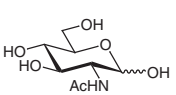
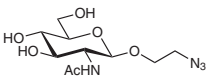


Availability or specification of the listed products are subject to change without prior notice.

A2172



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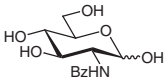

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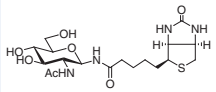

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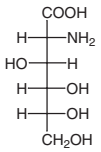

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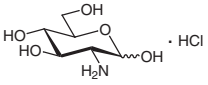

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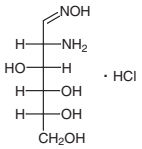

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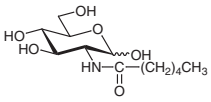

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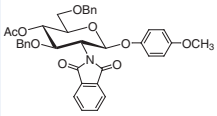

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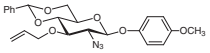

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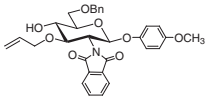

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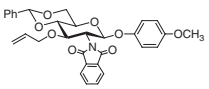

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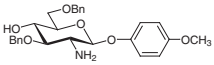

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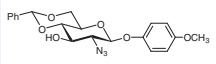

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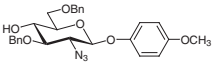

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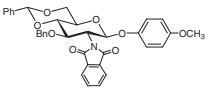

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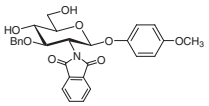

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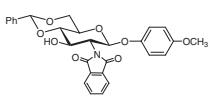

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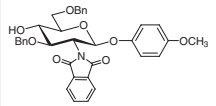

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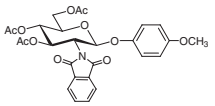

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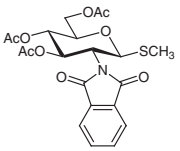

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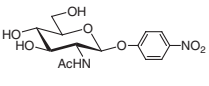

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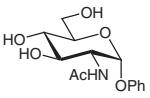

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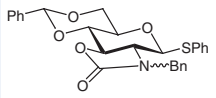

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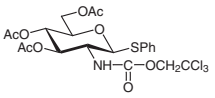
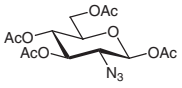


T2196



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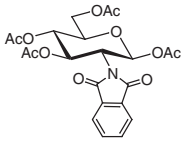

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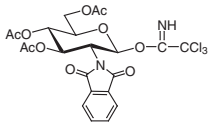

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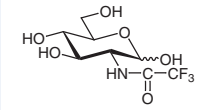

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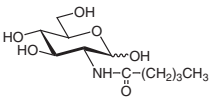
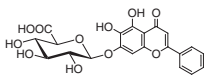


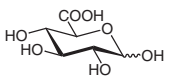
Glucuronic Acids

Product No.	Product Name	Unit Size	
B2835	Baicalin		25g
G0302	D-Glucuronic Acid	5g	25g
G0055	D-Glucurono-6,3-lactone	25g	500g
I0688	1,2-*O*-Isopropylidene-*α*-D-glucurono-6,3-lactone		1g
M1759	Methyl (Phenyl 2,3,4-Tri-*O*-acetyl-1-thio-*β*-D-glucopyranosid)uronate		1g
M1868	Methyl 1,2,3,4-Tetra-*O*-acetyl-*β*-D-glucuronate	1g	5g
N0857	4-Nitrophenyl *α*-D-Glucuronide		25mg
N0618	4-Nitrophenyl *β*-D-Glucuronide [Substrate for *β*-Glucuronidase]		100mg

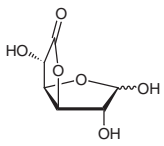
B2835



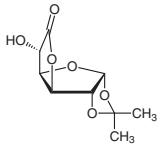
G0302



G0055



I0688



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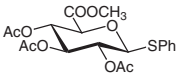

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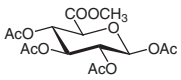
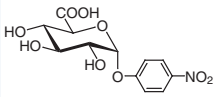


N0857



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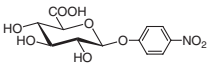
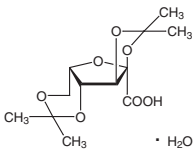


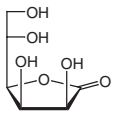
Gulose

Product No.	Product Name			Unit Size
D2191	(-)-2,3:4,6-Di-*O*-isopropylidene-2-keto-L-gulonic Acid Monohydrate			5g
G0235	L-(+)-Gulonic Acid γ-Lactone		5g	25g
G0239	L-Gulose	1g	5g	25g

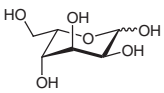
D2191



G0235



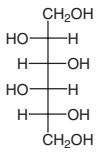
G0239



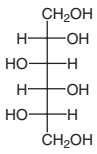
Idose

Product No.	Product Name	Unit Size
I0724	D-Iditol	100mg
I0725	L-Iditol	200mg

I0724



I0725



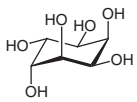
Inositol

Product No.	Product Name	Unit Size
I0629	*allo*-Inositol	25mg
I0632	1D-*chiro*-Inositol	200mg

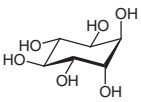
Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
I0633	1L-*chiro*-Inositol		200mg
I0628	*epi*-Inositol		200mg
I0630	*muco*-Inositol		100mg
I0040	*myo*-Inositol	25g	500g
I0631	*scyllo*-Inositol	200mg	1g
I0634	1L-*epi*-2-Inosose		200mg
P0409	Phytic Acid (*ca.* 50% in Water, *ca.* 1.1mol/L)	25g	500g
P0410	Phytin	25g	500g
P2219	D-Pinitol	100mg	1g
Q0070	(+)-*epi*-Quercitol		200mg
Q0071	(+)-*proto*-Quercitol		100mg
Q0069	(-)-*vibo*-Quercitol		200mg

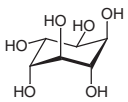
I0629



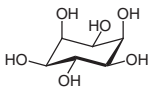
I0632



I0633



I0628



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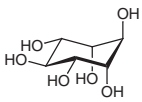

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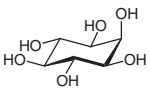

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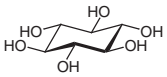

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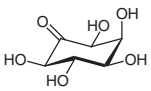

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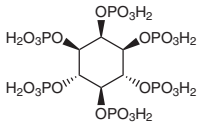

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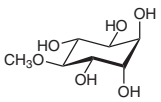

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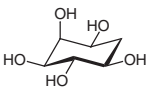

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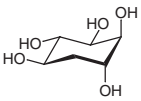

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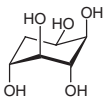
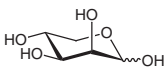


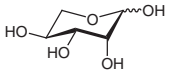
Lyxose

Product No.	Product Name		Unit Size	
L0073	D-(-)-Lyxose	1g	5g	25g
L0153	L-(+)-Lyxose		1g	5g

L0073



L0153



Mannose

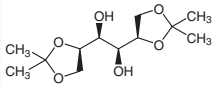
Product No.	Product Name	Unit Size	
D4372	1,6:2,3-Dianhydro-β-D-mannopyranose		200mg
D2024	1,2:5,6-Di-*O*-isopropylidene-D-mannitol	5g	25g

Product No.	Product Name	Unit Size		
D2447	2,3:5,6-Di-*O*-isopropylidene-D-mannofuranose			5g
H1452	1,2,3,4,5,6-Hexa-*O*-[11-[4-(4-hexylphenylazo)phenoxy]undecanoyl]-D-mannitol		1g	5g
I0489	3,4-*O*-Isopropylidene-D-mannitol		1g	5g
M0044	D-Mannitol		25g	500g
M1084	L-Mannitol			100mg
M0958	D-Mannono-1,4-lactone		1g	5g
M2435	$N^{(\omega)}$-(β-D-Mannopyranosyl)-L-asparagine			Price on request
M0045	D-(+)-Mannose	25g	100g	500g
M1308	L-(-)-Mannose			1g
M0046	Mannose-6-phosphate Barium Salt Hydrate			100mg
M1646	4-Methoxyphenyl α-D-Mannopyranoside			5g
M1647	4-Methoxyphenyl 2,3,4,6-Tetra-*O*-acetyl-α-D-mannopyranoside			5g
M2061	Methyl 2,3:4,6-Di-*O*-benzylidene-α-D-mannopyranoside		5g	25g
M0368	Methyl α-D-Mannopyranoside		25g	250g
M1501	Methyl 2,3,4,6-Tetra-*O*-acetyl-1-thio-α-D-mannopyranoside (contains *ca.* 5% β-isomer)			5g
M2102	Methyl 2,3,4,6-Tetra-*O*-pivaloyl-D-mannopyranoside			1g
N0619	4-Nitrophenyl α-D-Mannopyranoside [Substrate for α-Mannosidase]			1g
P1514	1,2,3,4,6-Penta-*O*-acetyl-D-mannopyranose			5g
P1803	1,2,3,4,6-Penta-*O*-pivaloyl-D-mannopyranose			1g
T1459	1,3,4,6-Tetra-*O*-acetyl-β-D-mannopyranose		1g	5g
T2567	2,3,4,6-Tetra-*O*-acetyl-D-mannopyranosyl Fluoride		1g	5g
T2307	1,3,4,6-Tetra-*O*-acetyl-2-*O*-(trifluoromethanesulfonyl)-β-D-mannopyranose			100mg
T2056	2,3,4,6-Tetra-*O*-benzoyl-D-mannopyranose		1g	5g
T2568	2,3,4,6-Tetra-*O*-pivaloyl-D-mannopyranosyl Fluoride			1g

D4372



D2024



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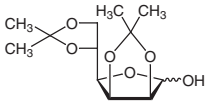

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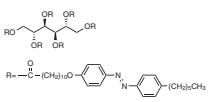

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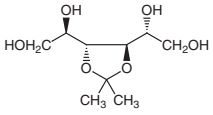

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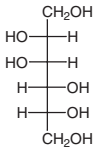

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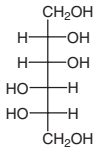

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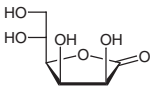

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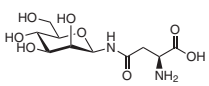

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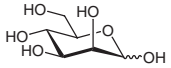

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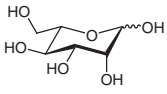

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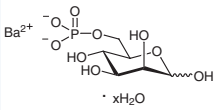

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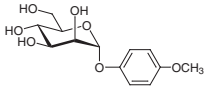

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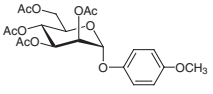

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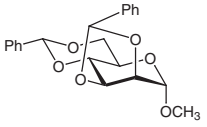

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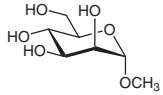

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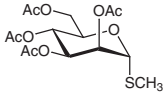

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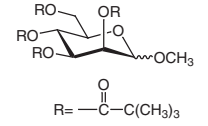

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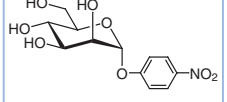

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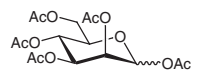

Availability or specification of the listed products are subject to change without prior notice.

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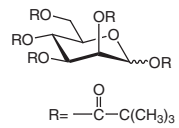

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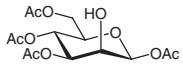

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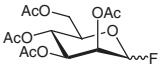

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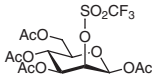

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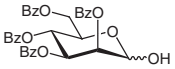

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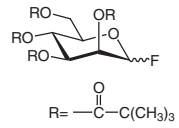
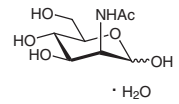


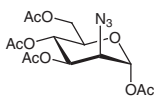
Mannosamine

Product No.	Product Name	Unit Size	
A2160	*N*-Acetyl-D-mannosamine Monohydrate	1g	5g
T1733	1,3,4,6-Tetra-*O*-acetyl-2-azido-2-deoxy-*α*-D-mannopyranose		100mg

A2160



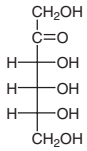
T1733



Psicose

Product No.	Product Name	Unit Size	
P1699	D-Psicose	100mg	1g
P1778	L-Psicose		100mg

P1699



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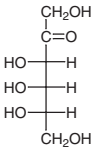
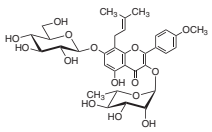


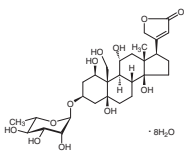
Rhamnose

Product No.	Product Name	Unit Size	
I0862	Icariin	200mg	1g
S0091	Ouabain Octahydrate	1g	5g
R0013	L-(+)-Rhamnose Monohydrate	5g	25g

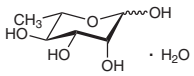
I0862



S0091



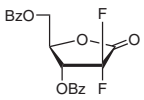
R0013



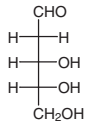
Ribose

Product No.	Product Name	Unit Size	
D4207	2-Deoxy-2,2-difluoro-D-*erythro*-pentonic Acid γ-Lactone 3,5-Dibenzoate	1g	5g
D0059	2-Deoxy-D-ribose	5g	25g
M1965	Methyl β-D-Ribofuranoside	1g	5g
A0171	Ribitol	1g	25g
R0067	β-D-Ribofuranose 1-Acetate 2,3,5-Tribenzoate	5g	25g
R0080	β-L-Ribofuranose 1-Acetate 2,3,5-Tribenzoate		1g
R0063	D-(+)-Ribono-1,4-lactone	1g	5g
R0025	D-(-)-Ribose	25g	250g
R0068	L-Ribose	1g 5g	25g
R0082	α-D-Ribose 1,5-Bis(phosphate) Tetrasodium Salt		5mg
R0083	β-D-Ribose 1,5-Bis(phosphate) Tetrasodium Salt	Price on request	
R0026	Ribose-5-phosphate Barium Salt Hydrate	100mg	1g
R0066	Tetra-*O*-acetyl-β-D-ribofuranose	5g	25g
R0065	Tetra-*O*-acetyl-β-D-ribopyranose		1g
T2607	1,2,3-Tri-*O*-acetyl-5-deoxy-β-D-ribofuranose	5g	25g
T2641	1,3,5-Tri-*O*-benzoyl-α-D-ribofuranose	5g	25g

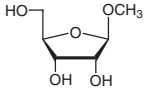
D4207



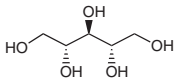
D0059



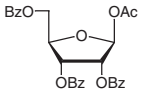
M1965



A0171



R0067



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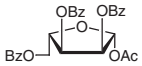

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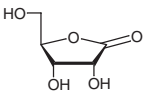

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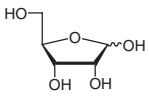

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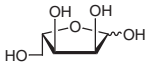

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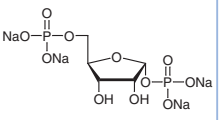

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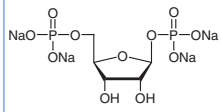

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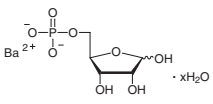
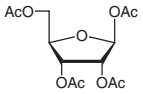
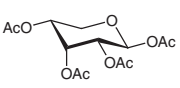


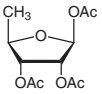
R0066



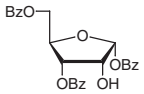
R0065



T2607



T2641

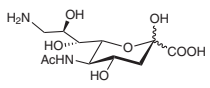


Availability or specification of the listed products are subject to change without prior notice.

Sialic Acids

Product No.	Product Name	Unit Size		
A2511	*N*-Acetyl-9-deoxy-9-aminoneuraminic Acid			Price on request
A2492	*N*-Acetyl-9-deoxy-9-fluoroneuraminic Acid			Price on request
A2205	*N*-Acetyl-2,3-didehydro-2-deoxyneuraminic Acid			5mg
A0639	*N*-Acetylneuraminic Acid Hydrate	100mg	1g	5g
A1105	*N*-Acetylneuraminic Acid	100mg	1g	5g
A1821	*N*-Acetylneuraminic Acid Methyl Ester			1g
G0336	*N*-Glycolylneuraminic Acid			10mg
M1706	Methyl 5-Acetamido-4,7,8,9-tetra-*O*-acetyl-3,5-dideoxy-2-*S*-phenyl-2-thio-D-*glycero*-D-*galacto*-2-nonulopyranosylonate			1g
M2319	Methyl 5-Acetamido-7,8,9-tri-*O*-acetyl-5-*N*,4-*O*-carbonyl-3,5-dideoxy-2-*S*-phenyl-2-thio-D-*glycero*-*β*-D-*galacto*-2-nonulopyranosylonate	200mg		1g
M2329	Methyl 5-*N*,4-*O*-Carbonyl-3,5-dideoxy-2-*S*-phenyl-2-thio-D-*glycero*-*β*-D-*galacto*-2-nonulopyranosylonate			1g
M2330	Methyl 7,8,9-Tri-*O*-acetyl-5-*N*,4-*O*-carbonyl-3,5-dideoxy-2-*S*-phenyl-2-thio-D-*glycero*-*β*-D-*galacto*-2-nonulopyranosylonate			Price on request
M1707	2,4,7,8,9-Penta-*O*-acetyl-*N*-acetylneuraminic Acid Methyl Ester			Price on request
A1822	4,7,8,9-Tetra-*O*-acetyl-*N*-acetylneuraminic Acid Methyl Ester			1g

A2511



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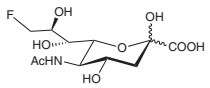

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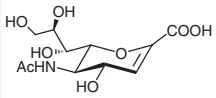
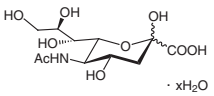


A0639
A1105



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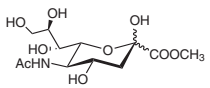
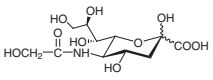
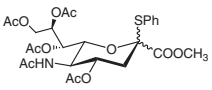


G0336



M1706



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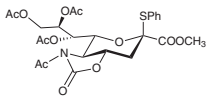

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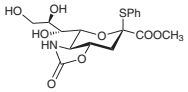

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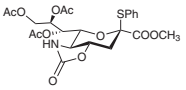

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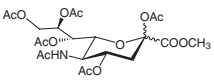

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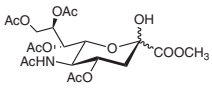
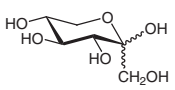


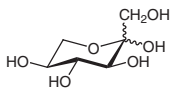
Sorbose

Product No.	Product Name	Unit Size
S0390	D-Sorbose	100mg
S0066	L-(-)-Sorbose	25g

S0390



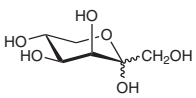
S0066



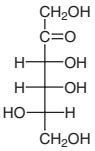
Tagatose

Product No.	Product Name	Unit Size	
T1501	D-Tagatose	1g	5g
T2535	L-Tagatose		100mg

T1501



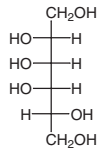
T2535



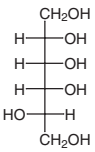
Talose

Product No.	Product Name	Unit Size	
T1398	D-Talitol		100mg
T2536	L-Talitol		100mg
T0869	D-(+)-Talose	100mg	500mg
T1767	L-(-)-Talose		100mg

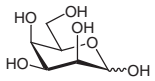
T1398



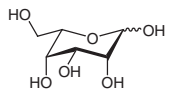
T2536



T0869



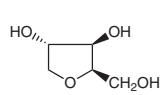
T1767



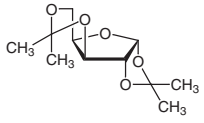
Xylose

Product No.	Product Name	Unit Size	
A2635	1,4-Anhydro-D-xylitol	20mg	100mg
D2616	1,2:3,5-Di-*O*-isopropylidene-α-D-xylofuranose		5g
I0721	1,2-*O*-Isopropylidene-α-D-xylofuranose	5g	25g
M1253	Methyl-β-D-xylopyranoside	5g	25g
N0868	2-Nitrophenyl β-D-Xylopyranoside		100mg
N0620	4-Nitrophenyl β-D-Xylopyranoside [Substrate for β-Xylosidase]		100mg
X0018	Xylitol	25g	500g
X0020	DL-Xylose		1g
X0019	D-(+)-Xylose	25g	500g
X0021	L-(-)-Xylose	5g	25g

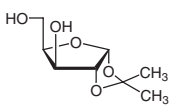
A2635



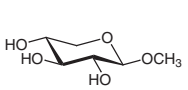
D2616



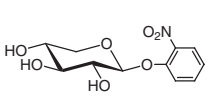
I0721



M1253



N0868



Availability or specification of the listed products are subject to change without prior notice.

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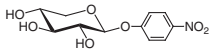
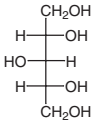
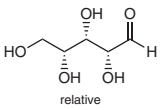
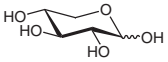
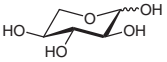
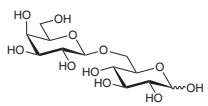
				

Disaccharides

Product No.	Product Name	Unit Size		
A2630	Allolactose	Price on request		
A0443	Amygdalin	1g	10g	
B3972	Bleomycin Sulfate (mixture)	10mg	50mg	
L0006	Calcium Lactobionate Hydrate		25g	
C0056	D-(+)-Cellobiose	5g	25g	
C0861	α-D-Cellobiose Octaacetate		25g	
D4215	*N,N'*-Diacetylchitobiose		20mg	
D3908	Diosmin	5g	25g	
G0270	Dipotassium Glycyrrhizinate Hydrate		25g	
F0897	Fucα(1-6)GlcNAc	Price on request		
G0374	Gal[2Ac,346Bn]β(1-3)GlcNPhth[46Bzd]-β-MP	Price on request		
G0330	Gal[2346Ac]β(1-3)GalN$_3$[46Bzd]-β-MP	1g	5g	
M1694	Gal[2346Ac]β(1-4)Glc[236Ac]-β-MP	Price on request		
G0309	Gal[2346Ac]β(1-3)GlcN$_3$[46Bzd]-β-MP	1g	5g	
G0311	Gal[2346Ac]β(1-3)GlcNPhth[46Bzd]-β-MP	1g	5g	
G0298	Galactinol Hydrate	100mg	1g	
G0379	Gal[3All,246Bn]β(1-3)GlcNPhth[6Bn]-β-MP	Price on request		
M1726	Gal[236Bn]β(1-4)Glc[236Bn]-β-MP	1g	5g	
M1727	Gal[246Bn]β(1-4)Glc[236Bn]-β-MP		1g	
M1686	Gal[26Bn]β(1-4)Glc[236Bn]-β-MP	1g	5g	
G0375	Galβ(1-3)GalNAc-α-*p*NP		5mg	
G0344	Galβ(1-3)GalNAc-β-*p*NP		5mg	
G0340	Galβ(1-3)GalNAc-α-Thr		5mg	
M1805	Galβ(1-4)Glc-β-MP		1g	
G0420	Galβ(1-3)GlcNAc-β-*p*NP	Price on request		
G0373	GalNAcβ(1-3)GlcNAcβ-Ethylazide	Price on request		
G0352	GalNAcβ(1-3)GlcNAc-β-*p*NP		2mg	
G0356	GalNAcβ(1-4)GlcNAc-β-*p*NP		2mg	
G0026	Gentiobiose		100mg	
G0376	GlcNAcβ(1-3)GalNAc-α-*p*NP		5mg	
G0341	GlcNAcβ(1-3)GalNAc-α-Thr		2mg	
G0337	GlcNAcβ(1-2)Manα-1-Ethylazide		100mg	
G0299	GlcNPhth[346Ac]β(1-3)Gal[246Bn]-β-MP	200mg	1g	
G0394	2-*O*-α-D-Glucopyranosyl-L-ascorbic Acid	1g	5g	
G0150	Glycyrrhizin	1g	25g	
H0049	Hesperidin	25g	100g	500g
I0231	Isomaltose	100mg	1g	
M1733	LacDiNAc MP Glycoside		5mg	
M1776	LacDiNAc(I) MP Glycoside		5mg	
L0005	Lactobionic Acid (mixture of Acid form and Lactone form)	25g	500g	
L0008	D-(+)-Lactose Monohydrate	25g	500g	
L0140	Lactulose		25g	
M0601	Maltitol	25g	500g	
M0797	Maltitol	25g	100g	500g
M0037	D-(+)-Maltose Monohydrate	25g	500g	
M1138	Maltulose Monohydrate		1g	
M2442	Man[2Bz,3All,46Bzd]β(1-4)GlcNPhth[36Bn]-β-MP	Price on request		
M0050	D-(+)-Melibiose Monohydrate	1g	10g	
M0338	Methyl Hesperidine	5g	25g	
G0151	Monoammonium Glycyrrhizinate Hydrate	1g	25g	
N0073	Naringin Hydrate		25g	
N0675	Neohesperidin Dihydrochalcone Hydrate	5g	25g	
N0947	Neu5Acα(2-3)Gal-β-ethylamine	Price on request		
N0948	Neu5Acα(2-6)Gal-β-ethylamine	Price on request		

Product No.	Product Name	Unit Size		
N0791	Neu5Acα(2-3)Galβ MP Glycoside		10mg	50mg
N0792	Neu5Acα(2-6)Galβ MP Glycoside		10mg	50mg
N0890	Neu5Acα(2-6)GalNAc-α-*p*NP			5mg
M1761	Neu5Ac[1Me,4789Ac]α(2-6)Gal[24Bz,3Bn]-β-MP			200mg
N0846	Neu5Ac[1Me,4789Ac]α(2-3)Gal[246Bz]-β-MP		200mg	1g
M1763	Neu5GcAc[1Me,4789Ac]α(2-6)Gal[24Bz,3Bn]-β-MP			200mg
N0816	Neu5GcAc[1Me,4789Ac]α(2-3)Gal[246Bz]-β-MP			Price on request
N0793	Neu5Gcα(2-3)Galβ MP Glycoside			5mg
N0794	Neu5Gcα(2-6)Galβ MP Glycoside			5mg
M1729	Neu5Troc[1Me,4789Ac]α(2-3)Gal[26Bn]-β-MP			1g
N0867	4-Nitrophenyl β-D-Cellobioside			100mg
S0052	Octa-*O*-acetyl D-(+)-Sucrose		25g	500g
P1879	Paeonolide			10mg
P1234	Palatinose Hydrate		25g	500g
R0035	Rutin Hydrate			25g
R0062	Rutinose			100mg
H0628	Rutinose Heptaacetate			1g
S0594	Stevioside			25g
S0839	Sucralose		5g	25g
S0111	D-(+)-Sucrose		25g	500g
T0832	D-(+)-Trehalose Anhydrous	1g	5g	25g
T0331	D-(+)-Trehalose Dihydrate		25g	500g
G0217	Trisodium Glycyrrhizinate Hydrate			25g
T0542	D-(+)-Turanose		1g	5g
X0067	Xylobiose		100mg	1g
X0065	Xylosucrose		100mg	1g

A2630



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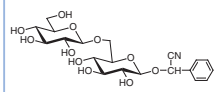

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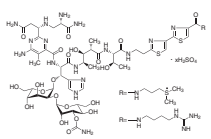

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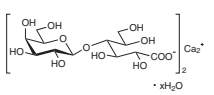

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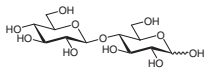

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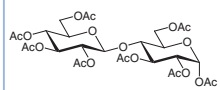

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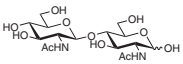

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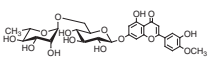

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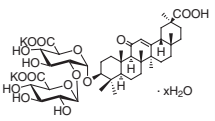

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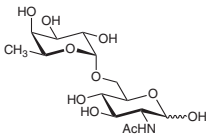

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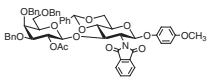

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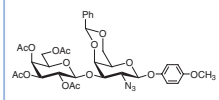

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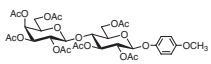

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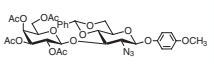

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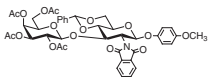

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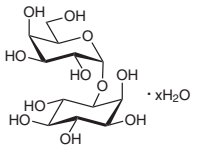

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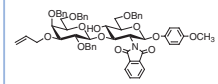

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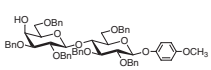

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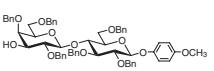

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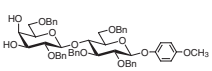
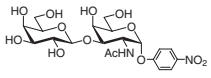
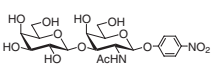
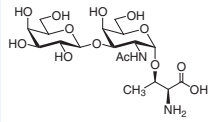
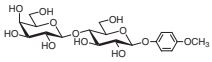
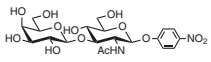
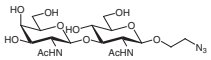
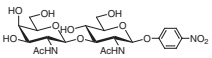
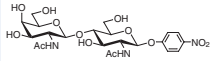
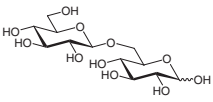
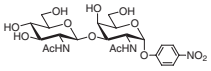
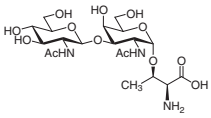
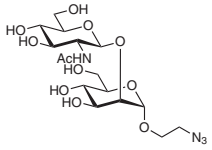
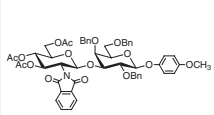
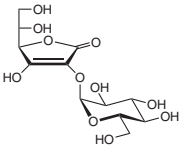
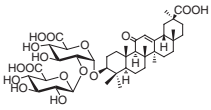
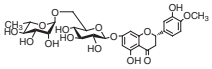
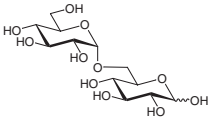
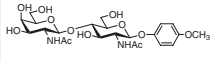
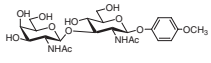
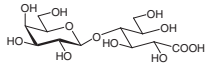
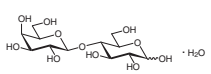
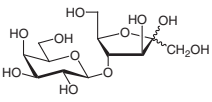
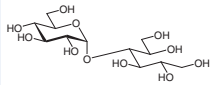
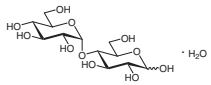
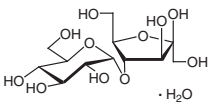
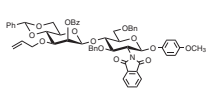
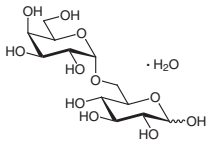
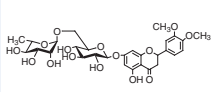
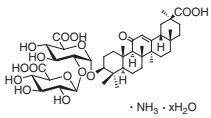
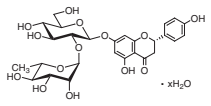
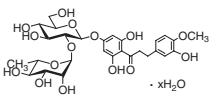
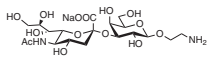
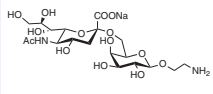
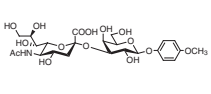
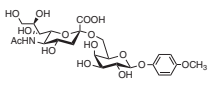
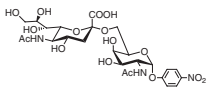
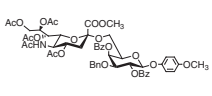
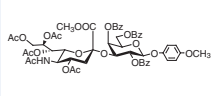
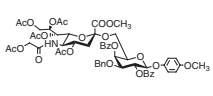
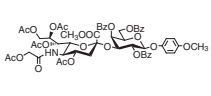
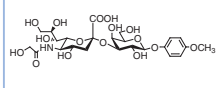
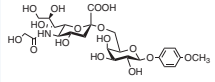
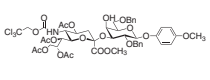
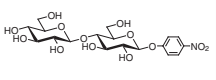
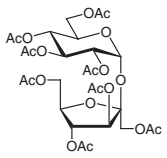
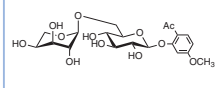
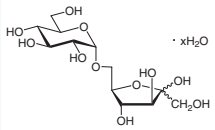
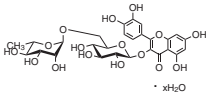
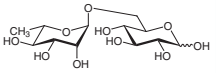
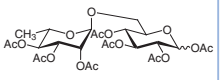
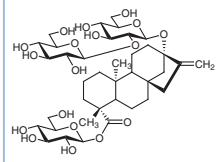
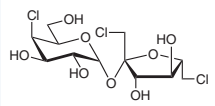
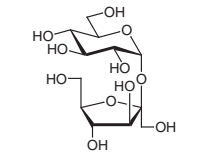
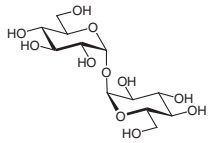
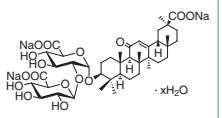
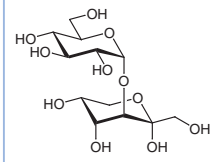
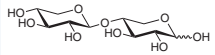
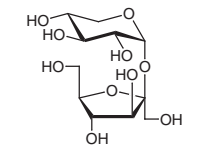


Availability or specification of the listed products are subject to change without prior notice.

G0375 	G0344 	G0340 	M1805 	G0420 
G0373 	G0352 	G0356 	G0026 	G0376 
G0341 	G0337 	G0299 	G0394 	G0150 
H0049 	I0231 	M1733 	M1776 	L0005 
L0008 	L0140 	M0601 M0797 	M0037 	M1138 
M2442 	M0050 	M0338 	G0151 	N0073 
N0675 	N0947 	N0948 	N0791 	N0792 
N0890 	M1761 	N0846 	M1763 	N0816 

N0793 	N0794 	M1729 	N0867 	S0052 
P1879 	P1234 	R0035 	R0062 	H0628 
S0594 	S0839 	S0111 	T0832 T0331 	G0217 
T0542 	X0067 	X0065 		

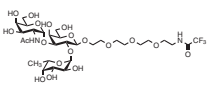
Trisaccharides

Product No.	Product Name	Unit Size
A2631	A Antigen PEG-trifluoroacetamide	Price on request
A2485	Acarbose Hydrate	1g 5g
B4172	B Antigen PEG-trifluoroacetamide	Price on request
C2795	Cellotriose	20mg
C2642	Chitotriose Trihydrochloride Hydrate	25mg
D0542	Digitoxin	100mg
D1828	Digoxin	100mg 1g
F0895	Fucα(1-2)Galβ(1-3)GalNAc-α-*p*NP (=H type 3 α-*p*NP Glycoside)	Price on request
F0896	Fucα(1-2)Galβ(1-3)GalNAc-β-*p*NP (=H type 3 β-*p*NP Glycoside)	Price on request
F0894	Fucα(1-2)Galβ(1-3)GlcNAc-β-*p*NP (=H type 1 β-*p*NP Glycoside)	Price on request
G0343	Galβ(1-3)[GlcNAcβ(1-6)]GalNAc-α-Thr	Price on request
G0377	Galβ(1-3)[Neu5Acα(2-6)]GalNAc-α-*p*NP	2mg
G0345	Galβ(1-3)[Neu5Acα(2-6)]GalNAc-β-*p*NP	5mg
G0347	Galβ(1-3)[Neu5Acα(2-6)]GlcNAc-β-*p*NP	2mg
G0353	Galβ(1-4)[Neu5Acα(2-6)]GlcNAc-β-*p*NP	2mg
G0422	Ganglioside GM_3 (phyto-type)	Price on request
G0419	Ganglioside GM_3[d18:1, (Carbon-13)C16:0]	Price on request
G0402	Gb_3-β-ethylamine	Price on request
G0403	Gb_3-β-ethylazide	Price on request
M1767	Gb_3-β-MP	100mg
G0423	GlcNAcβ(1-4)[Fucα(1-6)]GlcNAc	Price on request
G0342	GlcNAcβ(1-3)[GlcNAcβ(1-6)]GalNAc-α-Thr	2mg
G0378	GlcNAcβ(1-3)[Neu5Acα(2-6)]GalNAc-α-*p*NP	2mg
G0398	α-Glucosyl Hesperidin	5mg
I0329	Isomaltotriose	100mg 1g
K0032	1-Kestose	1g
M0049	D-(+)-Melezitose Hydrate	5g 25g
N0949	Neu5Acα(2-3)Galβ(1-4)GlcNAc-β-ethylamine	Price on request

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size
N0950	Neu5Acα(2-6)Galβ(1-4)GlcNAc-β-ethylamine	Price on request
N0853	Neu5Acα(2-3)Galβ(1-3)GlcNAc-β-*p*NP	Price on request
N0854	Neu5Acα(2-3)Galβ(1-4)GlcNAc-β-*p*NP	2mg
N0855	Neu5Acα(2-6)Galβ(1-3)GlcNAc-β-*p*NP	1mg
N0856	Neu5Acα(2-6)Galβ(1-4)GlcNAc-β-*p*NP	2mg
N0860	Neu5Acα(2-3)Galβ(1-4)Glc-β-*p*NP	5mg
P0927	Panose	100mg
R0002	D-(+)-Raffinose Pentahydrate	25g
R0095	Rebaudioside A	5g 25g
S0885	3'-Sialyllactose Sodium Salt	20mg 100mg
S0886	6'-Sialyllactose Sodium Salt	20mg 100mg
T2912	*N,N',N''*-Triacetylchitotriose	20mg

A2631



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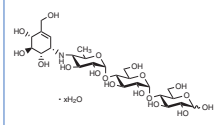

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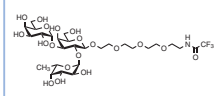

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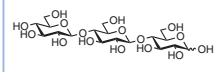

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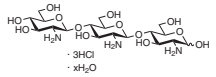

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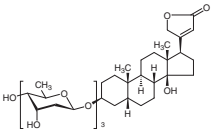

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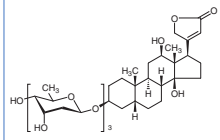

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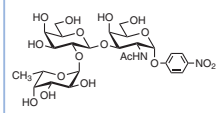

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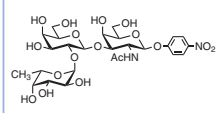

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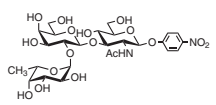

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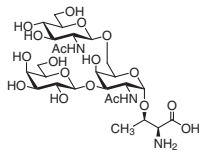

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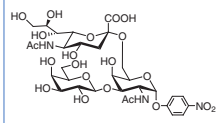

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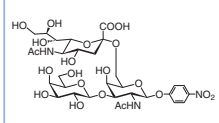

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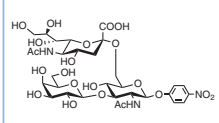

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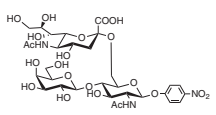

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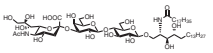

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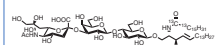

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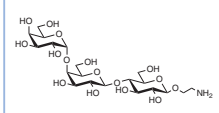

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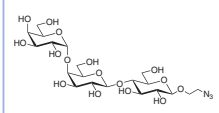

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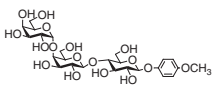

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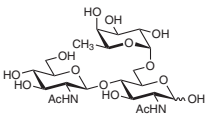

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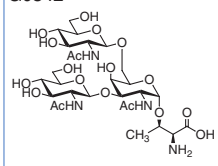

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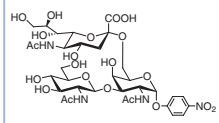

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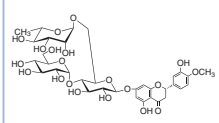

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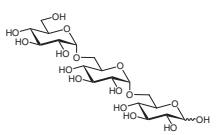

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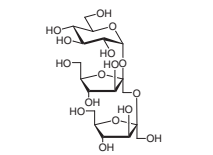

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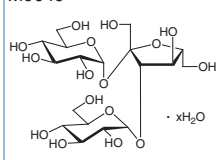

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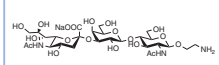

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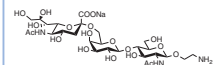

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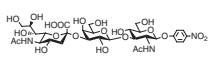

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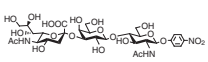

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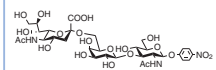

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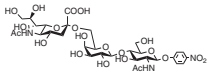

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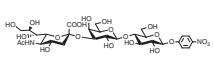
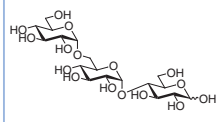
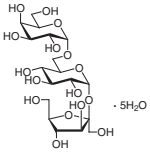


P0927



R0002



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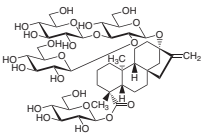
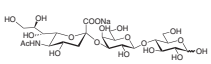


S0885



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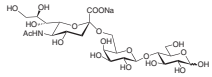
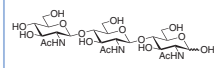


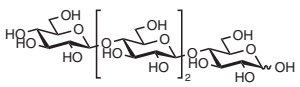
T2912



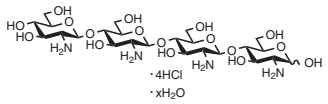
Tetrasaccharides

Product No.	Product Name	Unit Size
C2796	Cellotetraose	10mg
C2641	Chitotetraose Tetrahydrochloride Hydrate	25mg
G0348	Galβ(1-3)GlcNAcβ(1-3)Galβ(1-4)Glc-β-*p*NP	5mg
G0351	Galβ(1-4)GlcNAcβ(1-3)Galβ(1-4)Glc-β-*p*NP	Price on request
G0380	GalNAcβ(1-3)Galα(1-3)Galβ(1-4)Glc-β-*p*NP	Price on request
G0354	GalNAcβ(1-3)Galα(1-4)Galβ(1-4)Glc-β-*p*NP	5mg
G0372	GlcA[3S]β(1-3)Galβ(1-4)GlcNAcβ(1-2)Manα-Ethylazide	Price on request
H1284	Hyaluronate Tetrasaccharide	1mg 5mg
L0237	LacDiNAc Dimer Ethylazide	Price on request
L0229	Lac β(1-4)Lac-β-C_{10}	10mg 100mg
M1022	Maltotetraose	100mg
N0571	Nistose Trihydrate	1g
S0397	Stachyose Hydrate	1g 5g
T2910	*N*,*N*',*N*",*N*"-Tetraacetylchitotetraose	10mg

C2796



C2641



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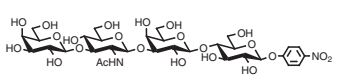
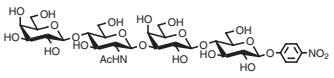
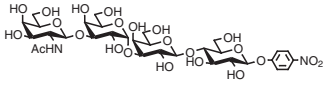


G0351



G0380



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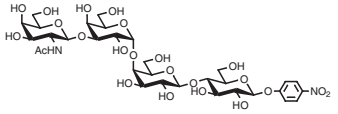

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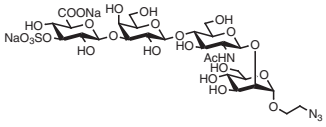

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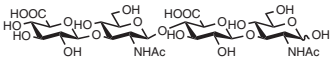
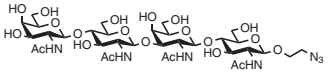
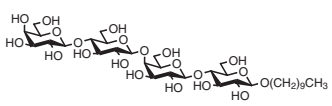


L0237



Availability or specification of the listed products are subject to change without prior notice.

L0229



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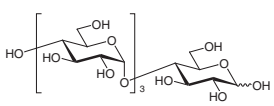
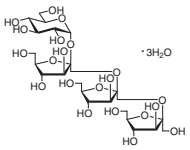
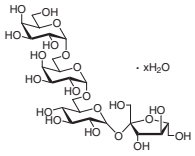


N0571



S0397



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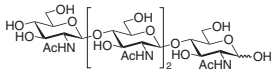
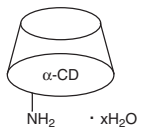


Oligosaccharides

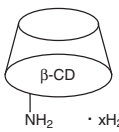
Product No.	Product Name			Unit Size
A2122	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-*α*-cyclodextrin Hydrate		200mg	1g
A1916	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-*β*-cyclodextrin Hydrate		200mg	1g
A2123	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-*γ*-cyclodextrin Hydrate			1g
C2644	Cellopentaose			25mg
C2762	Chitin Oligosaccharides (contains *N*-Acetylglucosamine)		25g	100g
C2849	Chitosan Oligosaccharides			25g
C0776	*α*-Cyclodextrin	10g	25g	100g
C0777	*β*-Cyclodextrin			25g
C0900	*β*-Cyclodextrin	25g	100g	500g
C0869	*γ*-Cyclodextrin	5g	25g	100g
D0540	Digitonin			100mg
D4217	Disialylnonasaccharide *β*-Ethylazide			Price on request
N0913	Disialylnonasaccharide-*β*-*p*NP			Price on request
D4065	Disialyloctasaccharide			Price on request
D3690	DNS-SGN			1mg
F0584	Forssman Pentaose MP Glycoside			Price on request
G0355	Gal*β*(1-3)GalNAc*β*(1-3)Gal*α*(1-4)Gal*β*(1-4)Glc-*β*-*p*NP			5mg
G0421	Ganglioside GM_1[d18:1, (Carbon-13)C16:0]			Price on request
H1041	Heptasaccharide Glc_4Xyl_3			100mg
H1044	Heptasaccharide Glc_4Xyl_3			100mg
H1333	HNK-1 Ethylazide			Price on request
H1285	Hyaluronate Hexasaccharide		1mg	5mg
H0979	Hydroxypropyl-*β*-cyclodextrin		25g	100g
M1025	Maltoheptaose			100mg
M1023	Maltopentaose			100mg
M2439	Man*α*(1-2)Man*α*(1-3)[Man*α*(1-6)Man*α*(1-6)]Man*β*(1-4)GlcNAc			Price on request
M1356	Methyl-*β*-cyclodextrin (mixture of several Methylated)		25g	250g
M1212	Mono-6-*O*-mesitylenesulfonyl-*γ*-cyclodextrin			1g
M1741	Mono-2-*O*-(*p*-toluenesulfonyl)-*β*-cyclodextrin Hydrate			1g
N0693	Nonasaccharide $Glc_4Xyl_3Gal_2$			100mg
P2027	*N*,*N*′,*N*″,*N*‴,*N*⁗-Pentaacetylchitopentaose			10mg
P0977	Poly-*β*-cyclodextrin (Cross-linked by Epichlorohydrin)			1g
S0523	Sialylglycopeptide			10mg
S0849	Sialyl Lewis X-Lactose		1mg	5mg
S0910	Sialyl Neolactotetraosylceramide (=Sialyl nLc_4Cer)			Price on request
T1844	Triacetyl-*β*-cyclodextrin			25g

A2122



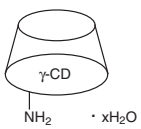
(2A*S*, 3A*S*)-α-CD

A1916



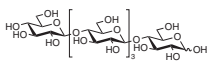
(2A*S*, 3A*S*)-β-CD

A2123



(2A*S*, 3A*S*)-γ-CD

C2644



C0776



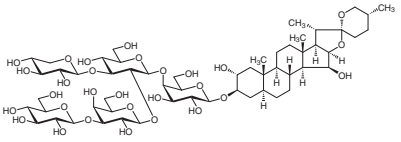
C0777
C0900



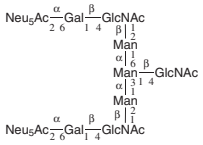
C0869



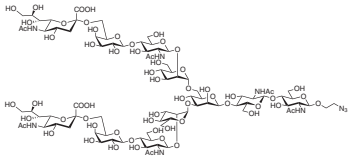
D0540



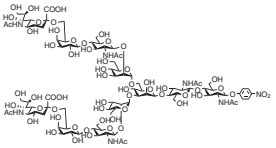
D4065



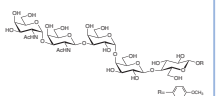
D4217



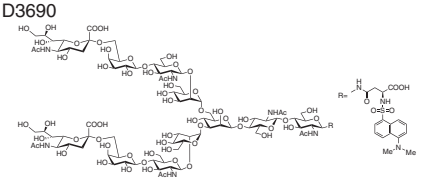
N0913



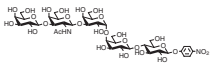
F0584



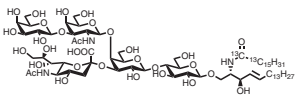
D3690



G0355



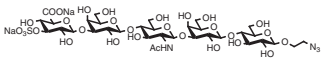
G0421



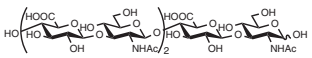
H1041
H1044



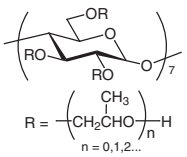
H1333



H1285



H0979



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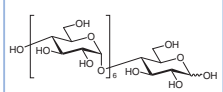

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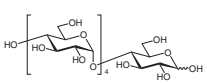

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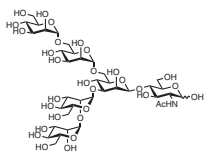

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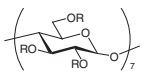

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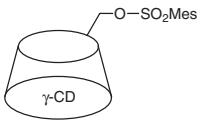

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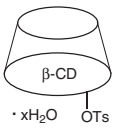

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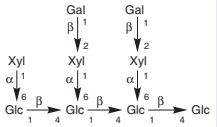

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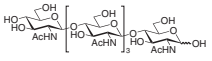

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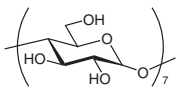

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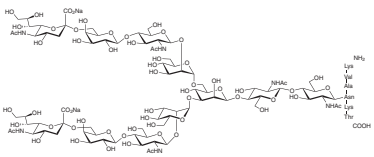
S0523



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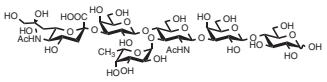

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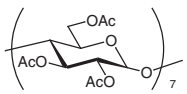

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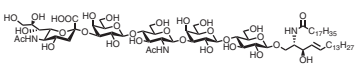


Availability or specification of the listed products are subject to change without prior notice.

Polysaccharides

Product No.	Product Name	Unit Size		
A0733	Alginic Acid		25g	500g
A0456	Amylopectin Hydrate (Amylose free), from Waxy Corn		25g	500g
A0847	Amylose (*Mw.=ca.* 15,000)			1g
A1328	(+)-Arabinogalactan from Larch Wood			25g
A0738	Calcium Alginate		25g	500g
C0045	Carboxymethyl Cellulose Sodium n≈500		25g	500g
C0603	Carboxymethyl Cellulose Sodium n≈1050		25g	500g
C1805	ι-Carrageenan		25g	500g
C1804	κ-Carrageenan		25g	500g
C2871	λ-Carrageenan		1g	5g
C0064	Cellulose PAB Capacity: 0.20meq/g			10g
C0068	Cellulose TEAE Capacity: 0.72meq/g			10g
C0072	Chitin		25g	250g
C2395	Chitosan (5-20mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)		25g	500g
C2396	Chitosan (50-100mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)		25g	100g
C0831	Chitosan (200-600mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)		25g	500g
C0335	Chondroitin Sulfate Sodium Salt		25g	100g
D3672	Dermatan Sulfate Sodium Salt		20mg	100mg
D1448	Dextran 40 (*Mw.=ca.* 40,000)		25g	500g
D1449	Dextran 70 (*Mw.=ca.* 70,000)	25g	100g	500g
E0265	Ethyl Cellulose [9-11mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]		25g	500g
E0072	Ethyl Cellulose [18-22mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]		25g	500g
E0266	Ethyl Cellulose [45-55mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]		25g	500g
E0290	Ethyl Cellulose [90-110mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]		25g	500g
F0918	Fluorescein Isothiocyanate Dextran (*Mw.=ca.* 10,000)			100mg
G0331	Glucan from Black Yeast		1g	5g
H0393	Heparin Sodium Salt from Hog intestine		100mg	1g
H0595	Hyaluronic Acid from Cockscomb			1g
H0242	Hydroxyethyl Cellulose (200-300mPa·s, 2% in Water at 20℃)		25g	500g
H0418	Hydroxyethyl Cellulose (800-1,500mPa·s, 2% in Water at 20℃)		25g	500g
H0392	Hydroxyethyl Cellulose (4,500-6,500mPa·s, 2% in Water at 25℃)		25g	500g
H0473	Hydroxypropyl Cellulose (3-6mPa·s, 2% in Water at 20℃)		25g	500g
H0474	Hydroxypropyl Cellulose (6-10mPa·s, 2% in Water at 20℃)		25g	500g
H0386	Hydroxypropyl Cellulose (150-400mPa·s, 2% in Water at 20℃)		25g	500g
H0475	Hydroxypropyl Cellulose (1,000-4,000mPa·s, 2% in Water at 20℃)		25g	500g
I0041	Inulin		5g	25g
M0290	Methyl Cellulose (13-18mPa·s, 2% in Water at 20℃)		25g	500g
M0291	Methyl Cellulose (20-30mPa·s, 2% in Water at 20℃)		25g	500g
M0292	Methyl Cellulose (80-120mPa·s, 2% in Water at 20℃)		25g	500g
M0293	Methyl Cellulose (350-550mPa·s, 2% in Water at 20℃)		25g	500g
M0294	Methyl Cellulose (1,000-1,800mPa·s, 2% in Water at 20℃)		25g	500g
M0185	Methyl Cellulose (3,500-5,600mPa·s, 2% in Water at 20℃)		25g	500g
M0295	Methyl Cellulose (7,000-10,000mPa·s, 2% in Water at 20℃)		25g	500g
P0024	Pectin from Citrus		25g	500g
H0652	Potassium Hyaluronate from Cockscomb			1g
H0603	Sodium Hyaluronate from Cockscomb		100mg	1g
X0048	Xanthan Gum		25g	500g
Z0008	Zymosan [Immunological Reagent]		100mg	1g

Lectin, Fucose Specific

Product No.	Product Name	Unit Size
L0169	Lectin, Fucose specific from *Aspergillus oryzae* (5mg/mL, PBS pH6.5)	1mL
A2659	AOL-Biotin Conjugate (1.0mg/mL)	1mL

AOL = *Aspergillus oryzae* L-fucose-specific lectin

Lectins recognize oligosaccharides and specifically well reversibly binded ones. Thus, lectins are widely utilized in cell biology related fields such as blood-type studies and binding studies of oligosaccharides to cancer cell surfaces, and many other important studies.[1] Lectins are widely distributed in nature and found from almost all types of living beings organisms like plants, microorganisms, fungus, invertebrates, vertebrates and viruses.

The product introduced today is a new-type of lectin isolated from *Aspergillus oryzae* in Japanese sake fermentation. This lectin has proven to have a strong affinity toward L-fucose according to the results of hemagglutination inhibition assay.[2] The fucose bonding position shows the highest binding for oligosaccharides are the ones containing L-Fuc α1,6 and α1,2. Fucosyl residues α1,3 and α1,4 also possess the specificity. The molecular weight of L-fucose specific lectin subunit, a dimeric substance, showed 35,000 (Fig. 1). This lectin shows 26% similarity to lectine isolated from *Aleuria aurantia*,[2] and its substrate specificity is also thought to be relatively similar.[3]

Generally, lectins have been applied for the detection and the analysis of complex-type oligosaccharides as they can specifically recognize oligosaccharides. Especially, the ones with fucose typically possess physiological properties. Therefore, these lectins are often used for such purposes. For example, fucosilated oligosaccharides are known to participate in the life processes such as embryonic growth, differentiation, cell recognition, canceration, and inflammation. When *in-vivo* transformations of the fucose to oligosaccharides take place, such reactions are recognized as important indications of the antigen epitopes for the Lewis blood-type and cancer related carbohydrate antigens.[4] The *Aspergillus oryzae* fucose specific lectin is not only utilized as an analyzing tool for the sugar-binding specificity of complex-type oligosaccharides, but it is highly applicable for a wide spectrum of studies on oligosaccharides.[5]

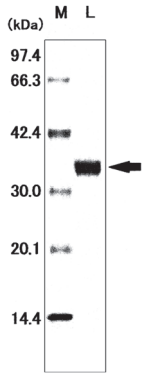


Fig.1 SDS-PAGE

L : 0.25 mg/ml × 5 μl
CBB dyeing
pure grade : single band
Gel : Gradient 10-20
Subunit Mr : 35000

This lectin was merchandised under the technical tie-up with GEKKEIKAN SAKE COMPANY, LTD.

References

1) N. Sharon, H. Lis, *Lectins (Japanese translation)*, Japan Scientific Societies Press: Tokyo, **1990**.
2) Molecular cloning and overexpression of *fleA* gene encoding a fucose-specific lectin of *Aspergillus oryzae*
H. Ishida, T. Moritani, Y. Hata, A. Kawato, K. Suginami, Y. Abe, S. Imayasu, *Biosci. Biotechnol. Biochem.* **2002**, *66(5)*, 1002.
3) K. Matsumura, K. Higashida, H. Ishida, Y. Hata, K. Yamamoto, M. Shigeta, Y. Mizuno-Horikawa, X. Wang, E. Miyoshi, J. Gu, N. Taniguchi, *J. Biol. Chem.* **2007**, *282*, 15700.
4) H. Narimatsu, *Tanpakushitsu Kakusan Koso* **1998**, *43(16)*, 2394.
5) A. Kuno, Y. Kato, A. Matsuda, M. K. Kaneko, H. Ito, K. Amano, Y. Chiba, H. Narimatsu, J. Hirabayashi, *Mol. Cell. Proteomics* **2009**, *8*, 99.

Availability or specification of the listed products are subject to change without prior notice.

An Enzyme that Adds Whole Sugar Chains without Breaking Down Products

Product No.	Product Name	Unit Size
G0365	Glycosynthase (Endo-M-N175Q) Recombinant: from *Mucor hiemalis* expressed in *Escherichia coli*	100 munits*

*One unit will convert 1μmole of *p*NP-GlcNAc to SG-GlcNAc-*p*NP per minute at 30℃ and pH7.0.

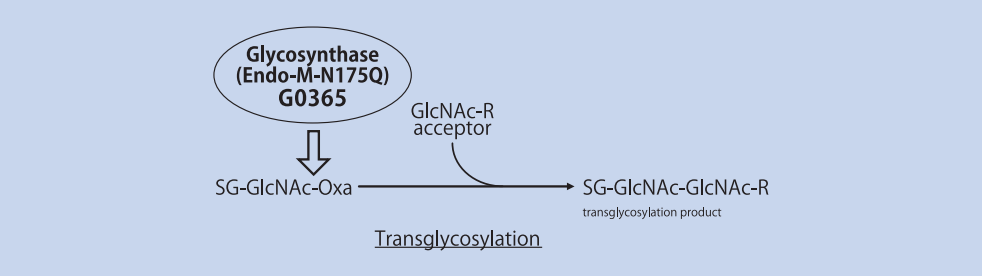


Figure 1. Scheme of transglycosylation reaction

Glycosynthase (Endo-M-N175Q) is an enzyme developed by Yamamoto, Umekawa, *et al.* through site-directed mutation of areas around the active center of Endo-M[1] which is already marketed. Since the feature of Glycosynthase is efficient transglycosylation activity by using oxazoline derivatives as glycosyl donors while suppressing sugar hydrolysis activity, the resulting glycosylated products are obtained in high yield with less digestion of the products by the enzyme. Due to this feature Glycosynthase is expected to be applied as useful tool in glycotechnology.

Umekawa and her colleagues caused transglycosylation reactions at the GlcNAc site of sperm antigen CD52 using oxazoline derivatives of the high-mannose type sugar chains or the complex type sugar chains as glycosyl donors[2]. They succeeded in obtaining glycosylated products in high yield of 84% and 76%, respectively. Moreover, they also achieved transglycosylation reactions using two biologically active blood-pressure-lowing peptides, PAMP12 and Substance P, as glycosyl acceptors and the oxazoline derivative of a complex type sugar chain containing sialic acids as a glycosyl donor in 95% and 98% yield, respectively[3]. The articles in 2009 describe the advantages of this glycosylation method using sugar-oxazoline derivatives[4-5].

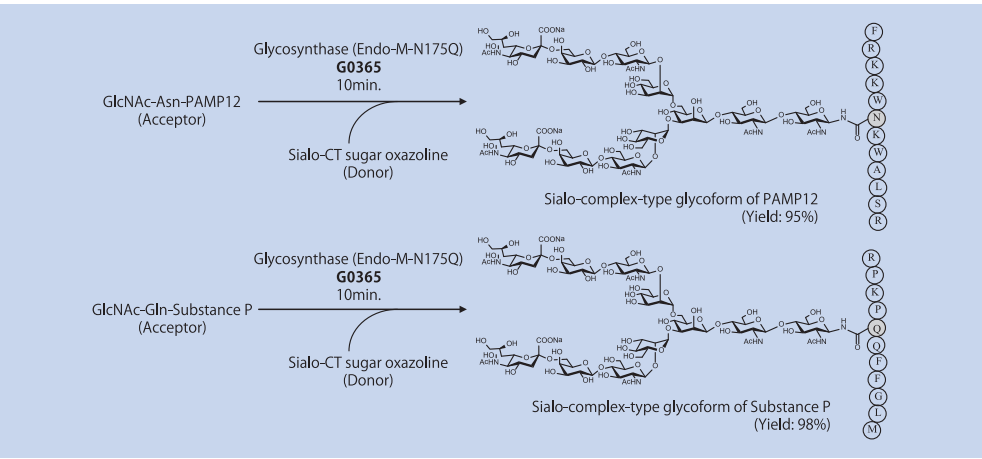


Figure 2. Experiment example of the transglycosylation

Practical realization of efficient transglycosylation reactions would also be useful for expansion into glycoprotein synthesis, such as the area of biosimilars, and creation of new functional sugar complexes can be expected.

A set of the transglycosylation data using a glycosynthase (Endo-M-N175Q) is shown below (Fig. 3). The oxazoline derivative of a complex type sugar as a glycosyl donor was transglycosylated with GlcNAc-*β*-*p*NP as a glycosyl acceptor, and the glycosylated product was afforded in a high yield of 95% after 24 hours. The sustained and effective production of the glycosylated compound was identified from HPLC profiles and MALDI-TOF MS as shown below (Fig. 4 and 5).

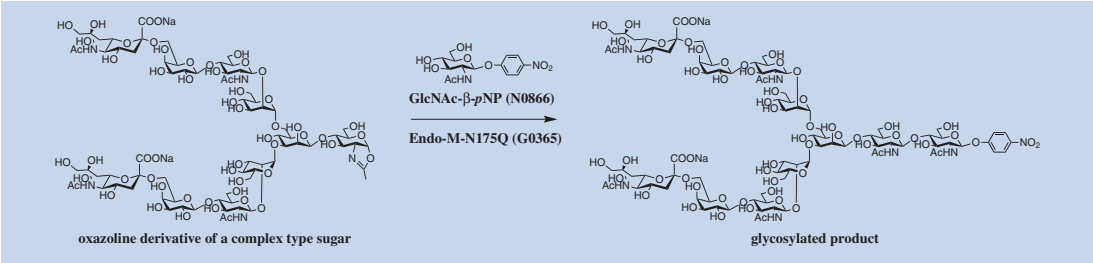
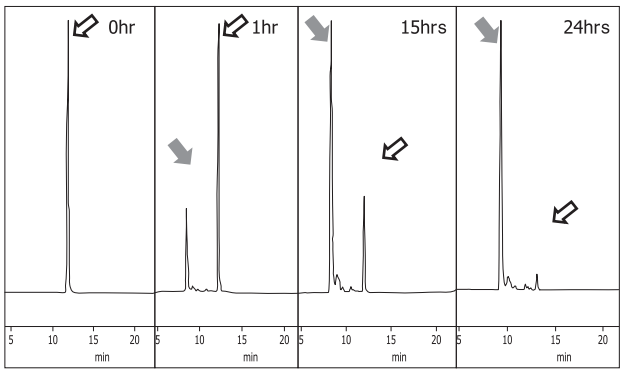


Figure 3. Transglycosylation of oxazoline derivative and GlcNAc-*β*-*p*NP



HPLC: ODS, CH_3CN / H_2O, UV 260nm
⇨ : GlcNAc-β-*p*NP ➡ : glycosylated product

Figure 4. HPLC profiles of transglycosylation reaction

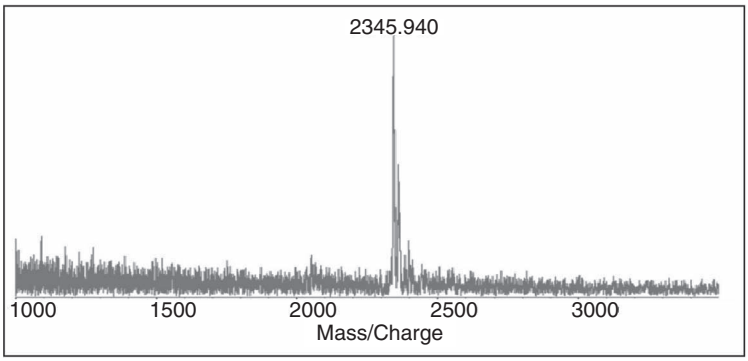


Figure 5. MALDI-TOF MS spectrum of transglycosylated product

Related Product

Product No.	Product Name	Unit Size
A1651	Endo-M (endo-*β*-*N*-Acetylglucosaminidase) Recombinant: from *Mucor hiemalis* expressed in *Candida boidinii*	100 munits

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

References

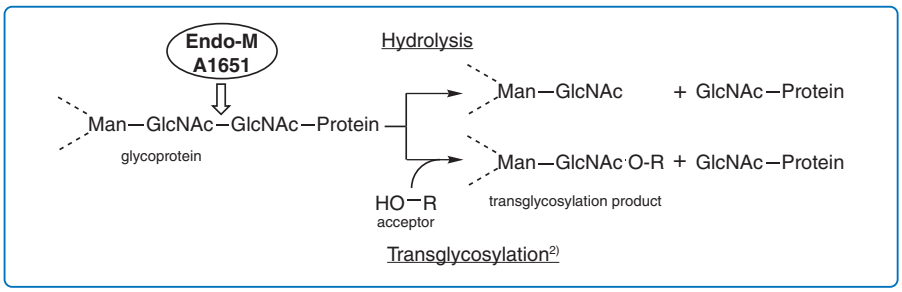
1) K. Yamamoto, S. Kadowaki, J. Watanabe, H. Kumagai, *Biochem. Biophys. Res. Commun.* **1994**, *203*, 244.
2) M. Umekawa, C. Li, T. Higashiyama, W. Huang, H. Ashida, K. Yamamoto, L-X. Wang, *J. Biol. Chem.* **2010**, *285*, 511.
3) M. Umekawa, T. Higashiyama, Y. Koga, T. Tanaka, M. Noguchi, A. Kobayashi, S. Shoda, W. Huang, L-X. Wang, H. Ashida, K. Yamamoto, *Biochim. Biophys. Acta* **2010**, *1800*, 1203.
4) P. Bojarová, V. Křen, *Trends Biotechnol.* **2009**, *27*, 199.
5) J. R. Rich, S. G. Withers, *Nat. Chem. Biol.* **2009**, *5*, 206.

An Enzyme Transfers the Intact Oligosaccharides

Product No.	Product Name	Unit Size
A1651	Endo-M (*endo-β-N*-Acetylglucosaminidase) Recombinant: from *Mucor hiemalis* expressed in *Candida boidinii* [Purity: single band by SDS-PAGE(85KDa)] (EC 3.2.1.96)	100 munits*

*1 unit will catalyze the release of 1μmol of Fmoc-Asn(GlcNAc) from Fmoc-SGN per min. at pH6.0 at 37℃

Endo-M is one of the enzymes known as *endo-β-N*-acetylglucosaminidases (*endo-β*-GlcNAc-ases). This enzyme was found by Yamamoto *et al*.[1], in the culture fluid of *Mucor hiemalis* isolated from soil. Endo-M hydrolyzes the *N*,*N*'-diacetylchitobiose moiety in oligosaccharides bound to the asparaginyl residue of various glycoproteins through the *N*-glycosidic linkage. The efficacy of this enzyme comes from the fact that one *N*-acetylglucosamine residue remains bound to the protein while cleaving the *N*,*N*'-diacetylchitobiose moiety. The enzyme is thus able to transfer the intact oligosaccharide to suitable acceptors. Unlike the conventional *endo-β*-GlcNAc-ase, it has been found that Endo-M is an enzyme with a broad substrate specificity, cleaving not only the high-mannose type and hybrid type of asparagine-linked oligosaccharides but also the complex type oligosaccharides in glycoproteins. Therefore, Endo-M is expected to be applied to various fields.

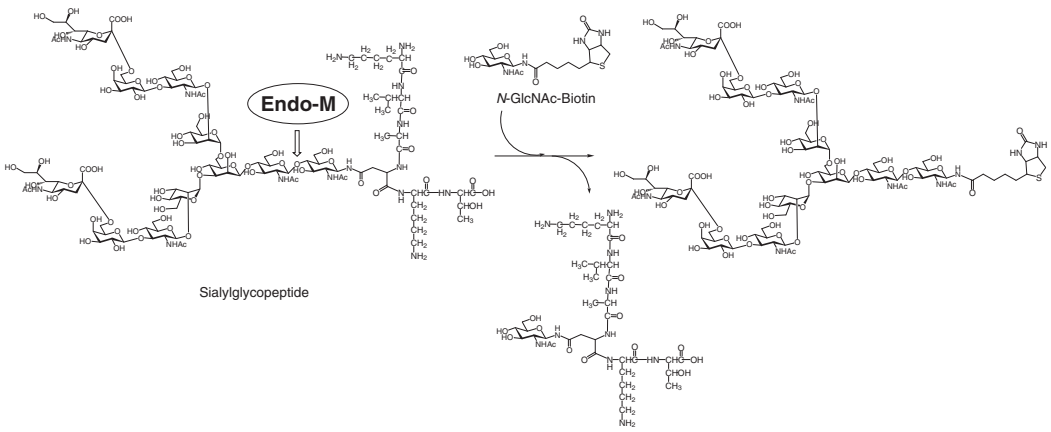


Yamamoto *et al*.[3] incubated an asialotransferrin glycopeptide with Endo-M in the presence of GlcNAc, followed by pyridylaminating (PA) oligosaccharides in the supernatant. In this experiment, they observed by HPLC that two separate PA-oligosaccharides had formed. One was the oligosaccharide released by hydrolysis, and the other was the released oligosaccharide that was transfered to GlcNAc. As acceptors, diacetylchitobiose and dansyl-asparaginyl *N*-acetylglucosamine [DNS-Asn(GlcNAc)] were also found to be effective. The enzyme was also capable of transferring high-mannose oligosaccharide to the acceptor diacetylchitobiose.

Haneda *et al*.[4] have transferred oligosaccharides with 9-fluorenylmethoxycarbonyl-asparaginyl-*N*-acetyl-glucosaminide [Fmoc-Asn(GlcNAc)] by incubating sialotransferrin glycopeptide, asialotransferrin glycopeptide and $Man_6GlcNAc_2$-Asn-peptide with Endo-M. Furthermore, synthetic hCG (β12-16)-GlcNAc-peptide has been subjected to transglycosylate with a sialo complex type oligosaccharide. An alternative synthetic method of peptide containing GlcNAc has been developed by Inazu *et al*.[5] This method uses Fmoc-Asn(GlcNAc), which was synthesized from aspartic acid containing an *N*-terminal group protected by an Fmoc group, and azide of GlcNAc instead of Fmoc-Asn-OH, and it applies a mixed acid anhydride method using dimethylthiophosphic acid (Mpt-MA) which generally shows poor responses toward the hydroxyl group. By combining this method with Endo-M, many glycopeptides can be designed and easily prepared. Yamamoto[6] has compiled the outline of this methodology as the Chemo-Enzymatic Synthesis in his review. Endo-M can also be used to create new functions, by introducing glyco-chains, to the substances that originally do not have the specific functions.[7]

As a specific example, it is also possible to synthesize functional undecasaccharide by transferring a biotin and azidoethyl group to an acceptor oligosaccharide as shown below.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.



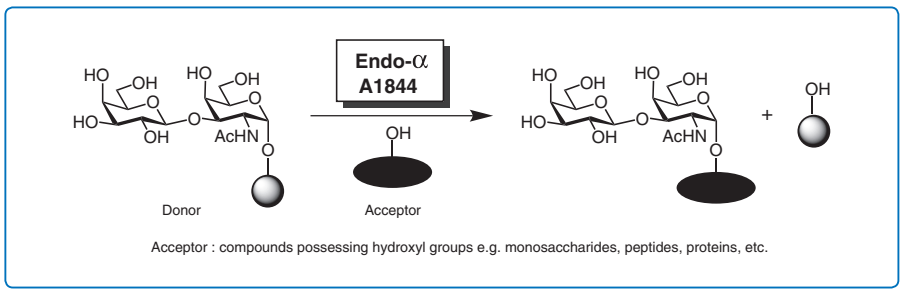
Related Products

Product No.	Product Name	Unit Size
A1614	N^{ω}-(2-Acetamido-2-deoxy-β-D-glucopyranosyl)-N^{α}-(*tert*-butoxycarbonyl)-L-asparagine	100mg
A2172	2-Azidoethyl 2-Acetamido-2-deoxy-β-D-glucopyranoside	500mg
G0365	Glycosynthase (Endo-M-N175Q) Recombinant: from *Mucor hiemalis* expressed in *Escherichia coli*	100munits
G0297	*N*-GlcNAc-Biotin	50mg
S0523	Sialylglycopeptide	10mg

Product No.	Product Name	Unit Size
A1844	Endo-α (*endo*-α-*N*-Acetylgalactosaminidase) Recombinant: from *Bifidobacterium longum* expressed in *Escherichia coli* (EC 3.2.1.97)	100 munits*

*1 unit will hydrolyze 1μmol of Galβ1-3GalNAcα-*p*NP to Galβ1-3GalNAc and *p*NP per min. at pH5.0 at 37℃

Yamamoto *et al*. have recently purified and isolated endo-α-*N*-acetylgalactosaminidase (Endo-α) found in the culture fluid of *Bifidobacterium longum*.[8] Endo-α can recognize the structure of Galβ1-3GalNAc disaccharide α-linked with a hydroxyl group. It releases Galβ1-3GalNAc by hydrolysis. When a compound possessing an hydroxyl group coexists as an acceptor, the released Galβ1-3GalNAc is transferred to the acceptor.[9] Discovered by Yamamoto *et al*., Endo-α can transfer Galβ1-3GalNAc to various compounds such as monosaccharides, peptides, and proteins, using core 1 contained in mucin-type oligosaccharide chains as a donor.



Ashida *et al*. have reported the oligosaccharide transfer reaction using Endo-α.[9a] According to the report, Galβ1-3GalNAcα-*p*NP was treated with Endo-α to produce Galβ1-3GalNAc and it transferred to monosaccharides (glucose, galactose, and mannose), disaccharides (maltose and sucrose), and sugar alcohols (mannitol and sorbitol).

Thus, by using Endo-M and Endo-α properly, it is possible to transfer both *N*-linked and *O*-linked oligosaccharides. As a tool for the enzymatic synthesis of glycoconjugates, it is expected that many applications will be realized in the various fields.

These products were merchandised as the fruition of NEDO project.
Endo-M was merchandised under licensed from patent-holding companies of Takara Bio Inc. and Kirin Brewery Co., LTD.

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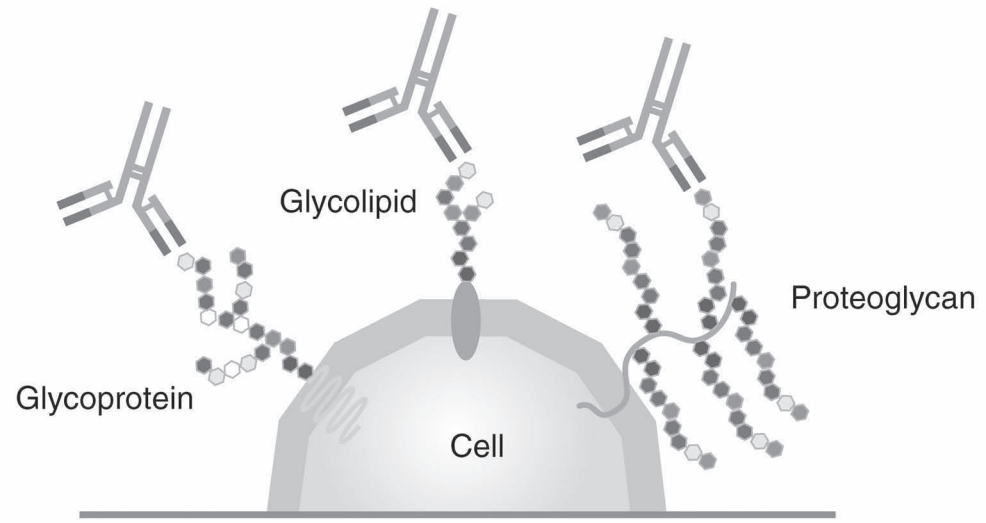
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Anti-Glyco Antibodies



Carbohydrate chains are called the third life chain following the protein and the nucleic acid and are one of the most important issues in the post genome research. Tokyo Chemical Industry Co., LTD. (TCI) supports glycoscience research by providing useful anti-carbohydrate chain antibodies.

Most carbohydrate chains attach to lipids or proteins and occur in the form of glycoproteins or glycolipids (N-glycan, O-glycan, proteoglycans and others). Carbohydrate chains are known to be expressed on brain, nerve, cancer, and endothelial cells. Some carbohydrate chains are known to relate to diseases (e.g., cancer, Alzheimer's disease, Guillain-Barré syndrome, Lysosome syndrome such as Fabry disease, gangliosidosis), differentiation and development (iPS/ES cells). Seasonal influenza viruses, annual epidemics that peak during winter, cause infection via cell-surface glycans. Anti-influenza virus drugs are structural mimics of sialic acid, because neuraminidase is a sialic acid hydrolase that is essential for the release of progeny virus particles from the surface of an infected cell.

Antibodies are proteins which are one of the components of the immune system. The specificity of antibodies is likened to the interaction between a key and a keyhole. Antibodies are useful reagents for research in many scientific disciplines including life science and diagnostic reagents.

Anti-carbohydrate antibodies can recognize glycolipids or glycoproteins. TCI mainly produces antibodies against glycolipids; ganglio series, globo series, lacto series, and neo-lacto series. These antibodies can be used for immunohistochemistry, cell-staining, inhibition assay for cell adhesion, flow cytometry, ELISA, TLC-immunostaining and other methods. TCI antibodies are very useful tools for analyzing the expression of carbohydrate chains and their functions.

Biotin-labeled anti-Glyco antibody is also available.

Anti-Glyco Monoclonal Antibody

Anti-Glyco Monoclonal Antibody

Product No.	Product Name	Unit Size
A2505	Anti-GM_1 Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMB16	0.1 mg
A2506	Anti-Gb_3 Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgG2b, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: BGR23	0.1 mg

Product No.	Product Name	Unit Size
A2507	Anti-GD_{1a} Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR17	0.1 mg
A2508	Anti-GD_{1b} Monoclonal Antibody Product Form: Mouse monoclonal antibody/IgG3, κ-chain Preparation: Ammonium sulfate precipitation from serum-free cell culture supernatant Clone: GGR12	0.1 mg
A2509	Anti-Sialyl Lewis A Monoclonal Antibody (2D3) Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: 2D3	0.1 mg
A2510	Anti-Lewis Y Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgG3, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: H18A	0.1 mg
A2576	Anti-GM_2 Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: MK1-16	0.1 mg
A2578	Anti-Lewis X Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: 73-30	0.1 mg
A2580	Anti-GD_3 Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR19	0.1 mg
A2582	Anti-GM_3 Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR6	0.1 mg
A2584	Anti-Sialyl Lewis A Monoclonal Antibody (1H4) Product Form: Purified mouse monoclonal antibody/IgG3, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: 1H4	0.1 mg
A2662	Anti-GQ_{1b} Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR13	0.1 mg
A2701	Anti-GalNAc-GD_{1a} Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone Name: 2A3D2	0.1 mg
A2702	Anti-GT_{1a} Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR11	0.1 mg
A2706	Anti-SGPG(HNK-1) Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgG2a, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: NGR50	0.1 mg
A2732	Anti-GT_{1b} Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from mouse ascites fluid. Clone: GMR5	0.1 mg

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Product No.	Product Name	Unit Size
A2849	Anti-Sialyl Lewis X Monoclonal Antibody Product Form: Purified mouse monoclonal antibody/IgM, κ-chain Preparation: The antibody is purified from serum-free cell culture supernatant by column chromatography. Clone Name: 2H5	0.1 mg

Biotinylated Anti-Glyco Antibody

Product No.	Product Name	Unit Size
A2822	Anti-Gb_3 Monoclonal Antibody Biotin Conjugate Product Form: Biotinylated mouse monoclonal antibody/IgG2b, κ-chain Clone: BGR23	0.1 mg

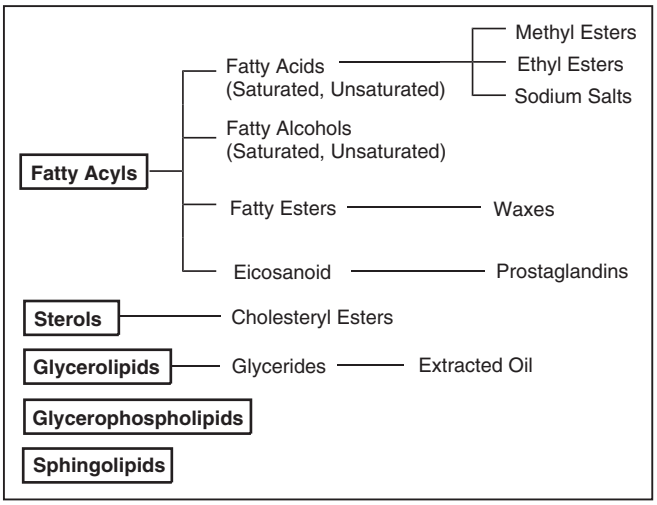
Anti-Glyco Monoclonal Antibody (Culture Supernatant)

Product No.	Product Name	Unit Size
A2575	Anti-GM_2 Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype : Mouse monoclonal antibody/IgM, κ-chain Clone: MK1-16	0.2 mL
A2577	Anti-Lewis X Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgM, κ-chain Clone: 73-30	0.2 mL
A2579	Anti-GD_3 Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgM, κ-chain Clone: GMR19	0.2 mL
A2581	Anti-GM_3 Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgM, κ-chain Clone: GMR6	0.2 mL
A2583	Anti-Sialyl Lewis A Monoclonal Antibody (1H4, Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgG3, κ-chain Clone: 1H4	0.2 mL
A2586	Anti-Gb_3 Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgG2b, κ-chain Clone: BGR23	0.2 mL
A2587	Anti-Lewis Y Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgG3, κ-chain Clone: H18A	0.2 mL
A2660	Anti-Sialyl Lewis X Monoclonal Antibody (Culture Supernatant) Product Form: Hybridoma culture supernatant (containing 10% fetal bovine serum) Isotype: Mouse monoclonal antibody/IgM, κ-chain Clone: 2H5	0.5 mL

Secondary Antibodies and Related Products (see p.252)

Lipids

Lipids form a broad category of biomolecules which constitute an essential part of living organisms in addition to carbohydrates and proteins. In this section, we will introduce lipid related substances such as fatty acids and their derivatives. The biosynthesis of fatty acids involves the condensation of malonyl-CoA (or methylmalonyl CoA) with acyl CoA as a primer.[1] Carboxylic acids with chains of 4 or more carbons are referred to as fatty acids while those with 10 or more carbons are called higher fatty acids.[2] Lipids and related substances can be classified as illustrated in this section.[3]



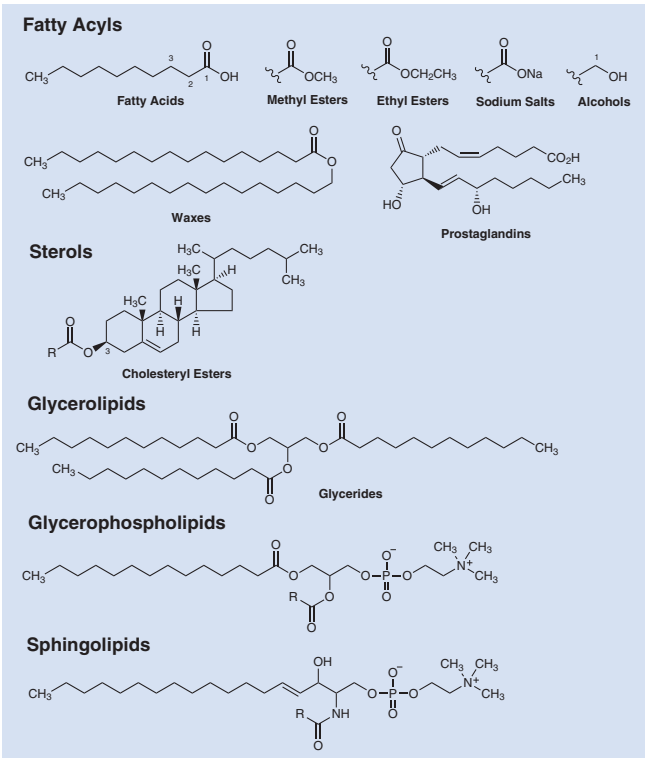


Figure 1. Classification of Lipids and Related Compounds

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Steroids or terpenes which are occasionally considered as lipid related substances will be explained in other sections.

Fatty acids exist in living organisms mainly as esters of glycerol and triacylglycerols which occur as a major form of energy storage in adipose tissue. Triacylglycerols are found in living organisms as mixtures of acyl groups with different number of carbons and are difficult in most cases to isolate as a single substance. Moreover, fatty acids also exist in living organisms in the form of cholesteryl esters which constitute an essential component of cell membranes where it is required to establish proper membrane permeability and fluidity.

Free fatty acids are known to suppress cell-growth at an order of 0.1mM and above, therefore considerable attention should be paid during their administration to cells.[4)]

■Storage Precautions

Unsaturated fatty acids like oleic acid are known to undergo aerial oxidation to produce peroxides. Opened bottles of unsaturated fatty acids and their derivatives should be stored in the refrigerator or frozen with inert gas such as nitrogen or argon. Moreover the tendency to oxidation increases as the degree of unsaturation in the fatty acids increases.

■Derivatives

Fatty acid methyl esters are the most widely used fatty acid derivatives in analytical chemistry due to their ease of handling in organic solvents as compared to the highly polar free fatty acids. Moreover their analysis by TLC, gas chromatography (GC) and liquid chromatography (LC) can be improvised by suppressing tailing.

Although fatty acid ethyl esters are rarely used for analysis as compared to the methyl esters, they offer an advantage since their method of preparation from fatty acids involves the use of the less toxic ethanol instead of methanol. For instance, eicosapentaenoic acid which is used as a hyperlipemia medicine is being supplied as ethyl ester. Ethyl esters of lower to middle-chain fatty acids can be also employed in the fragrance industry.

Sodium salts of fatty acids can be obtained as saponification products of lipids and are widely used in daily life as an ingredient of soap owing to their amphiphilicity and surfactant properties.

■Analysis

GC is the most frequently used technique for the analysis of fatty acids. However, their direct analysis appears to be difficult owing to their low volatility in electron impact (EI) ionization mass spectrometry under normal condition. They can however be easily detected by GC-MS method upon derivatization to their methyl esters.

The several methylation methods include the treatment of the free fatty acids with boron trifluoride-ether complex in methanol or with trimethylsilyldiazomethane, etc.

The GC on-column method is a simple method that uses a methanolic solution of trimethylsulfonium hydroxide or 3-(trifluoromethyl)phenyltrimethylammonium hydroxide to analyze the fatty acid component of lipids such as glycerolipids. Please refer to this *Reagent Guide* for protocols (p.276).

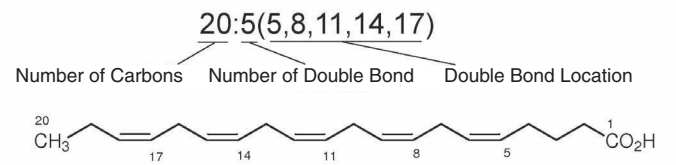
■Solubility

In general, the solubility of fatty acids in water decreases as the carbon number increases.

Fatty acid esters and glycerolipids are insoluble in water but soluble in ethanol, chloroform and diethyl ether. They can be added to the buffer solution as a dimethyl sulfoxide solution to examine their activity in living organisms. Please take caution that the solution becomes suspended as the concentration level of the dissolved substance increases. It is recommended to define the optimal concentration level and volume of addition in advance. Sodium salts of fatty acid are more water-soluble than the free fatty acids. Long-chain fatty acid salts tend to form micelles.

■Designation

Example: Icosapentaenoic Acid is described as 20:5 (5, 8, 11, 14, 17). Double bond geometry is *cis* unless otherwise noted.



Saturated Fatty Acids

Product No.	Product Name		Unit Size		
B0754	Butyric Acid	4:0		25mL	500mL
V0003	Valeric Acid	5:0		25mL	500mL
H0105	Hexanoic Acid	6:0		25mL	500mL
H0030	Heptanoic Acid	7:0		25mL	500mL
O0027	*n*-Octanoic Acid	8:0		25mL	500mL
N0288	Nonanoic Acid	9:0		25mL	500mL
D0017	Decanoic Acid	10:0		25g	400g
U0004	Undecanoic Acid	11:0		25g	250g
L0011	Lauric Acid	12:0		25g	500g
T0412	Tridecanoic Acid	13:0		25g	500g
M0476	Myristic Acid	14:0		25g	500g
P0035	Pentadecanoic Acid	15:0	25g	100g	500g
P0002	Palmitic Acid	16:0		25g	500g
H0019	Heptadecanoic Acid	17:0	25g	100g	500g
S0163	Stearic Acid	18:0		25g	500g
N0283	Nonadecanoic Acid	19:0		10g	25g
E0006	Arachidic Acid	20:0		1g	25g
H0010	Heneicosanoic Acid	21:0		1g	10g
D0963	Behenic Acid	22:0		25g	500g
B1747	Behenic Acid	22:0			5g
B1248	Behenic Acid	22:0		5g	25g
T0402	Tricosanoic Acid	23:0		1g	10g
T0076	Lignoceric Acid	24:0	1g	5g	25g
P0882	Pentacosanoic Acid	25:0		1g	5g
C0829	Cerotic Acid	26:0		1g	10g
H0971	Heptacosanoic Acid	27:0	100mg	1g	5g
M1342	Octacosanoic Acid	28:0			100mg
N0662	Nonacosanoic Acid	29:0		1g	5g
M0595	Melissic Acid	30:0		100mg	1g

Unsaturated Fatty Acids

Product No.	Product Name		Unit Size	
C0416	Crotonic Acid	4:1(2) *trans*	25g	500g
P0345	*trans*-2-Pentenoic Acid	5:1(2) *trans*	5mL	25mL
P1072	*trans*-3-Pentenoic Acid	5:1(3) *trans*	5mL	25mL
H0383	*trans*-2-Hexenoic Acid	6:1(2) *trans*	25g	250g
H0077	*trans*-3-Hexenoic Acid	6:1(3) *trans*		25g
S0053	Sorbic Acid	6:2(2,4) *trans*	25g	500g
H0426	2-Heptenoic Acid (contains 3-Heptenoic Acid)	7:1(2) n.c.		5mL
H0427	3-Heptenoic Acid	7:1(3) n.c.	5mL	25mL
O0004	*trans*-2-Octenoic Acid	8:1(2) *trans*		10mL
O0070	3-Octenoic Acid	8:1(3) n.c.		5mL
N0426	2-Nonenoic Acid	9:1(2) n.c.		25mL
N0312	3-Nonenoic Acid	9:1(3) n.c.		5mL
D0098	*trans*-2-Decenoic Acid	10:1(2) *trans*		25mL
D1186	3-Decenoic Acid	10:1(3) n.c.		5mL
D4449	4-Decenoic Acid	10:1(4) n.c.	5mL	25mL
U0032	2-Undecenoic Acid	11:1(2) n.c.		5g
T0759	2-Tridecenoic Acid	13:1(2) n.c.	5g	25g
H0428	2-Hexadecenoic Acid	16:1(2) n.c.	1g	5g
H0072	*cis*-9-Hexadecenoic Acid	16:1(9)	100mg	1g
O0009	Petroselinic Acid	18:1(6)		1g
O0011	Oleic Acid	18:1(9)	25mL	500mL
O0180	Oleic Acid	18:1(9)	5mL	25mL
O0010	Elaidic Acid	18:1(9) *trans*	5g	25g
L0124	Linoleic Acid	18:2(9,12)	5g	25g
L0053	Linoleic Acid	18:2(9,12)	25mL	100mL	500mL
L0152	γ-Linolenic Acid	18:3(6,9,12)	100mg	1g
L0050	Linolenic Acid	18:3(9,12,15)		25mL
E0640	*all cis*-8,11,14-Eicosatrienoic Acid	20:3(8,11,14)	10mg	50mg
A0781	Arachidonic Acid	20:4(5,8,11,14)	100mg	500mg
E0441	*all cis*-5,8,11,14,17-Eicosapentaenoic Acid	20:5(5,8,11,14,17)		100mg

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Product No.	Product Name		Unit Size	
D0965	Erucic Acid	22:1(13)	25g	400g
D2226	*cis*-4,7,10,13,16,19-Docosahexaenoic Acid	22:6(4,7,10,13,16,19)		100mg
T1642	*cis*-15-Tetracosenoic Acid	24:1(15)		1g

*n.c.: not certified

Fatty Acid Methyl Esters

Product No.	Product Name		Unit Size	
B0763	Methyl Butyrate	4:0	25mL	500mL
H0705	Methyl (*R*)-(-)-3-Hydroxybutyrate	4:0 3-OH	10mL	25mL
H0704	Methyl (*S*)-(+)-3-Hydroxybutyrate	4:0 3-OH	5mL	25mL
A0650	Methyl Acetoacetate	4:0 3-Oxo	25g	500g
C0419	Methyl Crotonate	4:1(2) *trans*	25mL	500mL
V0005	Methyl Valerate	5:0	25mL	500mL
M1863	Methyl 2-Oxovalerate	5:0 2-Oxo	5g	25g
K0035	Methyl 3-Oxovalerate	5:0 3-Oxo	25g	500g
P1210	Methyl *trans*-3-Pentenoate	5:1(3) *trans*	5mL	25mL
H0111	Methyl Hexanoate	6:0	25mL	500mL
K0037	Methyl 3-Oxohexanoate	6:0 3-Oxo	25mL	500mL
S0056	Methyl Sorbate	6:2(2,4) *trans*		25mL
H0032	Methyl Heptanoate	7:0	25mL	500mL
O0246	Methyl 3-Oxoheptanoate	7:0 3-Oxo		25mL
O0033	Methyl *n*-Octanoate	8:0	25mL	500mL
M2014	Methyl *trans*-2-Octenoate	8:1(2) *trans*		25mL
N0290	Methyl Nonanoate	9:0		25mL
H0835	Methyl 9-Hydroxynonanoate	9:0 9-OH	1g	5g
M2263	Methyl 9-Formylnonanoate	9:0 9-CHO	1g	5g
D0023	Methyl Decanoate	10:0	25mL	500mL
U0050	Methyl Undecanoate	11:0		25mL
L0015	Methyl Laurate	12:0	25mL	500mL
T0960	Methyl Tridecanoate	13:0		25mL
M0482	Methyl Myristate	14:0	25mL	500mL
P0869	Methyl Pentadecanoate	15:0	5mL	25mL
P0006	Methyl Palmitate	16:0	25g	250g
P1958	Methyl *cis*-9-Hexadecenoate	16:1(9)	100mg	1g
H0566	Methyl Heptadecanoate	17:0	5g	25g
S0080	Methyl Stearate	18:0	25g	500g
M2306	Methyl *cis*-6-Octadecenoate	18:1(6)	100mg	500mg
M2310	Methyl *trans*-6-Octadecenoate	18:1(6) *trans*	100mg	500mg
O0055	Methyl Oleate	18:1(9)	25mL	500mL
O0226	Methyl *trans*-9-Octadecenoate	18:1(9) *trans*		5mL
R0029	Methyl Ricinoleate	18:1(9) 12-OH	25mL	500mL
M2308	Methyl *cis*-11-Octadecenoate	18:1(11)	100mg	500mg
M2309	Methyl *trans*-11-Octadecenoate	18:1(11) *trans*	100mg	500mg
L0078	Methyl Linoleate	18:2(9,12)	25mL	500mL
M2307	Methyl *trans*,*trans*-9,12-Octadecadienoate	18:2(9,12) *trans*	100mg	500mg
L0051	Methyl Linolenate	18:3(9,12,15)		25mL
N0460	Methyl Nonadecanoate	19:0	5g	25g
A0900	Methyl Arachidate	20:0	5g	25g
D1017	Methyl *cis*-13-Docosenoate	20:1(13)	25mL	500mL
B1748	Methyl Behenate	22:0		10g
B1241	Methyl Behenate	22:0		25g
L0112	Methyl Lignocerate	24:0	1g	5g
T0812	Methyl Triacontanate	30:0	100mg	1g

Fatty Acid Ethyl Esters

Product No.	Product Name		Unit Size	
B0759	Ethyl Butyrate	4:0	25mL	500mL
H0229	Ethyl 2-Hydroxybutyrate	4:0 2-OH	5g	25g
H0230	Ethyl DL-3-Hydroxybutyrate	4:0 3-OH	25g	500g
H1029	Ethyl (*R*)-(-)-3-Hydroxybutyrate	4:0 3-OH	1g	5g
H0975	Ethyl (*S*)-(+)-3-Hydroxybutyrate	4:0 3-OH	5g	25g
A0649	Ethyl Acetoacetate	4:0 3-Oxo	25g	500g
C0418	Ethyl Crotonate	4:1(2) *trans*	25mL	500mL
V0004	Ethyl Valerate	5:0	25mL	500mL
E0644	Ethyl 2-Hydroxyvalerate	5:0 2-OH		25g
K0031	Ethyl 3-Oxovalerate	5:0 3-Oxo	5g	25g
L0120	Ethyl Levulinate	5:0 4-Oxo	25mL	500mL
H0108	Ethyl Hexanoate	6:0	25mL	500mL
E0345	Ethyl 2-Ethylbutyrate	4:0 2-Et	25mL	500mL
E0801	Ethyl 2-Methylvalerate	5:0 2-Me	25mL	500mL
E0803	Ethyl 3-Methylvalerate	5:0 3-Me	5g	25g
E0802	Ethyl DL-Leucate	5:0 2-OH, 4-Me	5g	25g
K0030	Ethyl 3-Oxohexanoate	6:0 3-Oxo	25mL	500mL
E0787	Ethyl *trans*-2-Hexenoate	6:1(2) *trans*		25g
H0031	Ethyl Heptanoate	7:0	25mL	500mL
O0216	Ethyl 3-Oxoheptanoate	7:0 3-Oxo	10g	25g
O0030	Ethyl *n*-Octanoate	8:0	25mL	500mL
O0286	Ethyl *trans*-2-Octenoate	8:1(2) *trans*		25mL
N0289	Ethyl Nonanoate	9:0	25mL	500mL
D0022	Ethyl Decanoate	10:0	25mL	500mL
D2767	Ethyl *trans*-2-Decenoate	10:1(2) *trans*		25mL
D1931	Ethyl *trans*-4-Decenoate	10:1(4) *trans*		10mL
U0049	Ethyl Undecanoate	11:0	25mL	250mL
L0013	Ethyl Laurate	12:0	25mL	500mL
T0959	Ethyl Tridecanoate	13:0	5mL	25mL
M0479	Ethyl Myristate	14:0	25mL 100mL	500mL
P0868	Ethyl Pentadecanoate	15:0	5mL	25mL
P0003	Ethyl Palmitate	16:0	25mL	500mL
H0501	Ethyl *cis*-9-Hexadecenoate	16:1(9)	100mg	1g
H0526	Ethyl Heptadecanoate	17:0	5g	25g
S0079	Ethyl Stearate	18:0	25g	500g
O0143	Ethyl Oleate	18:1(9)	5mL	25mL
O0054	Ethyl Oleate	18:1(9)	25mL	500mL
R0049	Ethyl Ricinoleate	18:1(9) 12-OH		25mL
L0055	Ethyl Linoleate	18:2(9,12)	25mL	500mL
L0135	Ethyl Linoleate	18:2(9,12)	5mL	25mL
N0459	Ethyl Nonadecanoate	19:0	5g	25g
A0899	Ethyl Arachidate	20:0	5g	25g
E0853	Ethyl *all cis*-5,8,11,14,17-Eicosapentaenoate (stabilized with Tocopherols)	20:5(5,8,11,14,17)		25g
D1014	Ethyl Erucate	22:1(13)	5mL	25mL
D2964	Ethyl *all cis*-7,10,13,16,19-Docosapentaenoate	22:5(7,10,13,16,19)		100mg
D2195	Ethyl *cis*-4,7,10,13,16,19-Docosahexaenoate	22:6(4,7,10,13,16,19)		100mg
L0111	Ethyl Lignocerate	24:0		5g

Fatty Acid Sodium Salts

Product No.	Product Name		Unit Size	
S0519	Sodium Butyrate	4:0	25g	100g
C1187	Sodium Hexanoate	6:0		25g
H0112	Sodium Hexanoate	6:0	25g	500g
S0058	Sodium Sorbate	6:2(2,4) *trans*	25g	500g
E0009	Sodium Heptanoate	7:0		25g
O0034	Sodium *n*-Octanoate	8:0	25g	250g
S0862	Sodium 2-Ethylhexanoate	6:0 2-Et	25g	250g
N0291	Sodium Nonanoate	9:0		25g
D0024	Sodium Decanoate	10:0	25g 100g	500g
L0016	Sodium Laurate	12:0	25g	500g
M0483	Sodium Myristate	14:0	25g	500g
P0007	Sodium Palmitate	16:0	25g	500g

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Product No.	Product Name		Unit Size	
S0081	Sodium Stearate	18:0	25g	500g
O0057	Sodium Oleate	18:1(9)	25g	100g 500g
R0030	Sodium Ricinolate	18:1(9) 12-OH	25g	500g
L0056	Sodium Linoleate	18:2(9,12)		25g

Saturated Higher Alcohols

Product No.	Product Name		Unit Size	
U0005	1-Undecanol	11:0	25mL	500mL
D0978	1-Dodecanol	12:0	25g	400g
T0414	Tridecanol (mixture of isomers)	13:0	25mL	500mL
T0803	1-Tridecanol	13:0		25g
T0084	1-Tetradecanol	14:0	25mL	500mL
P0036	1-Pentadecanol	15:0	25g	100g 500g
H0071	1-Hexadecanol	16:0	25g	500g
H0018	1-Heptadecanol	17:0	5g	25g
O0006	1-Octadecanol	18:0	25g	500g
N0284	1-Nonadecanol	19:0	5g	25g
E0004	1-Eicosanol	20:0	25g	500g
H0011	1-Heneicosanol	21:0		10g
D0964	1-Docosanol	22:0	25g	500g
T0403	1-Tricosanol	23:0		100mg
T0593	1-Tetracosanol	24:0	1g	5g
H0342	1-Hexacosanol	26:0	100mg	1g
O0199	1-Octacosanol	28:0	100mg	1g
T1049	1-Triacontanol	30:0	100mg	1g

Unsaturated Higher Alcohols

Product No.	Product Name		Unit Size	
D1936	*trans*-2-Dodecenol	12:1(2) *trans*		5mL
D2294	2,4-Dodecadien-1-ol (mixture of stereoisomers)	12:2(2,4) mix		5g
T1502	*trans*-2-Tridecen-1-ol	13:1(2) *trans*		10mL
O0058	Oleyl Alcohol	18:1(9)	25mL	500mL
O0228	*trans*-9-Octadecenol	18:1(9) *trans*	1g	5g
O0225	*cis*,*cis*-9,12-Octadecadien-1-ol	18:2(9,12)	5mL	25mL
D2174	*cis*-13-Docosenol	22:0(13)	1g	5g

Waxes

Product No.	Product Name		Unit Size	
P1077	Hexadecyl Palmitate	16:0-16:0	25g	500g
S0078	Dodecyl Stearate	18:0-12:0		25g

Lipid Extracts

Product No.	Product Name	Unit Size
C0421	Croton Oil	25mL

Prostaglandins

Product No.	Product Name	Unit Size	
L0262	Latanoprost	10mg	50mg
P1884	Prostaglandin E_2	1mg	10mg
P1885	Prostaglandin $F_{2\alpha}$	1mg	10mg

Fatty Acid Cholesteryl Esters

Product No.	Product Name		Unit Size		
C0319	Cholesterol Acetate	2:0		25g	500g
C0676	Cholesterol Propionate	3:0		10g	25g
C0668	Cholesterol Butyrate	4:0		25g	500g
C0677	Cholesterol Valerate	5:0			10g
C0673	Cholesterol Hexanoate	6:0			25g
C0672	Cholesterol Heptanoate	7:0			25g
C0334	Cholesterol *n*-Octanoate	8:0		5g	25g
N0347	Cholesterol Pelargonate	9:0		25g	500g
C0618	Cholesterol Decanoate	10:0			25g
C0620	Cholesterol Laurate	12:0			25g
C0675	Cholesterol Myristate	14:0		10g	25g
C0322	Cholesterol Palmitate	16:0			25g
C0323	Cholesterol Stearate	18:0		25g	500g
C0559	Cholesterol Oleate	18:1(9)	25g	100g	500g
C0321	Cholesterol Linoleate	18:2(9,12)			25g

Glycerides

Product No.	Product Name		Unit Size	
M1071	Monocaprylin	MG 8:0	1g	5g
M1072	Monocaprin	MG 10:0	1g	5g
G0081	Monolaurin	MG 12:0		25g
M1073	Monomyristin	MG 14:0	1g	5g
G0083	Monopalmitin	MG 16:0		25g
G0085	Monostearin	MG 18:0	25g	500g
G0082	Monoolein	MG 18:1(9)	25g	500g
M1075	Monoelaidin	MG 18:1(9) *trans*		1g
M1076	Monoerucin	MG 22:1(13)		1g
G0079	α,α'-Dilaurin	DG 12:0		10g
T0364	Tributyrin	TG 4:0	25mL	500mL
T0441	Tricaproin	TG 6:0	10mL	25mL
T0365	Tricaprylin	TG 8:0		25mL
T0413	Tricaprin	TG 10:0	10g	25g
G0087	Trilaurin	TG 12:0	25g 100g	500g
G0088	Trimyristin	TG 14:0		25g
G0091	Tripalmitin	TG 16:0		25g
G0213	Tripalmitin	TG 16:0	25g	250g
G0212	Tristearin	TG 18:0	25g	250g
G0089	Triolein	TG 18:1(9)	25g	100g
T1392	Trielaidin	TG 18:1(9) *trans*	1g	5g
T1388	Trilinolein	TG 18:2(9,12)	5g	25g
T1389	Triarachidin	TG 20:0	1g	5g
T1391	Tribehenin	TG 22:0	1g	5g
T1390	Trierucin	TG 22:1(13)		1g

＊MG: Monoglyceride, DG: Diglyceride, TG: Triglyceride

Glycerophospholipids

Product No.	Product Name	Unit Size	
D3924	1,2-Dimyristoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4249	1,2-Dimyristoyl-*sn*-glycero-3-phosphoethanolamine		250mg
D3946	1,2-Dimyristoyl-*sn*-glycero-3-phospho-*rac*-(1-glycerol) Sodium Salt		1g
D4250	1,2-Dioleoyl-*sn*-glycero-3-phosphocholine		250mg
D3925	1,2-Dipalmitoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4213	1,2-Dipalmitoyl-*sn*-glycero-3-phosphoethanolamine		250mg
D3926	1,2-Distearoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4214	1,2-Distearoyl-*sn*-glycero-3-phosphoethanolamine		250mg
L0022	Lecithin from Egg	25g	100g
L0023	Lecithin from Soybean	25g	500g

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Sphingolipids

Product No.	Product Name	Unit Size	
P1765	Phytosphingosine	1g	5g
S0874	D-Sphingosine		25mg

References

1) P. M. Dewick, in *Medicinal Natural Products*, 3rd ed., John Wiley & Sons, Chichester, **2009**, p. 39.
2) *Biochemical Nomenclature and Related Documents*, 2nd ed., Portland Press, London, **1992**, p. 180; http://www.chem.qmul.ac.uk/iupac/lipid/
3) Comprehensive classification system for lipids : E. Fahy, S. Subramaniam, H. A. Brown, C. K. Glass, A. H. Merrill, Jr., R. C. Murphy, C. R. H. Raetz, D. W. Russell, Y. Seyama, W. Shaw, T. Shimizu, F. Spener, G. van Meer, M. S. VanNieuwenhze, S. H. White, J. L. Witztum, E. A. Dennis, *J. Lipid Res.* **2005**, *46*, 839.
4) C. W. Sheu, D. Salomon, J. L. Simmons, T. Sreevalsan, E. Freese, *Antimicrob. Agents Chemother.* **1975**, *7*, 349.

Terpenes

Terpenes are a large family of natural products and are known to be the primary constituents of essential oils. They are biosynthesized via the mevalonate pathway. The basic structure is derived from five-carbon isoprene units[1,2] which are linked together in a head-to-tail fashion to form linear chains or rings. They can be classified on the basis of the length of the carbon chains as illustrated below.

Table 1. Classification of Terpenes and Examples

Name	Number of Carbons	Examples
Hemiterpenes	5	Isoprene
Monoterpenes	10	Menthol, Geraniol: Flavors, Food Additives
Sesquiterpenes	15	Artemisinin: Antimalarial Drug α-Bisaborol: Flavor, Cosmetic Ingredients
Diterpenes	20	Paclitaxel: Antitumor Agent, Gibberellins: Plant Hormones
Triterpenes	30	Lanosterol: Precursor of Steroid Biosynthesis

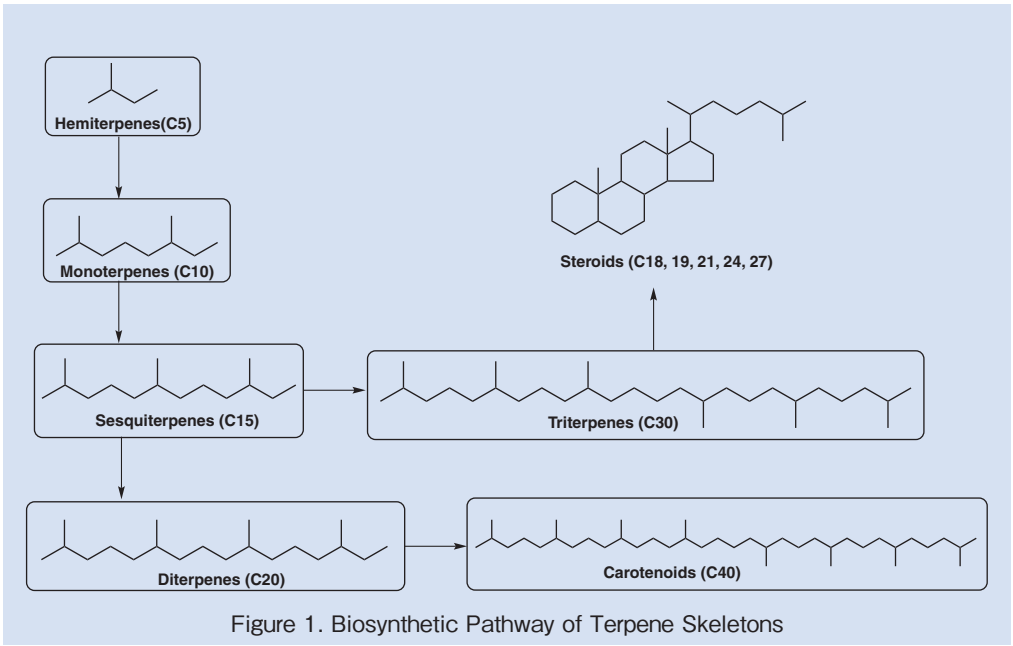

Figure 1. Biosynthetic Pathway of Terpene Skeletons

Terpenes are widespread in nature existing in marine organisms as well as in plants. Some terpenes show characteristic bioactivities such as antitumor activity, and their modes of action is currently under investigation. Since terpenes are mainly found in plants, they are frequently used as markers in plant metabolome analyses.

Nomenclature

According to the *IUPAC Nomenclature Appendix*, 42 parent skeletons are shown.[3] Practically, other common names are also used frequently. For further trivial names, please refer to References.[2,4]

Solubility

In general, most of the terpenes are insoluble in water but soluble in ethanol, chloroform and diethyl ether. They can be added to the buffer solution as a dimethyl sulfoxide solution to examine their activity in living organisms. Please take caution that the solution becomes suspended as the concentration level

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of the dissolved substance increases. It is recommended to define the optimal concentration level and volume of addition in advance. Glycosides of terpenes are more water-soluble than their aglycones.

Stability

In general, monoterpenes are relatively stable. However, oily sesquiterpenes and diterpenes are less stable bearing more oxygen fuctional groups rendering them unsuitable for storage over longer periods. However, most of the triterpenes are solid and show good stability.

Detection

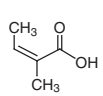
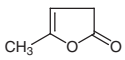
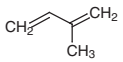
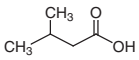
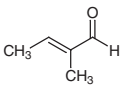
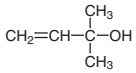
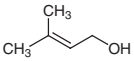
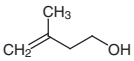
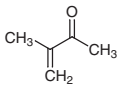
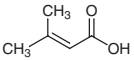
Since some terpenes do not have chromophore unit, UV detection by normal-phase HPLC is difficult. As a result, RI (refractive index) detector can be used instead. Normal-phase TLC is also frequently used to visualize terpenes by spraying them with phosphomolybdic acid solution or cerium sulfate solution followed by heating (see p. 340).

Some Tips

- Monoterpenes and some sesquiterpenes form azeotropic mixtures with the traces of water present in the sample, leading to a considerable loss during distillation. It is therefore recommended that these terpenes should be properly dried prior to their use using the following procedure:
  (1) dissolution of the sample in an appropriate organic solvent (2) drying it over anhydrous sodium or magnesium sulfate and (3) removal of the solvent *in vacuo*.
- In NMR measurement, using two different solvents separately, deuteriochloroform ($CDCl_3$) and benzene-d_6 (C_6D_6), may change the signal patterns to facilitate interpretation of the spectrum (mainly for proton). In addition, some hidden signals might also appear owing to the variation in the residual water signal positions.
- During storage over longer periods, $CDCl_3$ might partially decompose to form phosgene which can damage your precious sample. Therefore care should be taken especially while using $CDCl_3$ with high deuterium ratio (no less than 99.95%D). The sample should not be stored in the NMR tube as a solution after its analysis but recovered from the tube and the solvent should be evaporated completely to prevent its decomposition.

Hemiterpenes

Product No.	Product Name	Unit Size		
A1136	Angelic Acid		1g	5g
A1090	α-Angelicalactone			25g
I0160	Isoprene (stabilized with TBC)		25mL	500mL
M0182	Isovaleric Acid		25mL	500mL
T1003	*trans*-2-Methyl-2-butenal		5mL	25mL
M0178	2-Methyl-3-buten-2-ol		25mL	500mL
M0714	3-Methyl-2-buten-1-ol	25mL	100mL	500mL
M0726	3-Methyl-3-buten-1-ol	25mL	100mL	500mL
M0378	3-Methyl-3-buten-2-one (stabilized with HQ)			25mL
M0543	3-Methylcrotonic Acid	25g	100g	500g
M2052	Methyl 3,3-Dimethylacrylate			25g
T0246	Tiglic Acid		25g	500g

A1136 	A1090 	I0160 	M0182 	T1003 
M0178 	M0714 	M0726 	M0378 	M0543 

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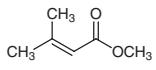

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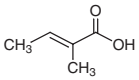
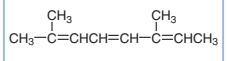


Acyclic Monoterpenes

Product No.	Product Name	Unit Size
D1277	Allocymene (mixture of isomers)	25mL
D0762	Citral (*cis*- and *trans*- mixture)	25mL
C1211	Citral Dimethyl Acetal (*cis*- and *trans*- mixture)	25mL 500mL
C1454	(-)-Citronellal	25mL
C1708	Citronellic Acid	25mL
C2254	(-)-β-Citronellol	5mL 25mL
C1466	(-)-β-Citronellol	25mL
C0370	β-Citronellol	25mL 500mL
C0915	Citronellyl Acetate	25mL
D1592	Dihydrolinalool	25mL 500mL
D3382	6,7-Dihydrolinalool	Price on request
D1212	2,6-Dimethyloctane	1mL
G0027	Geraniol	25mL 500mL
G0028	Geranyl Acetate	25mL 500mL
G0236	Geranylacetone [mixture of (*E*)- and (*Z*)- isomers, (3:2)]	25mL
G0218	Geranyl Formate [for Perfumery]	25mL
G0241	Geranyl Nitrile [mixture of (*E*)- and (*Z*)- isomers, (1:1)]	25mL
L0048	Linalool	25mL 500mL
L0049	Linalyl Acetate	25mL 500mL
M0235	Myrcene (stabilized with BHT)	25mL 500mL
N0077	Nerol	25mL 500mL
N0463	Neryl Acetate	25mL
D1442	Tetrahydrogeraniol	25mL 500mL

D1277



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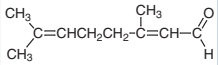

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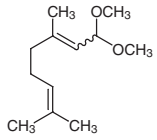

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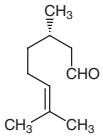

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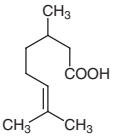

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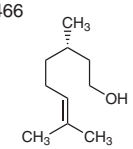

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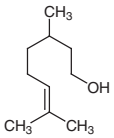

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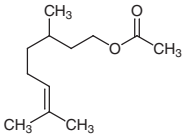

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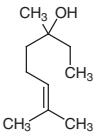

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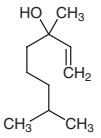

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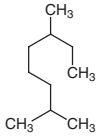

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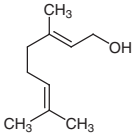

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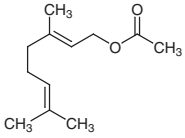

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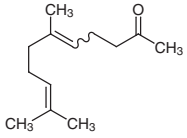

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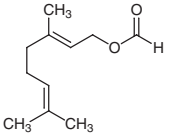

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

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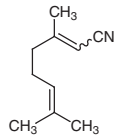

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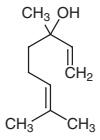

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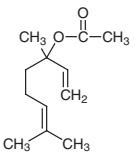

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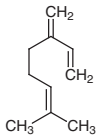

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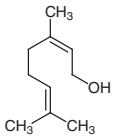

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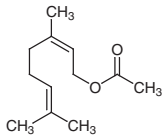

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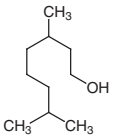

Monocyclic Monoterpenes

Product No.	Product Name	Unit Size		
C0026	Carvacrol		25g	500g
C0703	(*R*)-(-)-Carvone	25mL	100mL	500mL
C0704	(*S*)-(+)-Carvone			25mL
I0168	Cuminaldehyde		25g	500g
C0799	*o*-Cymene			0.1mL
C0798	*m*-Cymene		0.1mL	1mL
C0513	*p*-Cymene		25mL	500mL
I0744	Dehydroxylinalool Oxide (mixture of isomers)			25g
D2112	Ethyl Chrysanthemate		25g	100g
E0796	*N*-Ethyl-*p*-menthane-3-carboxamide		5g	25g
H0142	Hinokitiol		1g	5g
I0284	*cis*-1-Isopropyl-4-methylcyclohexane			5mL
M0320	Isopulegol			25mL
L0046	(±)-Limonene		25mL	500mL
L0047	(+)-Limonene		25mL	500mL
L0105	(+)-Limonene		5mL	25mL
L0132	(-)-Limonene	5mL	25mL	500mL
L0143	Linalool Oxide (mixture of isomers)			25mL
T2605	Linalool Oxide Pyranoid (mixture of isomers)			25g
M0321	(±)-Menthol		25mL	500mL
M0826	(+)-Menthol		25g	500g
M0545	(-)-Menthol	25g	100g	500g
M0513	(-)-Menthone	25mL	100mL	500mL
M0573	(-)-Menthoxyacetic Acid		5g	25g
M0571	(-)-Menthoxyacetyl Chloride			10g
A1107	(-)-Menthyl Acetate			25mL
M0834	(-)-Menthyl Chloride			1g
M1221	(+)-Menthyl Chloroformate		5mL	25mL
M0990	(-)-Menthyl Chloroformate		5mL	25mL
I0790	L-Menthyl Glyoxylate Hydrate			25g
I0889	L-Menthyl L-Lactate		5g	25g
M1044	(1*R*,2*S*,5*R*)-(-)-Menthyl (*S*)-*p*-Toluenesulfinate		5g	25g
M1066	(1*S*,2*R*,5*S*)-(+)-Menthyl (*R*)-*p*-Toluenesulfinate		1g	5g
M2023	8-Mercaptomenthone		5g	25g
N0626	(+)-Neomenthol		5mL	25mL
P0866	(-)-Perillaldehyde			25mL
M0051	(-)-α-Phellandrene		5mL	25mL
P1783	(-)-Piperitone		25g	250g
M0407	(+)-Pulegone		10mL	25mL
S0444	*trans*-Sobrerol			Price on request
T2344	Terpin Monohydrate			25g
M0317	α-Terpinene		25mL	500mL
M0318	γ-Terpinene		25mL	500mL
T1993	(±)-Terpinen-4-ol			25mL
T2581	(+)-Terpinen-4-ol		5g	25g
M0319	(-)-Terpinen-4-ol			25mL

Product No.	Product Name	Unit Size	
T0984	α-Terpineol	25mL	500mL
T0022	α-Terpineol	25mL	500mL
T0817	Terpinolene	25mL	500mL
T0023	Terpinyl Acetate	25mL	500mL
M0410	Thymol	25g	500g

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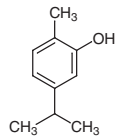

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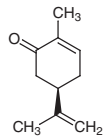

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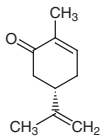

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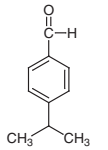

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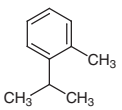

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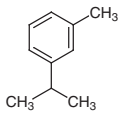

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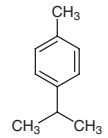

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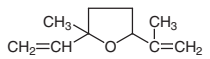

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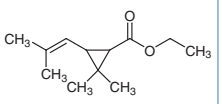

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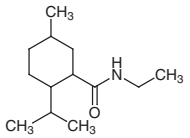

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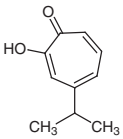

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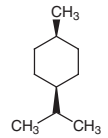

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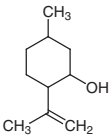

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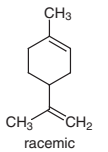
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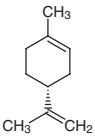

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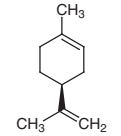

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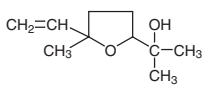

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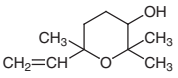

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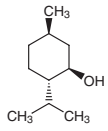
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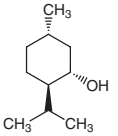

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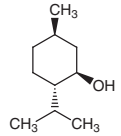

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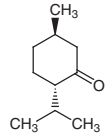

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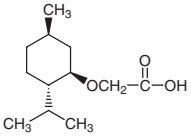

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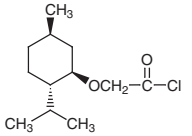

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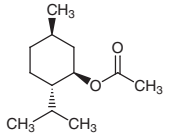

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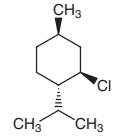

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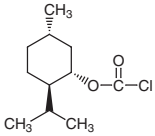

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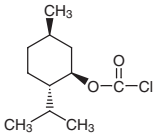

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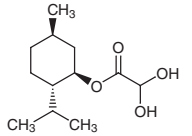

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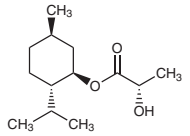

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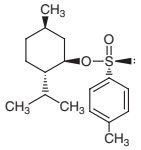

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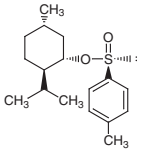

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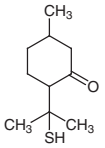

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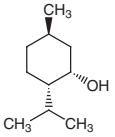

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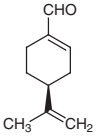
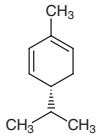
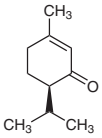
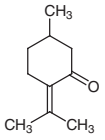
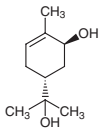
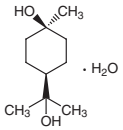
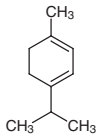
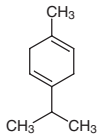
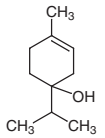
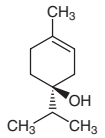
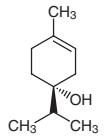
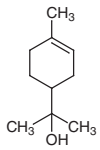
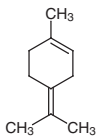
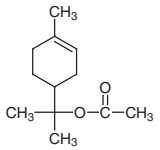
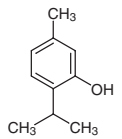


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

M0051 	P1783 	M0407 	S0444  relative	T2344  relative
M0317 	M0318 	T1993 	T2581 	M0319 
T0984 T0022 	T0817 	T0023 	M0410 	

Bicyclic Monoterpenes

Product No.	Product Name			Unit Size
B1012	(-)-Borneol		25g	500g
B0525	Borneol (contains *ca.* 20% Isoborneol)		25g	500g
B0526	Bornyl Acetate (contains *ca.* 20% Isobornyl Acetate)			25mL
B0567	(+)-3-Bromocamphor		25g	500g
B1125	(+)-3-Bromocamphor-8-sulfonic Acid Ammonium Salt		5g	25g
C1021	(-)-Camphanic Acid		1g	5g
C1022	(-)-Camphanic Chloride	1g	5g	25g
C0009	(±)-Camphene (contains *ca.* 20% Tricyclene)		25g	500g
C0011	(±)-Camphor		25g	500g
C0010	(+)-Camphor		25g	500g
C1251	(-)-Camphor			5g
C0012	(+)-Camphoric Acid		25g	100g
C0013	(1*R*)-Camphor Oxime		1g	25g
C0014	(±)-Camphorquinone		5g	25g
C1482	(1*R*)-(-)-Camphorquinone		1g	5g
C1660	(1*S*)-(+)-Camphorquinone		1g	5g
C1661	*anti*-(1*R*)-(+)-Camphorquinone 3-Oxime			1g
C0016	(±)-10-Camphorsulfonic Acid	25g	100g	500g
C0015	(+)-10-Camphorsulfonic Acid	25g	100g	500g
C0972	(-)-10-Camphorsulfonic Acid		25g	500g
C1391	(+)-10-Camphorsulfonimine			5g
C1393	(-)-10-Camphorsulfonimine			5g
C0998	(+)-10-Camphorsulfonyl Chloride		10g	25g
C1308	(-)-10-Camphorsulfonyl Chloride		5g	25g
C1324	(+)-10,2-Camphorsultam		1g	5g
C1325	(-)-10,2-Camphorsultam		1g	5g
C1326	(2*R*,8a*S*)-(+)-(Camphorylsulfonyl)oxaziridine		1g	5g
C1327	(2*S*,8a*R*)-(-)-(Camphorylsulfonyl)oxaziridine		1g	5g
C0047	(+)-3-Carene		25mL	500mL
C0542	1,8-Cineole			25mL
C0934	1,8-Cineole		25mL	500mL
D2715	(+)-3,9-Dibromocamphor		5g	25g
F0163	(+)-Fenchone			25mL
F0164	(-)-Fenchone		25mL	500mL
H0862	(1*R*,2*R*,5*R*)-(+)-2-Hydroxy-3-pinanone		1g	5g
H0863	(1*S*,2*S*,5*S*)-(-)-2-Hydroxy-3-pinanone		1g	5g
I0275	(±)-Isoborneol		25g	500g
I0306	Isobornyl Acetate		25mL	500mL

Product No.	Product Name	Unit Size	
I0638	Isobornyl Acrylate (stabilized with MEHQ)	25g	500g
I0617	Isobornyl Methacrylate (stabilized with MEHQ)	25g	500g
K0028	(*S*)-(+)-Ketopinic Acid	1g	5g
M1341	(1*S*)-(-)-10-Mercaptoborneol		100mg
M1070	(1*S*)-(-)-10-Mercaptoisoborneol		1g
P1876	Paeoniflorin		100mg
P1934	(1*S*,2*S*,3*R*,5*S*)-(+)-2,3-Pinanediol	5g	25g
P1099	(1*R*)-(+)-α-Pinene	25mL	500mL
P0440	(1*S*)-(-)-α-Pinene	25mL	500mL
P0441	(-)-β-Pinene	25mL	500mL
P1362	α-Pinene Oxide	25mL	250mL
C0017	Sodium (±)-10-Camphorsulfonate		25g
T1863	(1*R*)-(-)-Thiocamphor		5g
T0989	Thujone (α- and β- mixture)	5mL	25mL
T2578	(1*R*,4*R*,5*R*)-4,7,7-Trimethyl-6-thiabicyclo[3.2.1]octane	1g	5g
T2579	(1*S*,4*S*,5*S*)-4,7,7-Trimethyl-6-thiabicyclo[3.2.1]octane	1g	5g
V0072	(-)-Verbenone		25g

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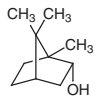

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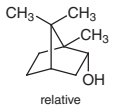

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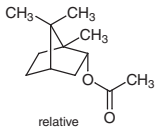

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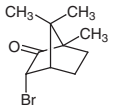

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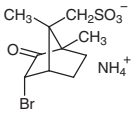

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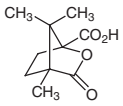

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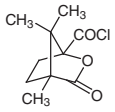

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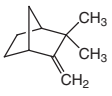

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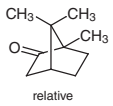

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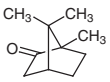

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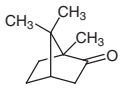

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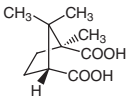

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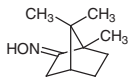

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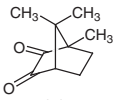

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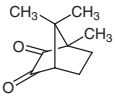

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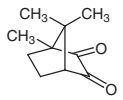

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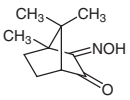

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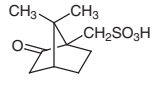

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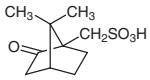

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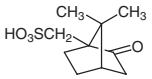

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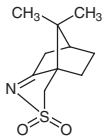

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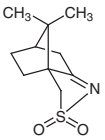

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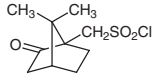

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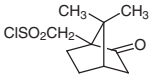

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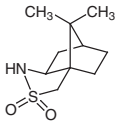
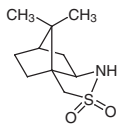
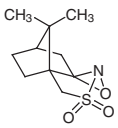
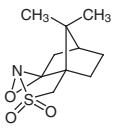
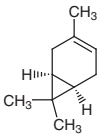
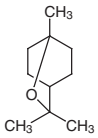
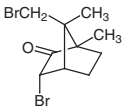
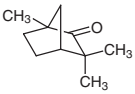
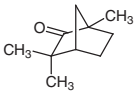
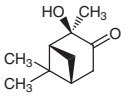
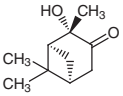
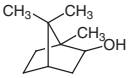
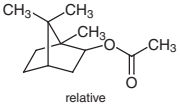
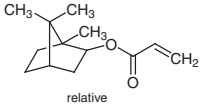
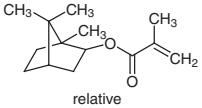
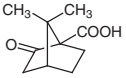
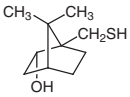
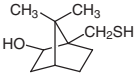
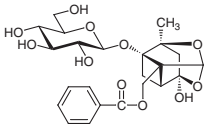
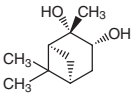
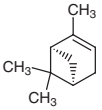
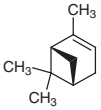
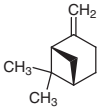
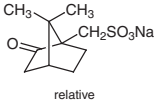
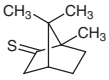
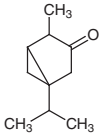
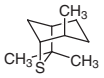
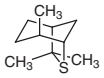
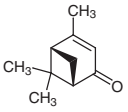


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

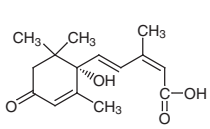
C1325 	C1326 	C1327 	C0047 	C0542 C0934 
D2715 	F0163 	F0164 	H0862 	H0863 
I0275  relative	I0306  relative	I0638  relative	I0617  relative	K0028 
M1341 	M1070 	P1876 	P1934 	P1099 
P0440 	P0441 	P1362 	C0017  relative	T1863 
T0989 	T2578 	T2579 	V0072 	

Sesquiterpenes

Product No.	Product Name			Unit Size
A1698	(*S*)-(+)-Abscisic Acid			100mg
A0792	Abscisic Acid (Synthetic)		100mg	500mg
A2190	Artemether		5g	25g
A2118	Artemisinin			5g
A2191	Artesunate		5g	25g
B4388	Bilobalide		10mg	50mg
B1413	Bisabolene (so called)			25mL
B2119	(±)-*α*-Bisabolol			25mL
C0957	*α*-Caryophyllene			1mL
C0796	*β*-Caryophyllene	25mL	100mL	500mL

Product No.	Product Name	Unit Size	
C2854	Cedrol	5g	25g
T0608	Farnesol (mixture of isomers)	5g	25g
F0347	Farnesyl Acetate (mixture of isomers)		25mL
G0228	Guaiazulene		10g
N0454	Nerolidol (*cis*- and *trans*- mixture)		25mL
N0920	(+)-Nootkatone		1g
P1982	Parthenolide	25mg	100mg
C0375	Picrotoxin (Picrotoxinin + Picrotin)	1g	5g
S0521	Santonin	5g	25g
V0117	Valencene		5g

A1698



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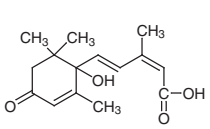

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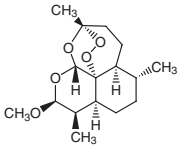

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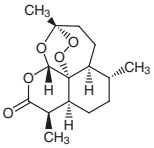

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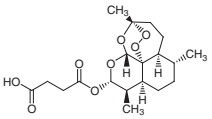

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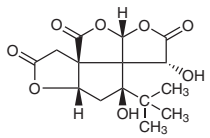

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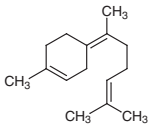

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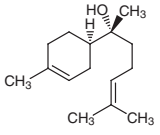

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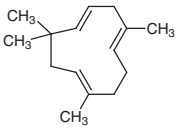

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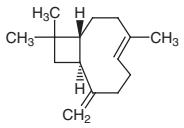

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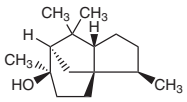

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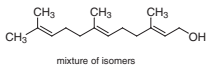

mixture of isomers

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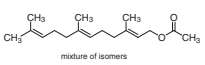

mixture of isomers

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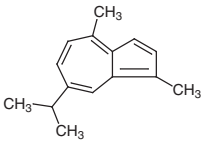

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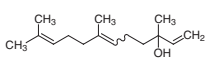

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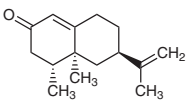

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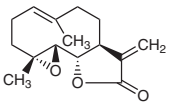

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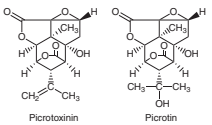
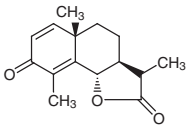


Picrotoxinin Picrotin

S0521



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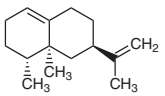


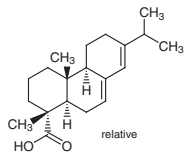
Diterpenes

Product No.	Product Name	Unit Size	
A0001	Abietic Acid	25g	500g
C2488	Carnosic Acid	20mg	100mg
D4148	10-Deacetylbaccatin III	100mg	500mg
D1588	(+)-Dehydroabietylamine	5g	25g
D1180	Dehydroabietylamine	25g	500g
D4102	Docetaxel		100mg

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name	Unit Size		
A0002	Ethyl Abietate			25g
F0855	Forskolin		10mg	50mg
G0221	Geranyl-linalool (mixture of isomers)			25mL
G0029	Gibberellin A_3	100mg	1g	5g
I0145	Isophytol		25g	500g
P1632	Paclitaxel			100mg
P1674	Phytantriol (mixture of isomers)			5g
P0411	Phytol			25g
P1675	Phytyl Acetate (*cis*- and *trans*- mixture)		5g	25g
P1933	Pisiferic Acid			100mg
R0088	13-*cis*-Retinoic Acid		100mg	1g
S0847	(3a*R*)-(+)-Sclareolide		5g	25g
A0651	Sodium Abietate		5g	25g
S0594	Stevioside			25g
T2899	Triptolide			10mg

A0001



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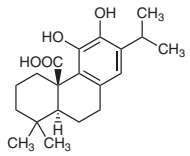

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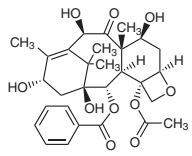

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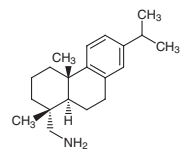

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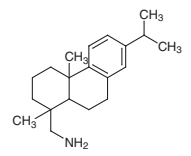

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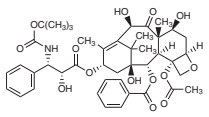

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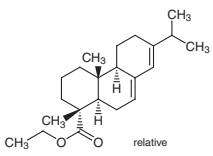

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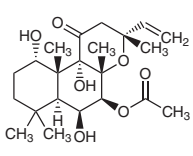

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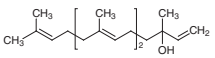

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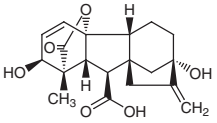

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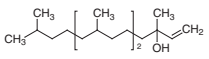

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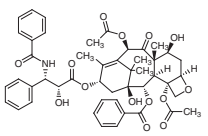

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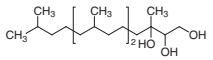

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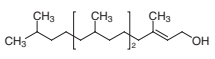

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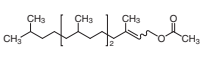

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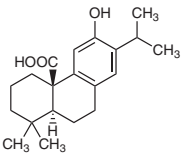

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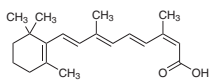

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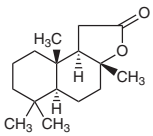

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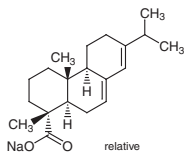

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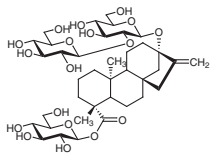

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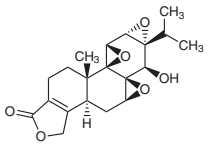
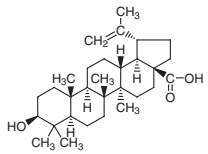


Triterpenes

Product No.	Product Name	Unit Size	
B2836	Betulinic Acid	100mg	1g
B0803	Betulinol		100mg

Product No.	Product Name	Unit Size		
C2737	Celastrol			25mg
G0149	Glycyrrhetic Acid		1g	25g
G0150	Glycyrrhizin		1g	25g
G0270	Glycyrrhizin Dipotassium Salt Hydrate			25g
G0151	Glycyrrhizin Monoammonium Salt Hydrate		1g	25g
G0217	Glycyrrhizin Trisodium Salt Hydrate			25g
C0427	Lanosterol			25g
L0258	Limonin		100mg	1g
O0317	Oleanolic Acid Hydrate		5g	25g
H0096	Squalane	25mL	100mL	500mL
H0097	Squalene		25mL	500mL
T2899	Triptolide			10mg
U0065	Ursolic Acid		100mg	1g

B2836



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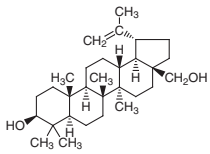

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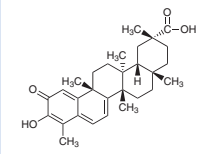

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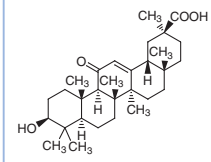

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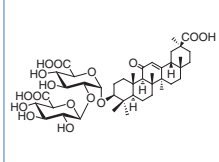

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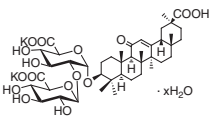

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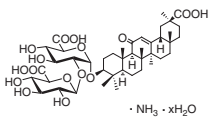

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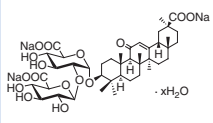

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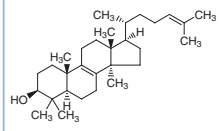

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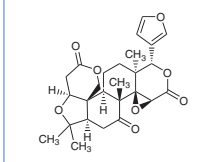

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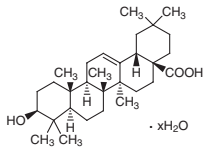

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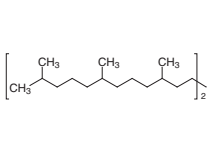

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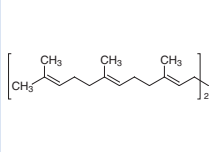

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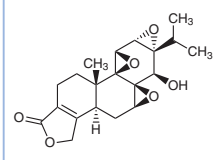

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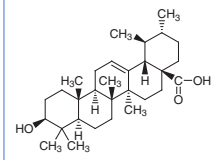

Others

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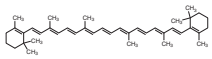
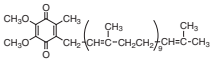
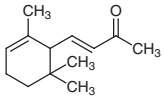
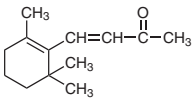
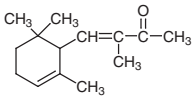
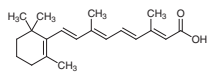
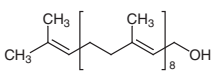
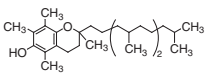
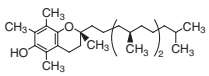
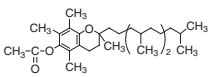
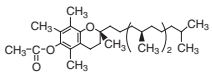
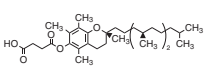
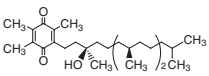
C0560	β-Carotene		1g	5g
C1971	Coenzyme Q_{10}		100mg	1g
I0076	α-Ionone		25g	250g
I0077	β-Ionone		25mL	500mL
M0363	Methylionone (mixture of α- and β-, predominantly α-*n*-isomer)			25mL
M0647	α-*iso*-Methylionone			25mL
R0064	Retinoic Acid		1g	5g
S0525	Solanesol		5g	25g
T0251	DL-α-Tocopherol		25g	250g
T2309	D-α-Tocopherol			25g
T0252	DL-α-Tocopherol Acetate	25g	100g	500g
T2322	D-α-Tocopherol Acetate			25g
T2628	D-α-Tocopherol Succinate		5g	25g
T2283	D-α-Tocopherylquinone			500mg

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

C0560 	C1971 	I0076 	I0077 	M0647 
R0064 	S0525 	T0251 	T2309 	T0252 
T2322 	T2628 	T2283 		

References

1) P. M. Dewick, in *Medicinal Natural Products*, 3rd ed., John Wiley & Sons, Chichester, **2009**, p. 187.
2) E. Breitmaier, in *Terpenes*, Wiley-VCH, Weinheim, **2006**.
3) For Sesquiterpenes: B. M. Fraga, *Nat. Prod. Rep.* **2008**, *25*, 1180; For Diterpenes: J. R. Hanson, *Nat. Prod. Rep.* **2007**, *24*, 1332; For Triterpenes: J. D. Connolly, R. A. Hill, *Nat. Prod. Rep.* **2008**, *25*, 794.

Steroids

Steroids are compounds consistuted of four fused rings, for example, the most common and best known steroid in humans, cholesterol. In animals, steroids are biosynthesized from lanosterol and are widely distributed. The distinctive feature in steroids is lack of methyl group at C-4 position as compared to terpenes. In this section, we have classified steroids into five basic categories based upon their chemical composition (Figure 1). Vitamin D, another steroid derivative, is described on p.165.

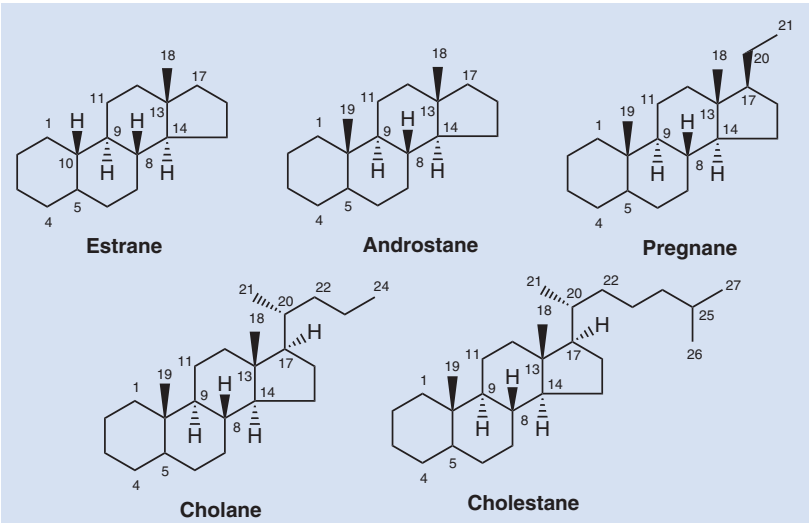


Figure 1. Basic Steroid Structures

●Steroid Hormones: Estranes, Androstanes, Pregnanes

Certain kinds of steroids like estrogenes, androstanes and pregnanes can act as hormones, their activities being closely related to their structures (Table 1). Pregnane-type steroids can be classified into glucocorticoids and progestogens based on their bioactivities. Their classification and the typical compounds in each category are illustrated as follows:

Estrogens: Estrogens function as the primary female sex hormone and in combination with synthetic progestogens can be used as oral contraceptives to suppress ovulation. Recently, it is also reported that they are effective for the prevention of osteoporosis, heart attacks and Alzheimer's disease in women.

Androgens: Testosterone is not only the principal and most well known male sex hormone but is also known to exert anabolic effects. This is also the main reason why some of them have been banned from use as bone density enhancers and muscle-building drugs by several sports organizations. They are also the intermediates of estrogene biosynthetic pathway or rather the precursors of all estrogens.

Progestogens: The only naturally occuring progestogen, *i.e.*, progesterone, exhibits antiovulatory action. Based on its structure, derivatives of 19-nortestosterone were synthesized and can be used as oral contraceptives.

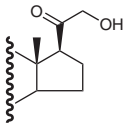
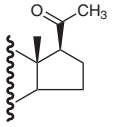
Glucocorticoids: Synthetic glucocorticoids such as dexamethasone and prednisolone find clinical use as anti-inflammatory agents. They are synthetically developed based on the structure of cortisone, a natural glucocorticoid.

WARNING

Some of the steroid hormones may cause serious physiological actions. To avoid inhalation and contacting with skin, wear protective goggles, mask and eyeglasses when handling. Sufficient caution should be taken, when using these compounds, from the opening up to the disposal of the reagents.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Table 1. Classification of Steroid Hormones

Hormones	Synonym	Typical Compound	Structure
Glucocorticoid	Adrenocorticotropic Hormone	Cortisone	Pregnane Type 
Progestogen	Gestagene	Progesterone	Pregnane Type 
Estrogen	Female Sex Hormone	Estradiol	Estrane Type
Androgen	Male Sex Hormone	Testosterone	Androstane Type

●Bile Acids: Cholanes

Cholane type steroids are predominantly found in the bile. Cholic acid and its derivatives exist in bile as the major component as conjugates of glycine and taurine. Since conjugated cholates are amphiphilic, they assist in the digestion and absorption of lipids in small intestine. This characteristic is also exploited also in its use as a surfactant.

●Cholesterol: Cholestanes

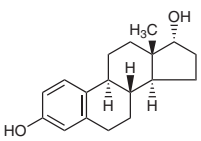
Cholesterol possesses a cholestane-type skeleton and in conjugation with fatty acids, it forms the main component of cell membranes in animals and microorganisms. These cholesterol conjugates establish and maintain proper membrane permeability. In addition, it is a precursor of steroids as mentioned above and also exists in its liberated form in organisms.

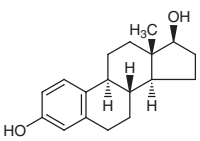
●Phytosteroids, Steroid Glycosides, Other Steroids

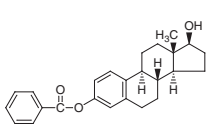
Steroids of plant origin have different biosynthetic pathways: they are synthesized from cycloartenol. They possess structural features distinct from animal steroids, for instance, a characteristic alkyl side-chain at C-24. Steroid glycosides and their aglycones are also listed in this section.

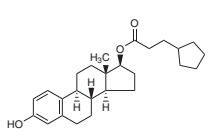
Estranes

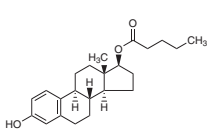
Product No.	Product Name	Unit Size		
E0919	α-Estradiol			1g
E0025	β-Estradiol	1g	5g	25g
E0329	Estradiol Benzoate		1g	5g
E0875	β-Estradiol 17-Cypionate		1g	5g
E0876	β-Estradiol 17-Valerate		1g	5g
E0218	Estriol		100mg	1g
E0026	Estrone		1g	5g
E0917	Estrone 3-Methyl Ether		1g	5g
E0037	Ethynylestradiol		1g	5g
M0728	Mestranol		1g	5g
M2530	2-Methoxy-β-estradiol		25mg	100mg
Q0091	Quinestrol		100mg	1g

E0919 

E0025 

E0329 

E0875 

E0876 

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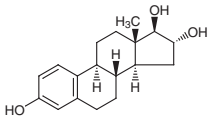

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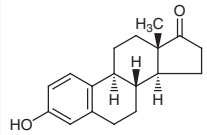

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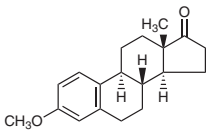

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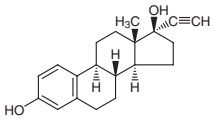

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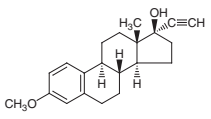

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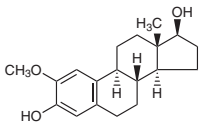

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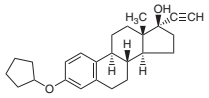
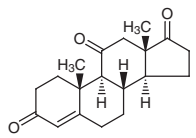


Androstanes

Product No.	Product Name	Unit Size	
A1397	Adrenosterone		1g
A0856	1,4-Androstadiene-3,17-dione	1g	5g
A0845	Δ^4-Androstene-3,17-dione	1g	5g
A0646	Androsterone	1g	5g
D0044	Dehydroepiandrosterone	1g	25g
D0045	Dehydroepiandrosterone Acetate	5g	25g
S0520	Dehydroepiandrosterone-3-sulfate Sodium Salt Hydrate		5g
E0374	Epiandrosterone	1g	5g
E0941	Exemestane	200mg	1g
M1801	Mestanolone	1g	5g
M1800	Mesterolone	1g	5g
H1193	Methandrostenolone	1g	5g
M0146	Methylandrostenediol	1g	25g
M0435	Methyltestosterone	1g	5g
M0638	$\Delta^{9(11)}$-Methyltestosterone		100mg
O0322	Oxymetholone		1g
A0462	Stanolone	1g	10g
S0530	Stanozolol	1g	5g
T0027	Testosterone	1g	10g
T0028	Testosterone Propionate	5g	25g

A1397



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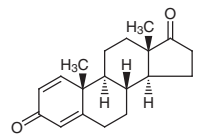

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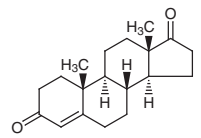

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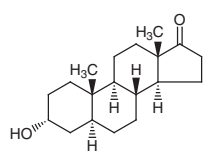

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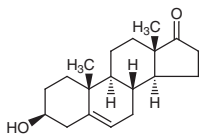

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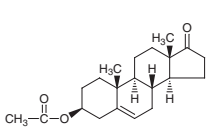

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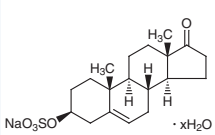

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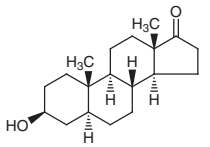

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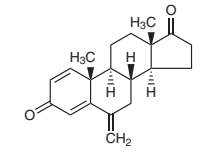

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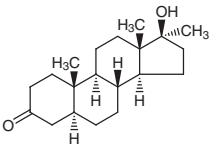
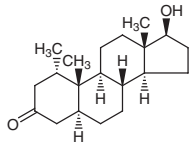
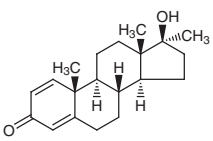
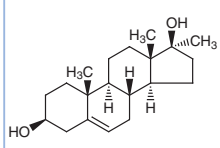
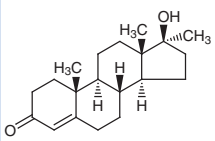
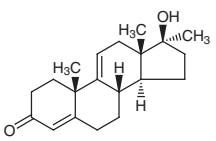
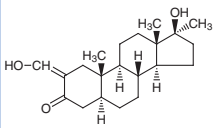
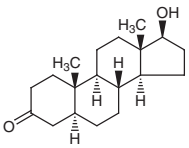
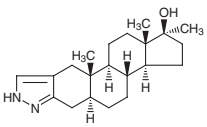
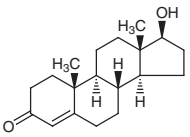
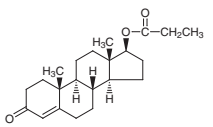


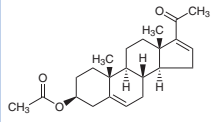
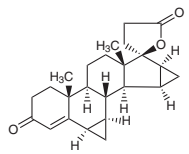
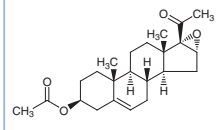
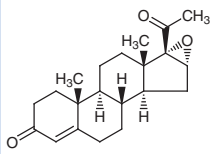
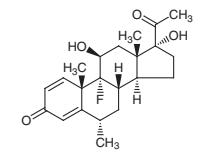
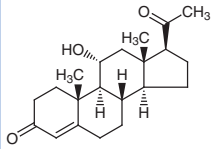
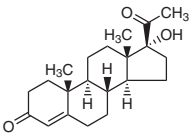
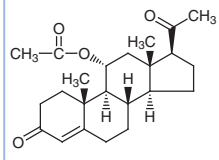
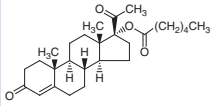
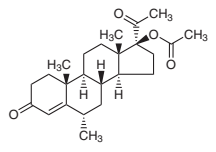
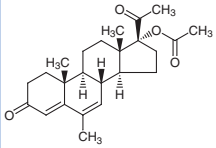
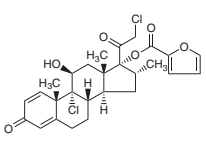
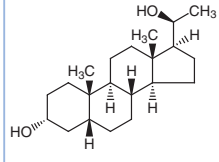
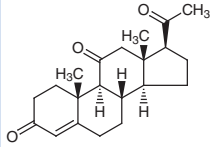
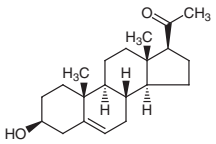
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

M1800 	H1193 	M0146 	M0435 	M0638 
O0322 	A0462 	S0530 	T0027 	T0028 

Pregnanes

Progestogens

Product No.	Product Name	Unit Size		
D4687	16-Dehydropregnenolone Acetate		5g	25g
D4209	Drospirenone			200mg
E0015	16,17-Epoxypregnenolone Acetate		100mg	1g
E0198	16,17-Epoxyprogesterone	1g	5g	25g
F0414	Fluorometholone			1g
H0498	11*α*-Hydroxyprogesterone			1g
H1250	17*α*-Hydroxyprogesterone		5g	25g
H0499	11*α*-Hydroxyprogesterone Acetate			1g
H0994	17*α*-Hydroxyprogesterone Caproate			5g
M1964	Medroxyprogesterone Acetate		1g	5g
M1949	Megestrol Acetate		1g	5g
M2354	Mometasone Furoate		200mg	1g
P0678	5*β*-Pregnane-3*α*,20*α*-diol		100mg	1g
P0771	4-Pregnene-3,11,20-trione			1g
P0786	Pregnenolone		5g	25g
P0477	Pregnenolone Acetate		1g	10g
P0478	Progesterone		5g	25g

D4687 	D4209 	E0015 	E0198 	F0414 
H0498 	H1250 	H0499 	H0994 	M1964 
M1949 	M2354 	P0678 	P0771 	P0786 

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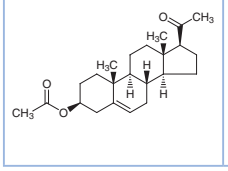

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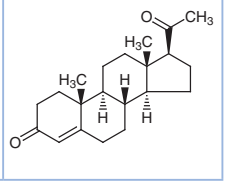
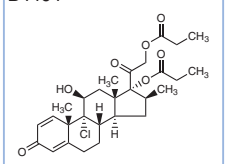


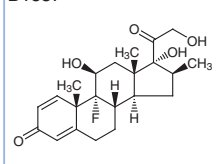
Glucocorticoids

Product No.	Product Name	Unit Size		
B4464	Beclometasone Dipropionate			1g
B1837	Betamethasone		1g	5g
B3165	Betamethasone 21-Acetate		1g	5g
B3166	Betamethasone 17,21-Dipropionate		1g	5g
B4110	Betamethasone 21-Phosphate Disodium Salt			1g
B3909	Budesonide		200mg	1g
C2612	Clobetasol 17-Propionate		1g	5g
C1478	Cortexolone			1g
C0388	Corticosterone	100mg	1g	5g
C1479	Corticosterone 21-Acetate			500mg
C1317	Cortisone		1g	10g
C0389	Cortisone Acetate	1g	5g	25g
D4523	Deflazacort		1g	5g
D0047	Deoxycorticosterone Acetate			1g
D1961	Dexamethasone			1g
D3628	Dexamethasone 21-Acetate		1g	5g
D4438	Dexamethasone 21-Phosphate Disodium Salt Hydrate		250mg	1g
F0945	Flumetasone		200mg	1g
F0437	Flunisolide			1g
F0657	Fluocinolone Acetonide		1g	5g
F0525	Fluticasone Propionate			100mg
H0533	Hydrocortisone		1g	25g
H0184	Hydrocortisone Acetate		1g	5g
M1665	6α-Methylprednisolone		1g	5g
M2354	Mometasone Furoate		200mg	1g
P0637	Prednisolone	1g	5g	25g
P1283	Prednisolone Acetate			5g
D3918	Prednisolone 21-Phosphate Disodium Salt			5g
P1276	Prednisone		5g	25g
T2303	Triamcinolone			1g
T2308	Triamcinolone Acetonide		1g	5g

B4464



B1837



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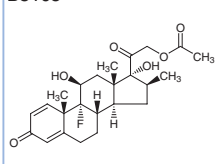

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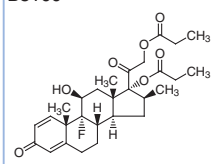

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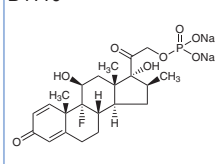

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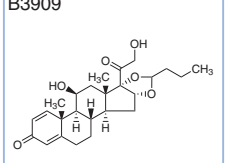

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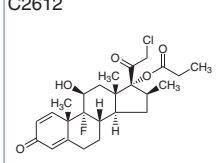

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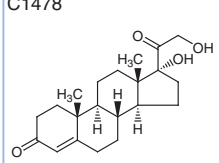

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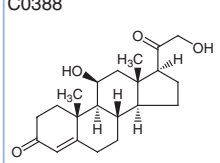

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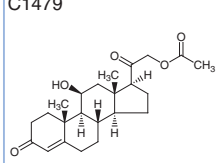

 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

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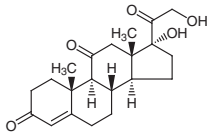

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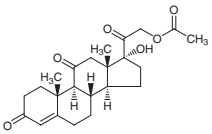

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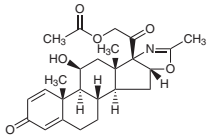

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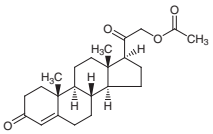

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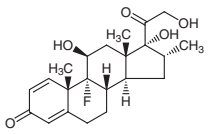

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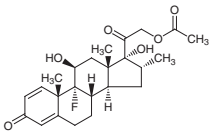

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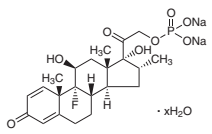

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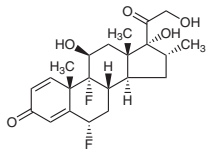

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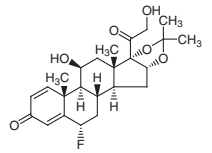

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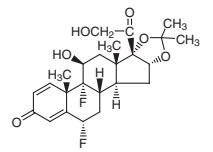

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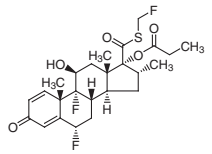

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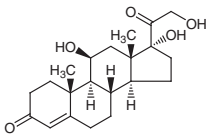

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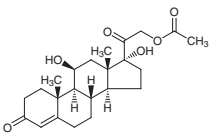

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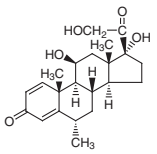

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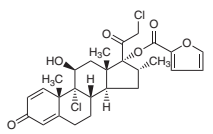

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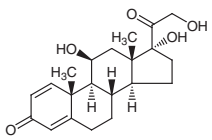

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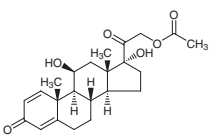

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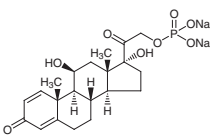

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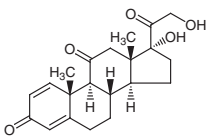

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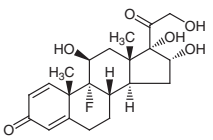

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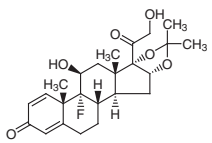
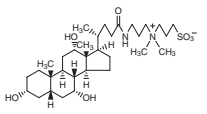


Cholanes (Bile Acids)

Product No.	Product Name	Unit Size		
C1578	CHAPS		1g	5g
C0750	Chenodeoxycholic Acid		5g	25g
C0324	Cholic Acid		25g	500g
S0596	Cholic Acid Sodium Salt from Bovine Bile		5g	25g
D0042	Dehydrocholic Acid		25g	250g
C0315	Deoxycholic Acid		25g	100g
D1820	Deoxycholic Acid Sodium Salt			25g
C0316	Deoxycholic Acid Sodium Salt			25g
G0207	Glycocholic Acid Sodium Salt Hydrate		1g	5g
H0521	3β-Hydroxy-Δ^5-cholenic Acid		1g	5g
H0869	3α-Hydroxy-7-oxo-5β-cholanic Acid		5g	25g
H0535	Hyodeoxycholic Acid		1g	25g
H0870	Hyodeoxycholic Acid Sodium Salt			25g
L0089	Lithocholic Acid		5g	25g
C1412	Methyl Cholate			25g
H0529	Methyl Hyodeoxycholate		5g	25g
O0267	12-Oxochenodeoxycholic Acid			25g
C0325	Sodium Cholate		25g	500g
D0043	Sodium Dehydrocholate			25g
T0808	Taurocholic Acid Sodium Salt from Bovine Bile	1g	5g	25g

Product No.	Product Name	Unit Size
T1567	Tauroursodeoxycholic Acid Dihydrate	5g
U0030	Ursodeoxycholic Acid	5g 25g
U0068	Ursodeoxycholic Acid Sodium Salt Hydrate	25g

C1578



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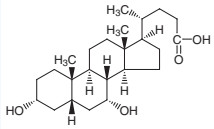

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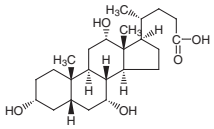

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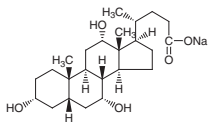

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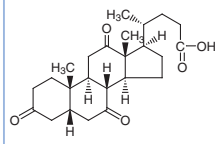

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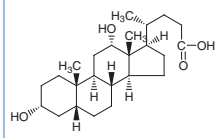

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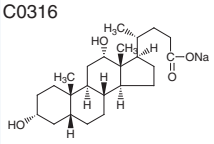

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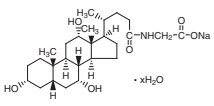

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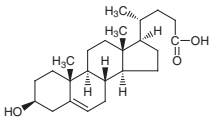

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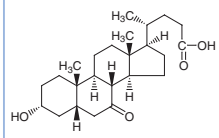

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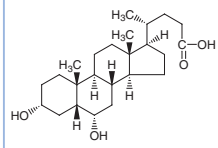

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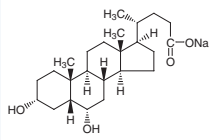

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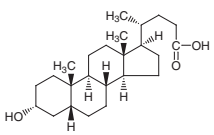

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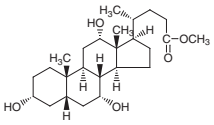

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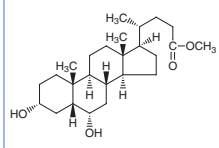

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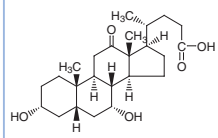

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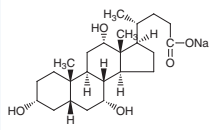

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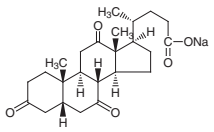

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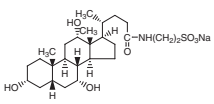

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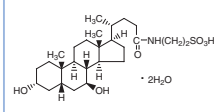

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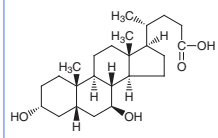

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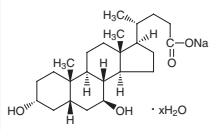

Cholestanes

Product No.	Product Name	Unit Size
C0317	β-Cholestanol (contains α-Cholestanol)	25g
C1366	(+)-4-Cholesten-3-one	5g
C0318	Cholesterol (stabilized with α-Tocopherol)	25g 100g 500g
C1222	Cholesterol-5α,6α-epoxide	1g
C0695	Cholesteryl Bromide from Beef Fat	10g
C0610	Cholesteryl Chloride from Beef Fat	25g

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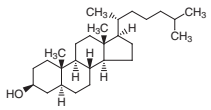
C0317



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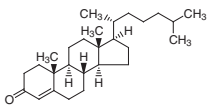

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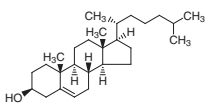

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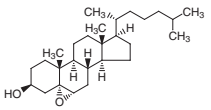

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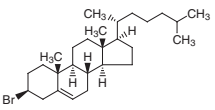

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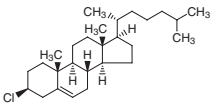
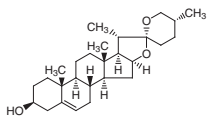


Phytosteroids, Steroid Glycosides & Other Steroids

Phytosteroids

Product No.	Product Name	Unit Size	
D1474	Diosgenin	1g	10g
E0018	Ergosterol	5g	25g
H0003	Hecogenin	100mg	1g
J0009	Jervine		10mg
S0040	*β*-Sitosterol (contains Campesterol)		25g
S0221	*β*-Sitosterol Acetate (contains Campesterol Acetate)	1g	5g
S0386	Stigmastanol		1g
S0088	Stigmasterol	1g	25g

D1474



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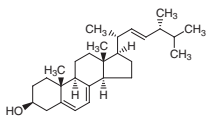

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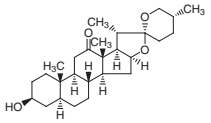

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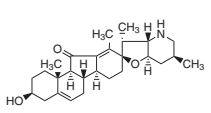

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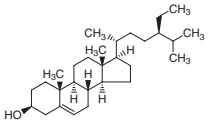

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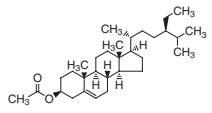

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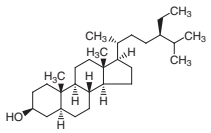

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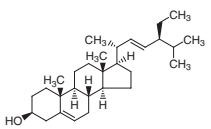
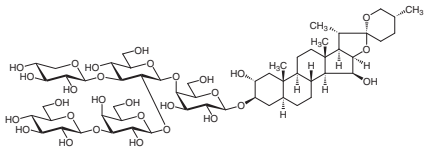


Steroid Glycosides

Product No.	Product Name	Unit Size	
D0540	Digitonin		100mg
D0542	Digitoxin		100mg
D1828	Digoxin	100mg	1g
S0091	Ouabain Octahydrate	1g	5g
T0329	Tomatine [for Cholesterol assay]		100mg

D0540



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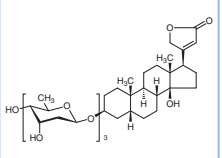

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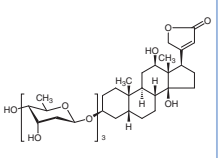

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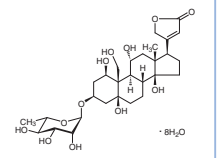

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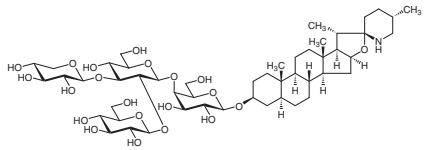
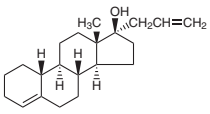


Other Steroids

Product No.	Product Name	Unit Size	
A2570	Allylestrenol		1g
D4162	9(10)-Dehydronandrolone	1g	5g
D4163	Desogestrel		100mg
D0541	Digitoxigenin		10mg
E0905	Eplerenone		200mg
E0920	Estra-4,9-diene-3,17-dione	1g	5g
E0918	Estra-5(10),9(11)-diene-3,17-dione 3-Ethylene Ketal	1g	5g
E0040	Ethisterone	1g	5g
E0921	Ethylgonendione		1g
F0675	Finasteride	200mg	1g
G0404	Gestodene	100mg	1g
G0436	Gestrinone		100mg
L0246	Lynestrenol		1g
M1732	Mifepristone	1g	5g
N0777	Nandrolone		100mg
N0449	Norethisterone	100mg	1g
N0450	Norethisterone Acetate	100mg	1g
N0889	(-)-Norgestrel	100mg	1g
S0260	Spironolactone	1g	5g
T2330	Tibolone		1g
T2328	Trenbolone		1g

A2570



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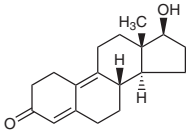

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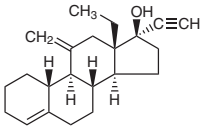

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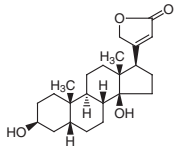

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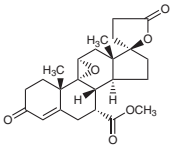

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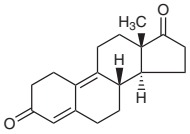

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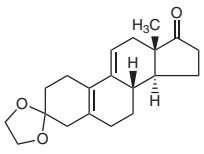

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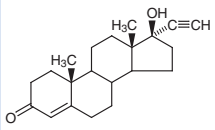

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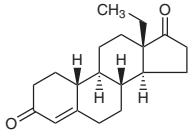

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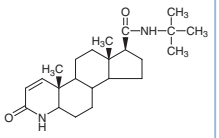
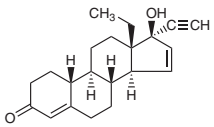
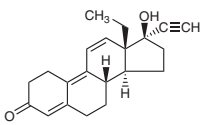
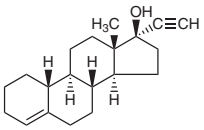
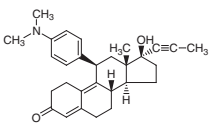
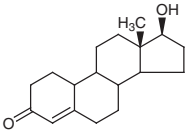
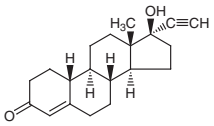
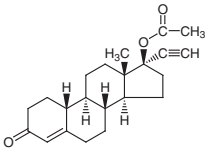
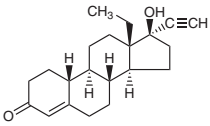
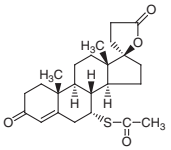
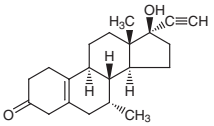
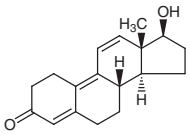


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

G0404 	G0436 	L0246 	M1732 	N0777 
N0449 	N0450 	N0889 	S0260 	T2330 
T2328 				

Reference

P. M. Dewick, in *Medicinal Natural Products*, 3rd ed., John Wiley & Sons, Chichester, **2009**, pp. 247-298.

Phenylpropanoids & Aromatic Polyketides

Both phenylpropanoids and aromatic polyketides are natural organic compounds of plant origin biosynthesized via the shikimic acid pathway. Phenylalanine and tyrosine are their precursors.[1)]

Phenylpropanoids are classified in the group of compounds in which side chains with three carbons are attached to a benzene ring. They are ingredients of essential oils obtained from anis, cinnamon bark, and clove and are used for fragrances and aromatherapy.

Aromatic polyketides are designated as compounds in which carbon chains are extended with malonyl-CoA onto phenylpropanoids.[2)] Diarylheptides are biosynthesized from two cinnamyl-CoA units and one malonyl-CoA. Their two aromatic rings are connected with an aliphatic seven-carbon chain. Stilbenoids, chalconoids, flavonoids and isoflavonoids are formed from a cinnamyl-CoA with three malonyl-CoA units. Chalconoids, flavonoids and isoflavonoids possess a C_6-C_3-C_6 skeleton whereas stilbenes have a C_6-C_2-C_6 skeleton which arises by decarboxylation during the biosynthesis. Most of them have phenolic hydroxy groups and show antioxidative activity. Some of them show physiologic activities towards plants, such as phytoalexins, with the budding of seeds and adjusting of growth. Isoflavonoids are a unique compound group: they are biosynthesized via the phenyl group migration from flavonoids.[2)] To date, they are found only in the Leguminosae/Fabacaeae plant family. This distinct biosynthesis triggered researchers to investigate detailed biosynthetic mechanisms.

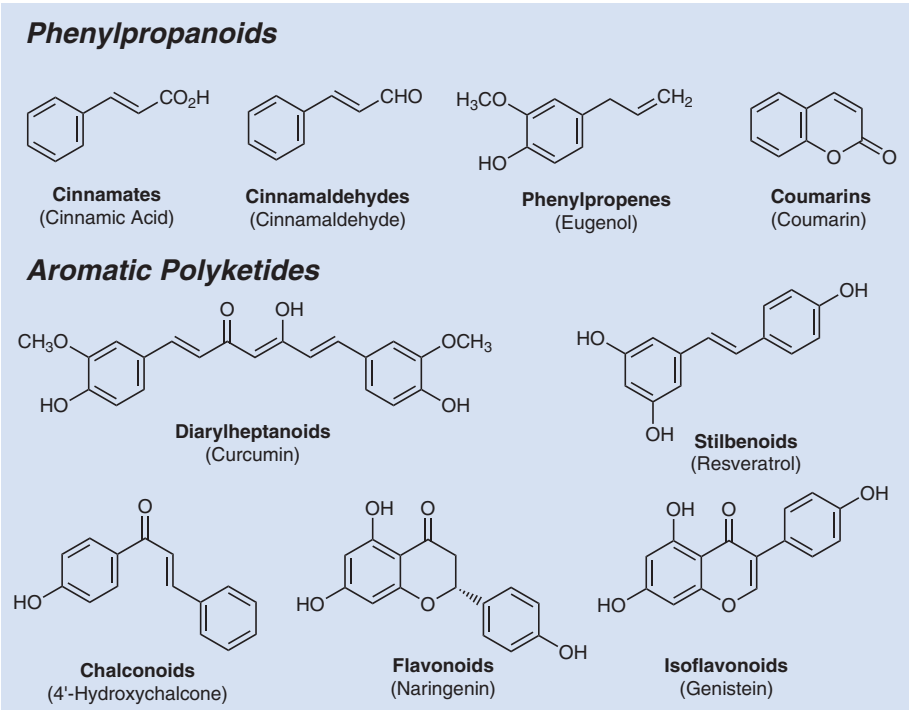


Figure 1. Structures of Phenylpropanoids and Aromatic Polyketides

Solubility

They are generally soluble in many organic solvents. They can be rather difficult to dissolve in non-polar solvents such as hexane but dissolve well in high polar solvents such as chloroform, methanol and DMSO. Compounds with carboxyl or phenolic hydroxy groups are soluble in aqueous alkaline solutions. Since they are easily oxidized in the liquid state, we suggest you to use them within a short period of time after preparation.

 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Storage Precautions

As long as no special remark is mentioned in the catalogues or labels, they can be stored at room temperature. Solids can be stored longer than liquid compounds or solutions. Note should be taken that compounds with phenolic hydroxy groups are labile to oxidation and can gradually change color from brown to black while being stored. Compounds with aldehyde groups are also apt to be oxidized to carboxylic acids. After unsealing these labile reagents, they should be stored refrigerated or frozen under an inert gas such as nitrogen/argon.

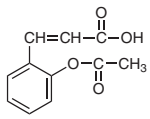
Phenylpropanoids

Cinnamic Acids & Esters

Product No.	Product Name	Unit Size		
A2413	2-Acetoxycinnamic Acid		1g	5g
C0878	Allyl Cinnamate (stabilized with TBC)			25g
A0691	4-Aminocinnamic Acid		5g	25g
C0358	Benzyl Cinnamate		25g	500g
C0002	Caffeic Acid		5g	25g
C1768	α-CHCA			1g
C0181	Chlorogenic Acid Hydrate		1g	5g
C0617	Cholesterol *trans*-Cinnamate			25g
C0636	*trans*-Cinnamic Acid Zone Refined (number of passes:40)			1sample
C0353	*trans*-Cinnamic Acid	25g	100g	500g
C0960	Cinnamyl Cinnamate			25g
C0394	*trans*-*o*-Coumaric Acid		5g	25g
C0655	*trans*-*m*-Coumaric Acid			25g
C0393	*trans*-*p*-Coumaric Acid	25g	100g	500g
C0447	α-Cyanocinnamic Acid			25g
C2677	α-Cyano-3-hydroxycinnamic Acid			5g
D2588	*trans*-2,4-Dichlorocinnamic Acid		5g	25g
D3794	*trans*-2,5-Dichlorocinnamic Acid		5g	25g
D2326	*trans*-2,3-Dimethoxycinnamic Acid			25g
D2364	2,4-Dimethoxycinnamic Acid			25g
D1972	2,5-Dimethoxycinnamic Acid			10g
D1728	3,4-Dimethoxycinnamic Acid			25g
E0856	4-Ethoxycinnamic Acid		5g	25g
C0359	Ethyl Cinnamate		25g	500g
C0448	Ethyl α-Cyanocinnamate			25g
E0677	Ethyl 4-Cyanocinnamate		1g	5g
M1082	2-Ethylhexyl 4-Methoxycinnamate		25mL	500mL
E0739	Ethyl 4-Hydroxy-3-methoxycinnamate			25g
M1204	Ethyl 4-Methoxycinnamate		5g	25g
H0267	*trans*-Ferulic Acid		25g	250g
F0248	2-Fluorocinnamic Acid			5g
F0264	3-Fluorocinnamic Acid		5g	25g
F0244	4-Fluorocinnamic Acid		5g	25g
H0524	3-Hydroxy-4-methoxycinnamic Acid		1g	5g
I0815	Isoamyl 4-Methoxycinnamate		5g	25g
C1779	Isopropyl Cinnamate			25g
M0761	*cis*-2-Methoxycinnamic Acid		5g	25g
M0449	*trans*-2-Methoxycinnamic Acid			25g
M0444	3-Methoxycinnamic Acid		25g	250g
M0576	4-Methoxycinnamic Acid			25g
C0360	Methyl Cinnamate		25g	500g
M1336	α-Methylcinnamic Acid		5g	25g
M1295	2-Methylcinnamic Acid		5g	25g
M1298	3-Methylcinnamic Acid		5g	25g
M0715	4-Methylcinnamic Acid			25g
M0634	3,4-Methylenedioxycinnamic Acid			25g
M2259	Methyl *trans*-4-Hydroxycinnamate		5g	25g
N0354	3-Nitrocinnamic Acid		10g	25g
O0172	γ-Oryzanol		25g	250g
P2088	Phenethyl Caffeate		25mg	250mg
P1300	α-Phenylcinnamic Acid			25g
P2007	2-Phenylethyl Cinnamate		25g	500g
P1898	4-Propoxycinnamic Acid			25g
D2932	Sinapinic Acid			5g
D1765	Sinapinic Acid		5g	25g
T1323	Sodium 3,4,5-Trimethoxycinnamate			25g

Product No.	Product Name	Unit Size
T2016	2,3,4-Trimethoxycinnamic Acid	5g 25g
T1393	2,4,5-Trimethoxycinnamic Acid	5g
T1104	3,4,5-Trimethoxycinnamic Acid	25g
C0899	Vinyl Cinnamate (stabilized with MEHQ)	25mL 500mL

A2413



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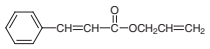

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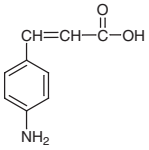

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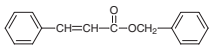

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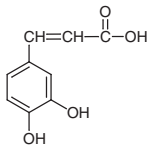

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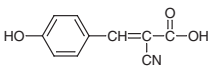

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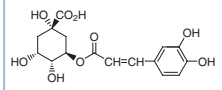

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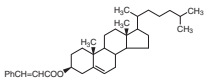

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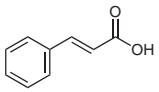

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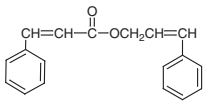

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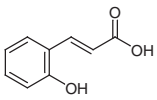

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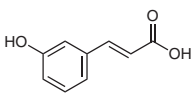

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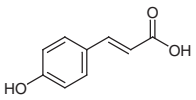

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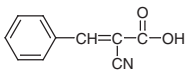

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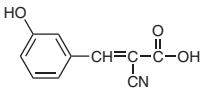

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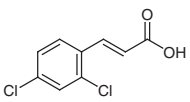

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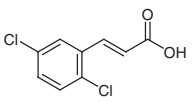

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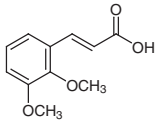

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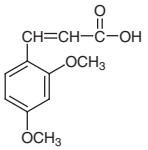

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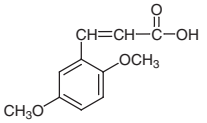

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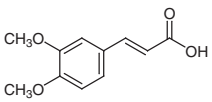

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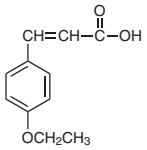

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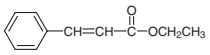

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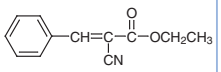

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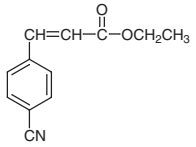

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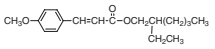

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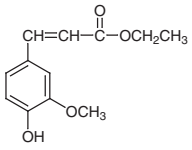

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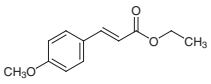

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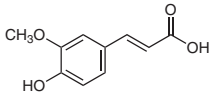

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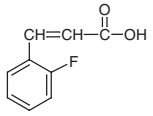

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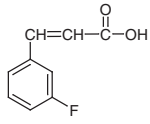

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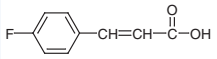

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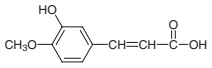

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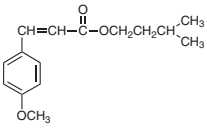

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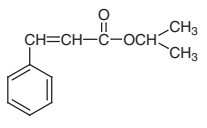
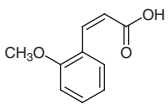
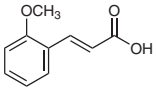
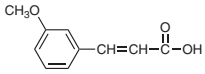
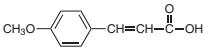
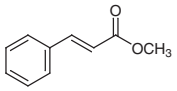
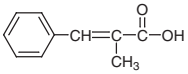
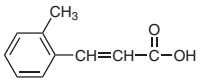
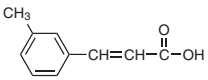
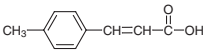
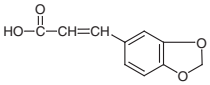
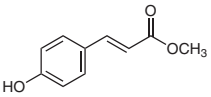
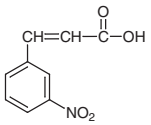
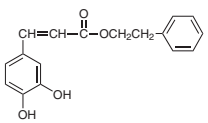
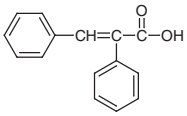
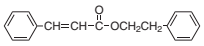
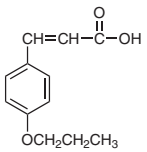
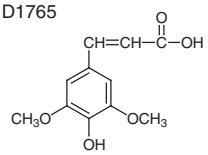
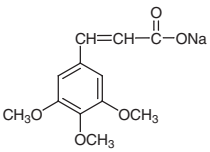
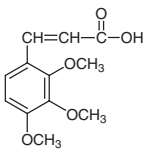
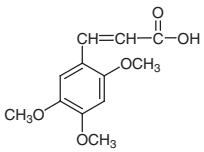
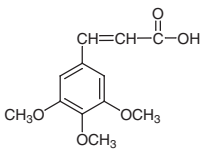
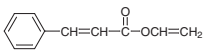


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

M0761 	M0449 	M0444 	M0576 	C0360 
M1336 	M1295 	M1298 	M0715 	M0634 
M2259 	N0354 	P2088 	P1300 	P2007 
P1898 	D2932 D1765 	T1323 	T2016 	T1393 
T1104 	C0899 			

Cinnamaldehydes

Product No.	Product Name	Unit Size	
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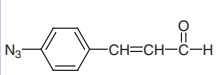
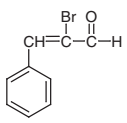
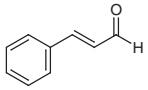
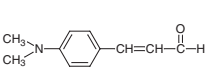
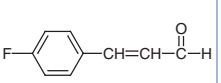
B1253	α-Bromocinnamaldehyde		25g
C0352	*trans*-Cinnamaldehyde	25mL	500mL
D0648	4-Dimethylaminocinnamaldehyde	5g	25g
F0722	4-Fluorocinnamaldehyde	5g	25g
H0685	α-Hexylcinnamaldehyde	25mL	500mL
H0952	2-Hydroxycinnamaldehyde		1g
M1012	4-Methoxycinnamaldehyde		25g
N0611	2-Nitrocinnamaldehyde	5g	25g
N0541	4-Nitrocinnamaldehyde		5g

A0971 	B1253 	C0352 	D0648 	F0722 

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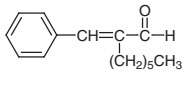
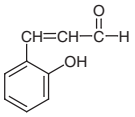
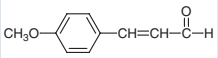
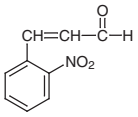
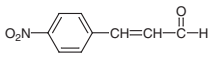
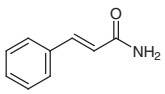
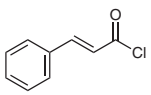
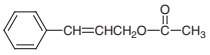
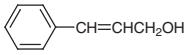
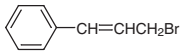
				

Cinnamic Acid Derivatives

Product No.	Product Name	Unit Size	
C0536	*trans*-Cinnamamide		25g
P0133	Cinnamoyl Chloride	25g	500g
A0901	Cinnamyl Acetate	25mL	500mL
C0362	Cinnamyl Alcohol	25g	500g
C1109	Cinnamyl Bromide		25g
C1235	Cinnamyl Chloride		25g
D1953	3-(3,4-Dimethoxyphenyl)propionic Acid	10g	25g
N0690	4-Nitrocinnamyl Alcohol	1g	5g
R0121	Rhododendrol		1g
H1314	Zingerone		25g

C0536	P0133	A0901	C0362	C1109
				
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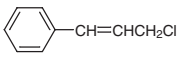
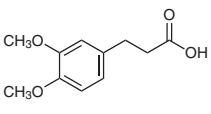
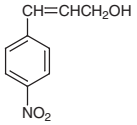
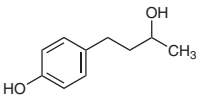
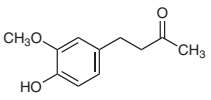
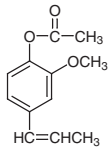
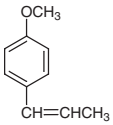
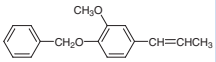
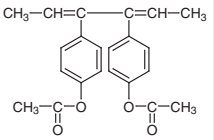
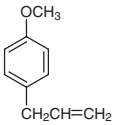
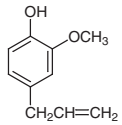
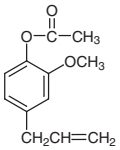
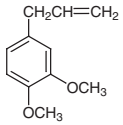
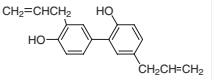
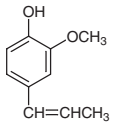
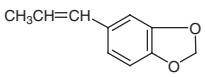
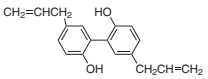
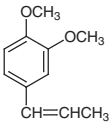
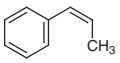
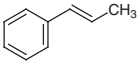
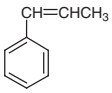
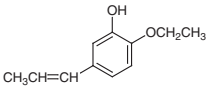
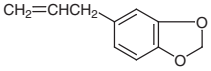
				

Phenylpropenes

Product No.	Product Name	Unit Size	
A1184	Acetylisoeugenol	25g	500g
P0494	*trans*-Anethole	25g	500g
B1441	Benzylisoeugenol		25g
B1366	Dienestrol Diacetate	100mg	1g
A0702	Estragole	10g	100g
A0232	Eugenol	25mL	500mL
E0210	Eugenol Acetate		25g
D1360	Eugenol Methyl Ether	25mL	500mL
H1309	Honokiol	200mg	1g
I0132	Isoeugenol (*cis*- and *trans*- mixture)	25g	500g
I0183	Isosafrole (*cis*- and *trans*- mixture)		25mL
D3971	Magnolol	200mg	1g
P1103	*O*-Methyl Isoeugenol	25mL	500mL
M1174	*cis*-*β*-Methylstyrene (stabilized with TBC)		10mL
M1175	*trans*-*β*-Methylstyrene (stabilized with TBC)		10mL
P0495	*β*-Methylstyrene (*cis*- and *trans*- mixture) (stabilized with TBC)		25mL
E0804	Propenylguaethol		25g
S0002	Safrole	25g	500g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

A1184 	P0494 	B1441 	B1366 	A0702 
A0232 	E0210 	D1360 	H1309 	I0132 
I0183 	D3971 	P1103 	M1174 	M1175 
P0495 	E0804 	S0002 		

Coumarins

Product No.	Product Name		Unit Size	
A1527	7-Acetoxy-4-methylcoumarin		5g	25g
A2200	3-Acetylcoumarin		5g	25g
A1848	8-Acetyl-7-hydroxy-4-methylcoumarin			5g
A2573	Angelicin			25mg
B3943	Bergamottin			5mg
B2840	Bergapten		1g	5g
C0395	Coumarin		25g	500g
D4001	Daphnetin		1g	5g
M0216	Dicoumarol		1g	25g
D4170	6,7-Dihydroxycoumarin-3-carboxylic Acid		1g	5g
E0375	Ellagic Acid Dihydrate		5g	25g
E0386	Esculetin			1g
E0024	Esculin Sesquihydrate		5g	25g
E0545	4-Ethoxycoumarin		5g	25g
E0538	7-Ethoxycoumarin		5g	25g
E0491	7-Ethoxy-4-methylcoumarin			25g
H0235	4-Hydroxycoumarin		25g	250g
H1327	6-Hydroxycoumarin		5g	25g
H1005	6-Hydroxy-4-methylcoumarin		5g	25g
I0861	Isopimpinellin			10mg
M1723	7-Methoxycoumarin		5g	25g
M1393	7-Methoxy-4-methylcoumarin		5g	25g
M0189	6-Methylcoumarin			25g
M1236	7-Methylcoumarin			25g
M0766	4-Methylesculetin			25g
M0453	4-Methylumbelliferone		25g	500g
P1060	4-Methylumbelliferyl Phosphate			100mg
N0923	6-Nitrocoumarin		5g	25g
O0426	Osthole	250mg	1g	5g
P2077	Psoralen		20mg	100mg

Product No.	Product Name	Unit Size	
S0367	Scopoletin	100mg	1g
T2267	Trioxsalen	1g	5g
H0236	Umbelliferone	5g	25g
W0005	Warfarin Sodium (contains Isopropyl Alcohol)	5g	25g
X0009	Xanthotoxin	100mg	1g

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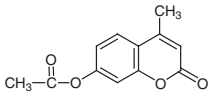

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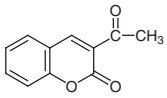

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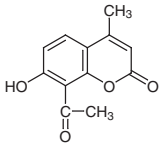

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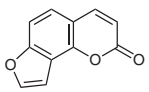

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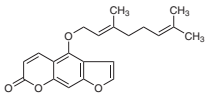

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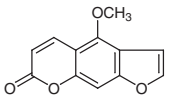

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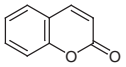

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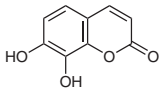

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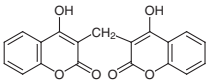

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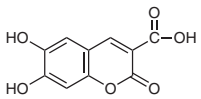

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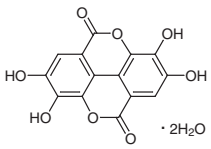

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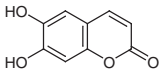

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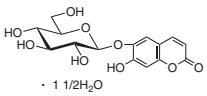

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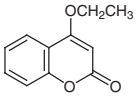

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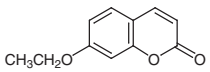

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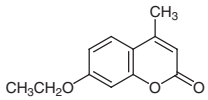

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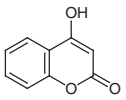

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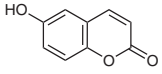

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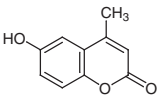

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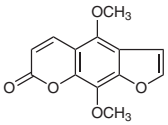

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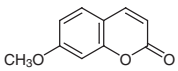

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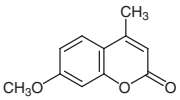

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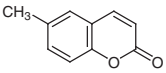

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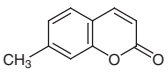

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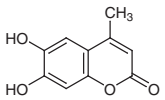

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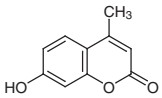

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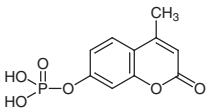

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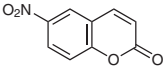

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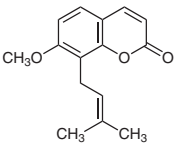

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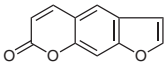

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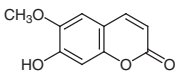

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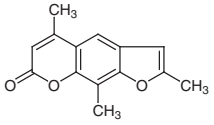

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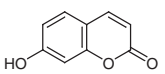

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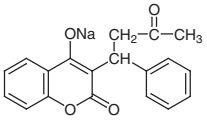

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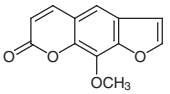

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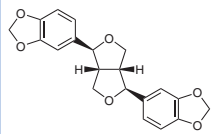
Lignins & Lignans

Product No.	Product Name	Unit Size	
L0082	Lignin (Alkaline)	25g	500g
L0045	Lignin (Dealkaline)	25g	500g
S0495	Sesamin		100mg
L0098	Sodium Ligninsulfonate	25g	500g

S0495

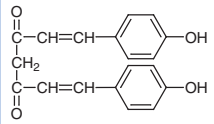


Aromatic Polyketides

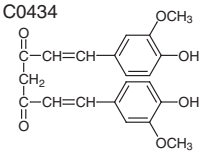
Diarylheptanoids

Product No.	Product Name	Unit Size	
B3347	Bisdemethoxycurcumin	5g	25g
C2302	Curcumin (Synthetic)	5g	25g
C0434	Curcumin (Natural)	1g	25g

B3347



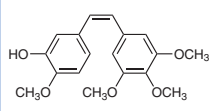
C2302
C0434



Stilbenoids

Product No.	Product Name	Unit Size		
C2520	Combretastatin A4		25mg	250mg
G0371	Gnetol			100mg
I0804	Isorhapontigenin			100mg
O0373	Oxyresveratrol		100mg	1g
P1928	Piceatannol		100mg	1g
P1878	Piceid		1g	5g
P1927	Pinostilbene			100mg
P1924	Pterostilbene		100mg	1g
R0071	Resveratrol	1g	5g	25g
R0089	Rhapontigenin			100mg
T2842	3,3',4,5'-Tetramethoxypiceatannol		1g	5g
T1829	3,4',5-Trimethoxy-*trans*-stilbene			5g

C2520



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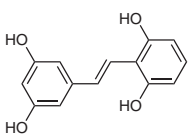

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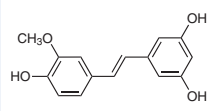

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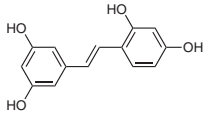

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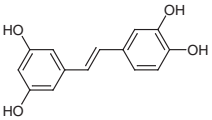

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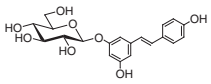

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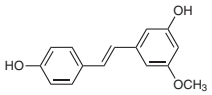

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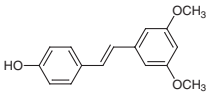

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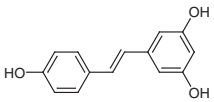

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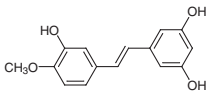

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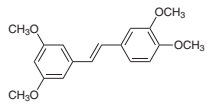

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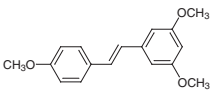
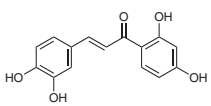


Chalconoids

Product No.	Product Name	Unit Size		
B3803	Butein		100mg	1g
C0071	Chalcone	25g	100g	500g
H0234	2-Hydroxychalcone		5g	25g
H0385	2'-Hydroxychalcone		25g	500g
H0955	4-Hydroxychalcone			5g
H0945	4'-Hydroxychalcone			5g
I0822	Isoliquiritigenin		100mg	1g
M1409	4-Methoxychalcone			25g
N0675	Neohesperidin Dihydrochalcone Hydrate		5g	25g
P1966	Phloretin		1g	5g
P0248	Phlorizin Hydrate		1g	5g
X0068	Xanthohumol			25mg

B3803



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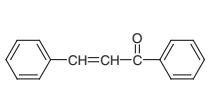

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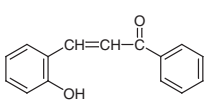

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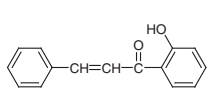

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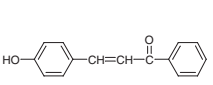

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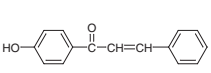

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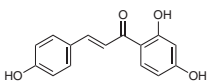

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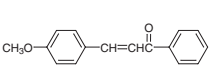

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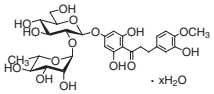

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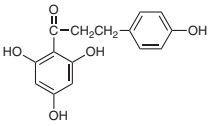

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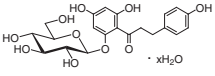

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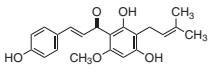

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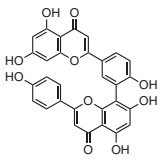
Flavonoids

Product No.	Product Name	Unit Size		
A2544	Amentoflavone		20mg	100mg
A1514	Apigenin			100mg
T2721	Baicalein		1g	5g
B2835	Baicalin			25g
C0705	(+)-Catechin Hydrate		1g	10g
C1652	Chrysin			25g
D4279	3,4'-Dihydroxyflavone		1g	5g
D1916	7,8-Dihydroxyflavone Hydrate		1g	5g
D3908	Diosmin		5g	25g
E0890	(-)-Epicatechin Gallate		20mg	100mg
E1084	(-)-Epigallocatechin		10mg	50mg
E0694	(-)-Epigallocatechin Gallate Hydrate			100mg
T0121	Fisetin	100mg	1g	5g
F0255	Flavanone			25g
F0015	Flavone		1g	5g
G0398	α-Glucosyl Hesperidin			5mg
H0721	Hesperetin		5g	25g
H0049	Hesperidin	25g	100g	500g
H1024	2'-Hydroxyflavanone			1g
H1025	3'-Hydroxyflavanone			1g
H1026	4'-Hydroxyflavanone			1g
H1027	6-Hydroxyflavanone		1g	5g
H1006	7-Hydroxyflavanone		1g	5g
H0379	3-Hydroxyflavone		1g	10g
H1238	5-Hydroxyflavone			1g
H0851	6-Hydroxyflavone		1g	5g
H0852	7-Hydroxyflavone		1g	5g
H1405	3-Hydroxy-4'-methoxyflavone		1g	5g
I0862	Icariin		200mg	1g
K0018	Kaempferol Hydrate		100mg	1g
T2682	Luteolin		1g	5g
M1403	6-Methoxyflavanone		1g	5g
M2364	3-Methoxyflavone		1g	5g
M2365	5-Methoxyflavone		1g	5g
M1346	6-Methoxyflavone		1g	5g
M1423	7-Methoxyflavone		1g	5g
M2371	3-Methylflavone-8-carboxylic Acid		5g	25g
M0338	Methyl Hesperidine		5g	25g
P0041	Morin Hydrate	1g	5g	25g
M2131	Myricetin		500mg	5g
M2361	Myricitrin		10mg	50mg
N0072	Naringenin		5g	25g
N0073	Naringin Hydrate			25g
N0871	Nobiletin		10mg	100mg
P0042	Quercetin Hydrate			25g
Q0025	Quercetin (Ethanol Solution) [for Spray]			100mL
R0035	Rutin Hydrate			25g
S0508	Silybin (mixture of Silybin A and Silybin B)			25g
T2708	Tangeretin		10mg	100mg

A2544



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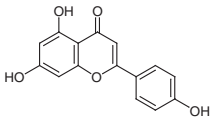

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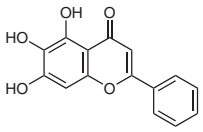

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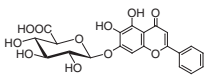

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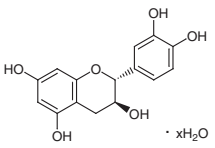

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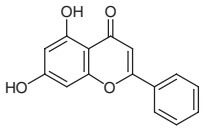

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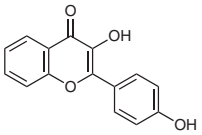

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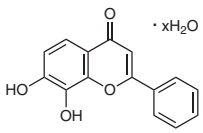

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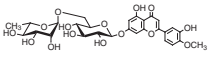

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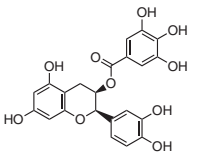

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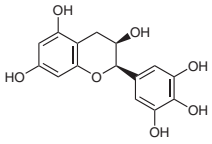

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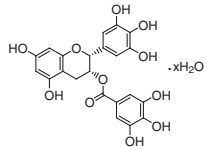

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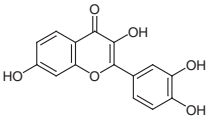

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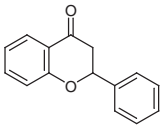

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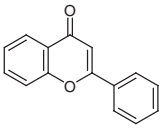

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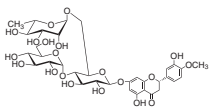

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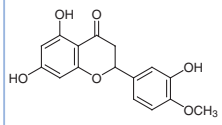

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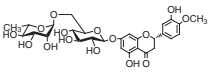

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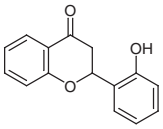

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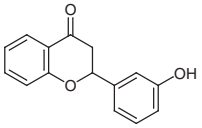

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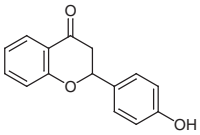

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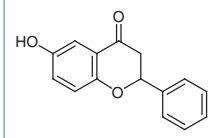

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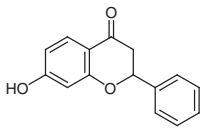

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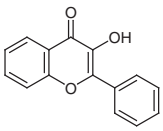

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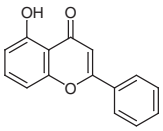

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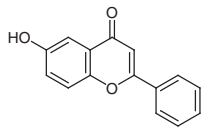

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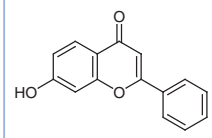

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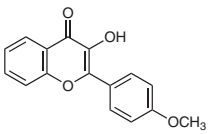

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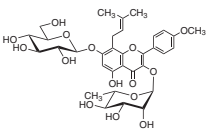

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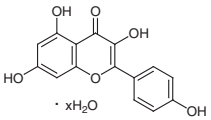

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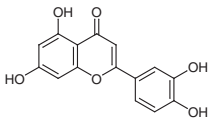

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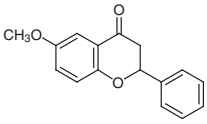

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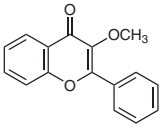

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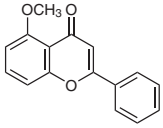

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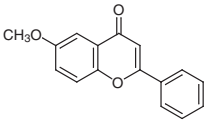

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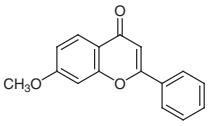

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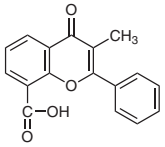

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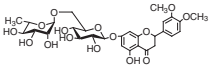

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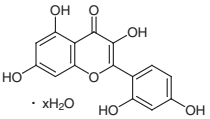

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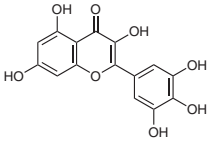

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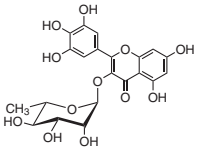

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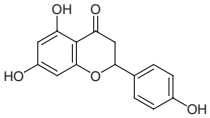

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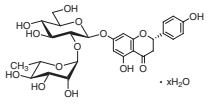

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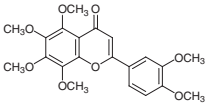

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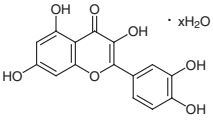

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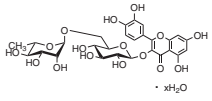

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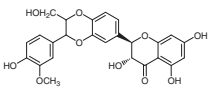

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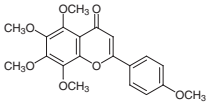
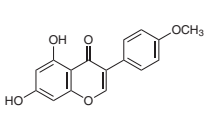


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Isoflavonoids

Product No.	Product Name			Unit Size
B4098	Biochanin A	200mg	1g	5g
D2668	Daidzein			1g
D3920	Daidzin			25mg
D4239	Dihydrodaidzein			25mg
E0922	(±)-Equol			200mg
F0868	Formononetin		1g	5g
G0272	Genistein		100mg	1g
I0669	Ipriflavone		5g	25g
O0405	Ononin			10mg
P1886	Puerarin		200mg	1g
R0090	Rotenone		5g	25g

B4098



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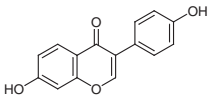
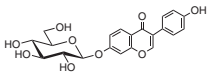


D3920



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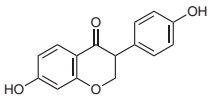

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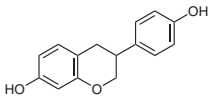

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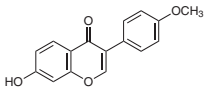
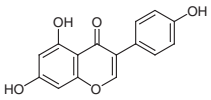


G0272



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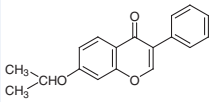

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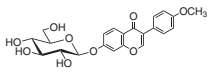

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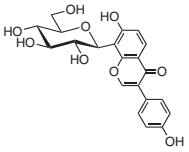

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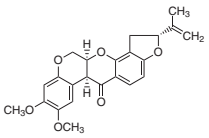


References

1) P. M. Dewick, in *Medicinal Natural Products*, 3rd ed., John Wiley & Sons, Chichester, **2009**, p. 137.
2) T. Akashi, T. Aoki, S. Ayabe, *Plant Physiol.* **2005**, *137*, 882.

Alkaloids

Alkaloids are nitrogen-containing small molecules which are mainly found in plants.[1] To date, approximately 27 thousand alkaloids have been reported in which 21 thousand were of plant origin.

Since most of the alkaloids exhibit potent bioactivity, they are the main component of many herbal medicines. Some alkaloids are also used as pharmaceuticals. Alkaloids interact with proteins electrostatically due to the positive charge of the nitrogen atoms which facilitates binding to the negative charge of the proteins. Especially, pharmaceutical alkaloids tend to bind to the receptors in neural systems.

Biosynthesis

Biosynthetic pathways to alkaloids vary greatly depending on the nitrogen source. Alkaloids are biosynthesized from various kinds of amino acids as depicted in Figure 1. Further complex alkaloids are also biosynthesized by attaching another alkaloid to the original skeletons.

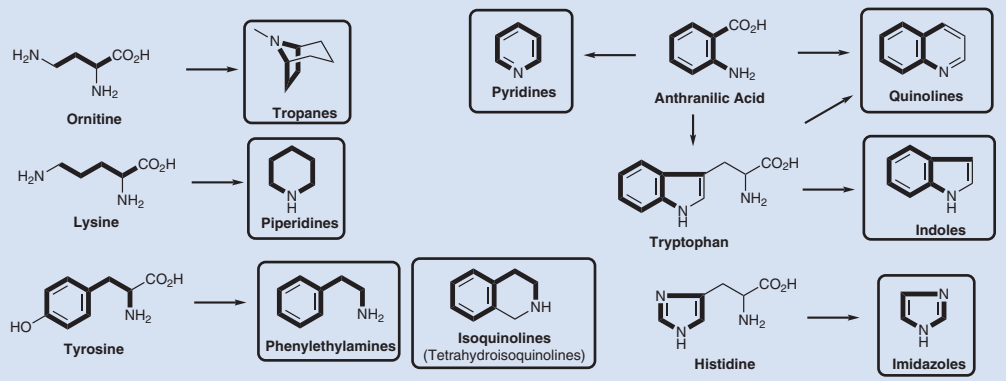


Figure 1. Alkaloid Biosynthesis and Basic Structures

Structure Classification

In the *IUPAC Nomenclature Appendix*, 67 alkaloid parent structures are shown.[2] They can be classified into their basic skeletons based on their biosynthetic origins as shown in Figure 1. In this section, alkaloids are categorized into nine: eight as shown above and purine alkaloids as the ninth. Polyamines which are occasionally considered as alkaloid-related substances, will be explained in the section "Polyamines" (p. 157).

Solubility

In general, alkaloids dissolve in acidic water. Their salts dissolve in neutral water. They are usually insoluble in neutral water as free forms, but soluble in polar organic solvents such as chloroform, methanol or DMSO.

Analysis

HPLC : In the reversed phase mode using an ODS column, peak tailing is suppressed by addition of acetic acid or trifluoroacetic acid to the mobile phase. Effective analysis would be achieved by a mixed mode column, TCI Dual (p. 295), with ion-exchange and reversed phase modes simultaneously. Detection is generally conducted by a UV detector.

TLC : In a normal phase silica gel TLC analysis, a solvent system of chloroform-methanol-aqueous ammonia gives a relatively a good separation. NH_2-type silica gel is also effective. Dragendorff's reagent is a selective visualizing reagent for alkaloids. Tertiary amines and quaternary ammonium salts give orange spots.

Storage Precautions

Alkaloids are relatively stable at room temperature, however, they tend to form carbonate salts due to their basicity by reaction with carbon dioxide in the air. In addition, they are usually colorized by reaction with oxygen. Therefore, opened bottles should be stored in the refrigerator or frozen with inert gas such as nitrogen or argon.

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

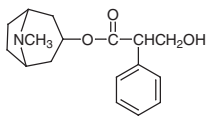
WARNING

Some of the alkaloids may cause serious physiological actions in very minute amounts. They may cause paralysis, convulsions, and death in the worst case. To avoid inhalation and contacting with skin, wear protective goggles, mask and eyeglasses when handling. Sufficient caution should be taken, when using these compounds, from the opening to the disposal of the reagents.

Tropane Alkaloids

Product No.	Product Name	Unit Size	
A0754	Atropine	5g	25g
A0550	Atropine Sulfate Monohydrate	5g	25g
B3401	*N*-(*tert*-Butoxycarbonyl)nortropinone	1g	5g
E0834	*N*-(Ethoxycarbonyl)nortropinone	5g	25g
H0155	Homatropine Hydrobromide	1g	25g
H0156	Homatropine Hydrochloride	1g	25g
H0448	Homatropine Methyl Bromide	5g	25g
H1289	(±)-*exo*-6-Hydroxytropinone		1g
H0450	(-)-Hyoscyamine		5g
N0844	Nortropinone Hydrochloride	5g	25g
S0021	Scopolamine Hydrobromide Trihydrate	1g	10g
S0231	Scopolamine Methyl Bromide		1g
S0230	Scopolamine Methyl Nitrate	1g	5g
S0229	Scopolamine *N*-Oxide Hydrobromide Monohydrate		1g
T0534	Tropine	5g	25g
T2743	Tropisetron Hydrochloride	1g	5g

A0754



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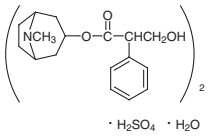

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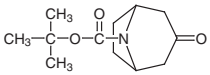

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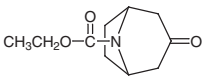

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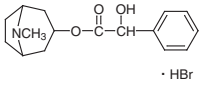

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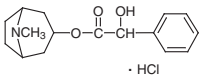

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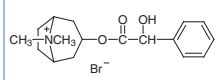

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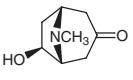

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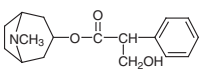

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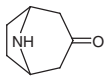

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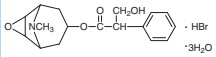

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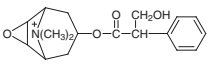

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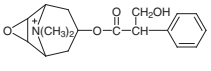

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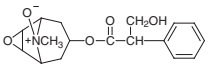

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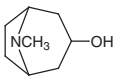

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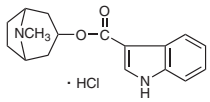

Piperidine Alkaloids

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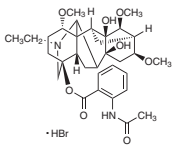
L0272	Lappaconitine Hydrobromide	200mg	1g
L0096	Lobeline Hydrochloride		1g
M2120	Matrine	200mg	1g
P0460	Piperine	1g	5g
S0926	Sinomenine Hydrochloride	1g	5g

L0272



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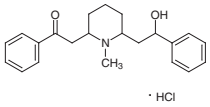

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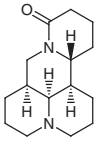

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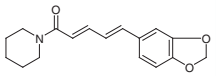

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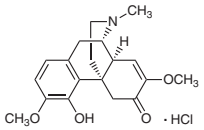

Phenylethylamines

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A0172	DL-Adrenaline		1g	25g
A0173	L-Adrenaline	1g	5g	25g
A0175	L-Adrenaline Bitartrate		1g	25g
A0909	DL-Adrenaline Hydrochloride		5g	25g
A1234	Adrenalone Hydrochloride Hydrate		5g	25g
C2691	4-Amino-α-(*tert*-butylaminomethyl)-3,5-dichlorobenzyl Alcohol Hydrochloride			100mg
A0305	Dopamine Hydrochloride	1g	5g	25g
E0387	2-Ethylamino-1-(4-methoxyphenyl)propane Hydrochloride			25g
E0381	Etilefrine Hydrochloride			25g
H1351	Hordenine		1g	5g
I0260	Isoproterenol Hydrochloride		5g	25g
I0261	Isoproterenol Sulfate Dihydrate			25g
M0844	2-(2-Methoxyphenyl)ethylamine		5mL	25mL
M1891	2-(3-Methoxyphenyl)ethylamine		5g	25g
D2104	*N*-Methylhomoveratrylamine			25g
A0906	L-Noradrenaline Bitartrate Monohydrate			1g
N0608	(1*R*,2*S*)-(-)-Norephedrine			25g
N0631	(1*S*,2*R*)-(+)-Norephedrine			25g
P0742	DL-Norephedrine Hydrochloride			25g
N0389	DL-Norphenylephrine Hydrochloride		5g	25g
P0395	L-Phenylephrine		5g	25g
P0396	L-Phenylephrine Bitartrate		5g	25g
P0397	DL-Phenylephrine Hydrochloride			25g
P0398	(*R*)-Phenylephrine Hydrochloride		5g	25g
P1654	Pseudoephedrine Hydrochloride			25g
S0232	Synephrine		5g	25g
S0233	Synephrine Tartrate			25g
A0302	Tyramine	1g	25g	250g

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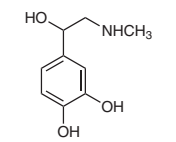

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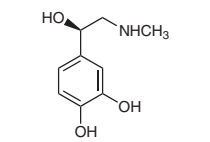

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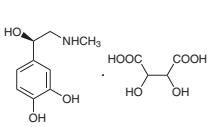

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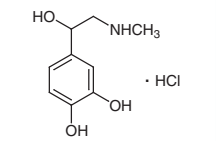

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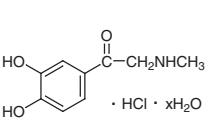
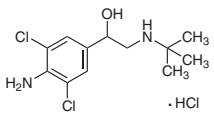
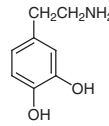
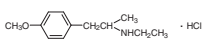
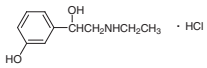
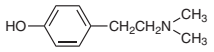
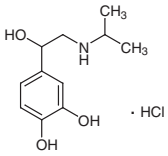
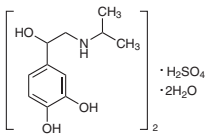
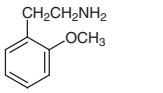
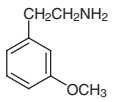
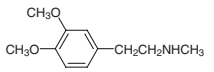
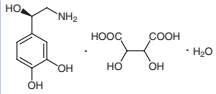
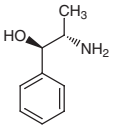
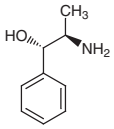
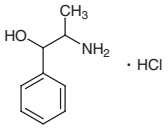
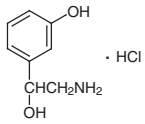
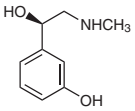
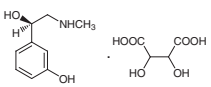
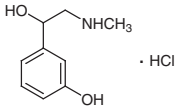
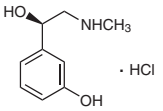
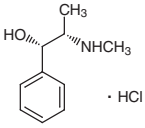
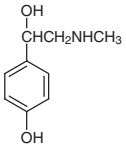
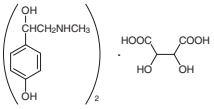
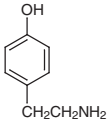
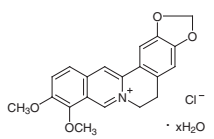
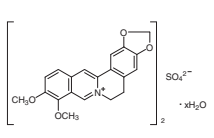
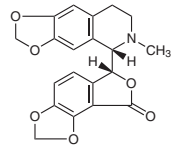
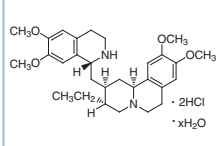
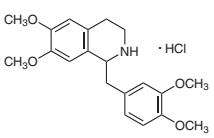


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

C2691 	A0305 	E0387 	E0381 	H1351 
I0260 	I0261 	M0844 	M1891 	D2104 
A0906 	N0608 	N0631 	P0742 	N0389 
P0395 	P0396 	P0397 	P0398 	P1654 
S0232 	S0233 	A0302 		

Isoquinoline Alkaloids

Product No.	Product Name	Unit Size	
B0450	Berberine Chloride Hydrate	5g	25g
B0451	Berberine Sulfate Hydrate	5g	25g
B1890	(+)-Bicuculline	25mg	100mg
E0007	Emetine Dihydrochloride Hydrate		1g
N0918	Norlaudanosine Hydrochloride	5g	25g
P0016	Papaverine Hydrochloride		25g
C0433	Tubocurarine Chloride Pentahydrate	100mg	1g

B0450 	B0451 	B1890 	E0007 	N0918 

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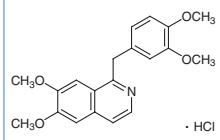

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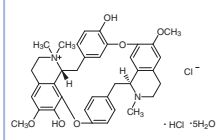
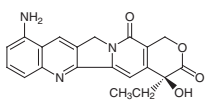


Quinoline Alkaloids

Product No.	Product Name	Unit Size	
A2063	9-Aminocamptothecin		10mg
C1495	(*S*)-(+)-Camptothecin	100mg	1g
C0347	Cinchonidine	25g	250g
C0348	Cinchonidine Dihydrochloride		25g
C0349	Cinchonidine Sulfate Dihydrate		25g
C0350	Cinchonine	25g	200g
C0351	Cinchonine Hydrochloride Hydrate		25g
C0791	Cinchonine Sulfate Dihydrate		25g
E0781	7-Ethylcamptothecin	100mg	1g
E0748	7-Ethyl-10-hydroxycamptothecin	100mg	1g
H0752	Hydroquinidine Hydrochloride	25g	250g
I0714	Irinotecan Hydrochloride Trihydrate		100mg
I0728	*β*-Isocupreidine		1g
Q0006	Quinidine	5g	25g
Q0027	Quinidine Cupric Sulfate Solution [for Spray]		100mL
Q0010	Quinidine Sulfate Dihydrate	5g	25g
Q0028	Quinine	25g	100g
Q0030	Quinine Hydrochloride Dihydrate		25g
N0822	Rubitecan		100mg

A2063



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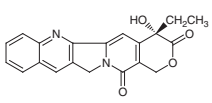

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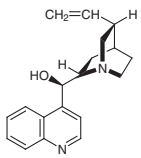

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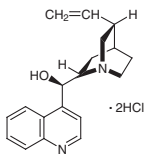

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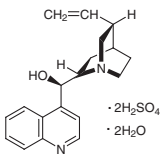

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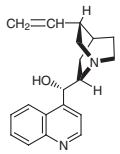

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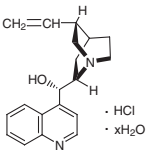

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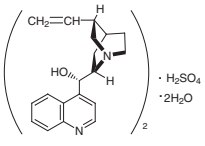

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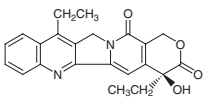

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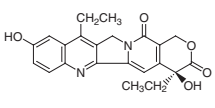

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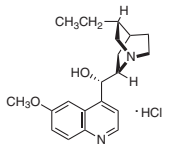

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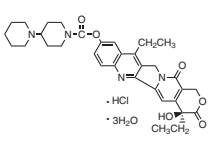

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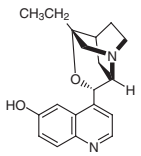

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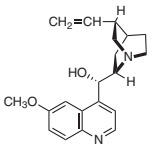

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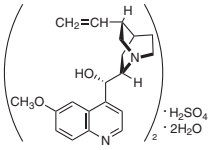

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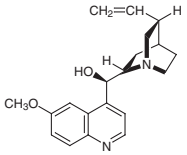

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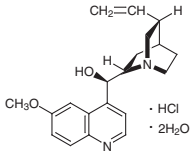

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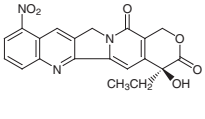
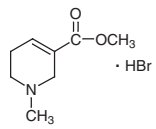


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Pyridine Alkaloids

Product No.	Product Name	Unit Size	
A0523	Arecoline Hydrobromide	5g	25g
C2609	(-)-Cytisine	100mg	1g
N0079	Nicotine	25mL	500mL
N0080	Nicotine Bi-L-(+)-tartrate Dihydrate		25g
N0081	Nicotine Sulfate (40-45% in Water as Nicotine base)	25mL	500mL
T1429	Trigonelline Hydrochloride		5g

A0523



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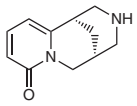

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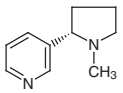

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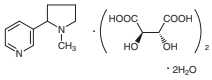

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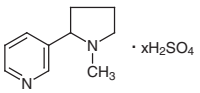

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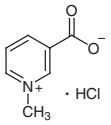
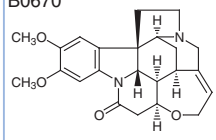


Indole Alkaloids

Product No.	Product Name	Unit Size	
B0946	Brucine Anhydrous		25g
B0670	Brucine Hydrate		25g
B0671	Brucine Hydrochloride Monohydrate		5g
B0672	Brucine Sulfate Heptahydrate		25g
C0001	Cacotheline Monohydrate	1g	5g
D2633	Dihydroergotamine Mesylate	100mg	1g
D1247	Dihydroergotamine Tartrate	100mg	1g
E0268	Ergometrine Maleate		100mg
E0019	Ergotamine Tartrate	100mg	1g
E1012	(±)-Evodiamine		1g
D0653	Gramine	25g	250g
H0001	Harmine		1g
H0002	Harmine Hydrochloride	100mg	1g
H1360	Harmol	200mg	1g
I0868	Indirubin		25mg
N0904	Nicergoline		100mg
P0406	Physostigmine free base	200mg	1g
P0407	Physostigmine Salicylate		Price on request
R0007	Reserpine	1g	5g
R0105	Rhynchophylline		25mg
R0102	Rutaecarpine	200mg	1g
S0249	Strychnine		25g
S0257	Strychnine Hydrochloride Hydrate		25g
S0093	Strychnine Nitrate		25g
S0094	Strychnine Sulfate Pentahydrate		25g
V0061	Vincamine	1g	5g
Y0002	Yohimbine Hydrochloride	5g	25g

B0946
B0670



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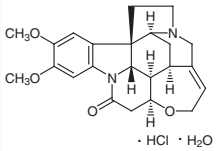

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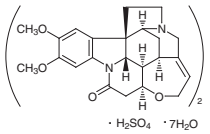

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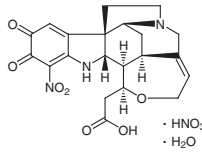

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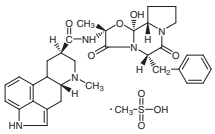

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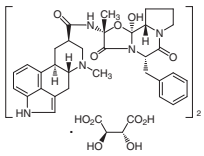

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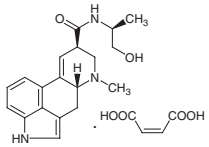

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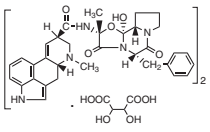

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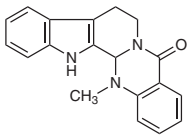

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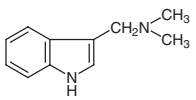

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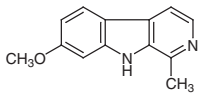

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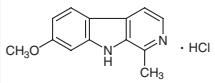

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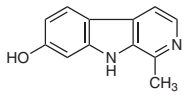

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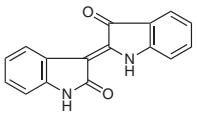

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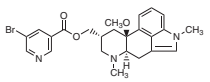

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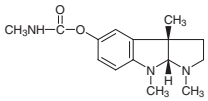

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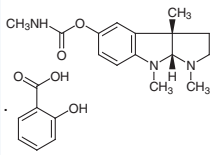

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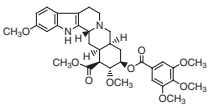

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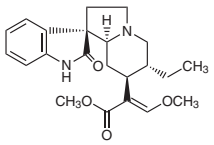

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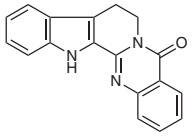

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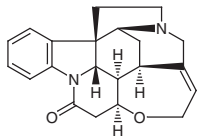

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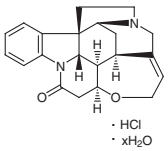

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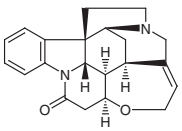

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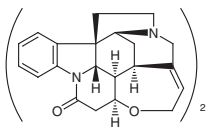

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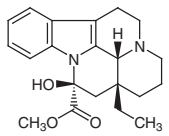

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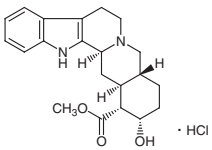

Imidazole Alkaloids

Product No.	Product Name			Unit Size
H0146	Histamine Dihydrochloride	1g	5g	25g
H0147	Histamine Diphosphate Hydrate		1g	5g
P0434	Pilocarpine Hydrochloride		1g	5g
P0399	Pilocarpine Nitrate			5g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

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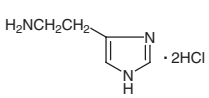
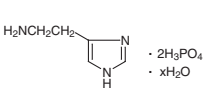
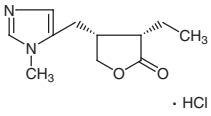
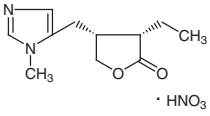
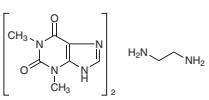
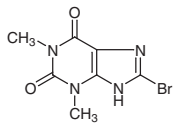
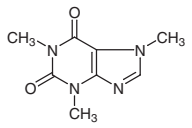
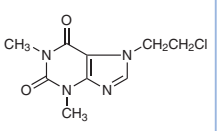
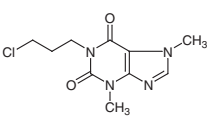
			

Purine Alkaloids

Product No.	Product Name	Unit Size		
A2805	Aminophylline		25g	100g
B3456	8-Bromotheophylline		1g	5g
C2042	Caffeine		25g	500g
C2748	7-(2-Chloroethyl)theophylline		5g	25g
C1103	1-(3-Chloropropyl)theobromine			25g
C0293	8-Chlorotheophylline		25g	250g
D3600	Diprophylline		25g	500g
D4302	Doxofylline		1g	25g
H0402	Etofylline		25g	500g
M1756	3-Methyl-7-propylxanthine			25g
M2432	1-Methylxanthine		50mg	200mg
M2073	3-Methylxanthine		5g	25g
H1430	Proxyphylline		5g	25g
T0178	Theobromine		25g	500g
T0179	Theophylline	25g	100g	500g
T2941	Theophylline-7-acetic Acid			25g

A2805	B3456	C2042	C2748	C1103
				
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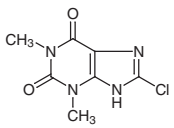	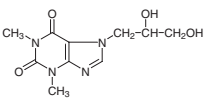	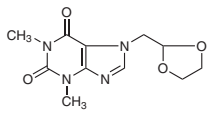	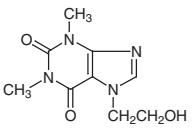	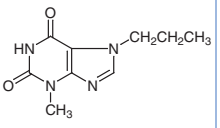
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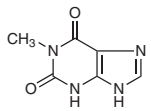	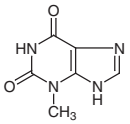	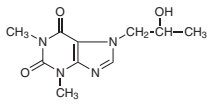	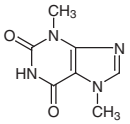	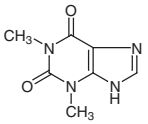
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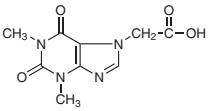
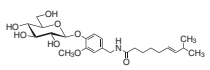
				

Others

Product No.	Product Name	Unit Size
C2548	Capsaicin β-D-Glucopyranoside	200mg
M1149	Capsaicin (Natural)	1g
C0380	Colchicine (contains 5% Ethyl Acetate at maximum)	500mg 5g
G0293	Galantamine Hydrobromide	100mg 1g
J0009	Jervine	10mg
S0358	Stachydrine Hydrochloride	10mg
T0329	Tomatine [for Cholesterol assay]	100mg

C2548



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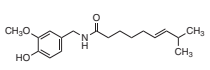

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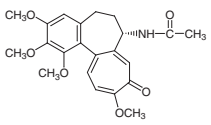

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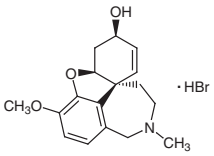

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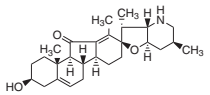

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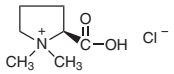

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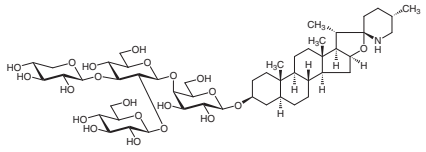

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Polyamines

Polyamines are organic compounds having at least two amino groups as part of an otherwise aliphatic chain. The amino groups are usually separated by three or four methylene units, such as putrescine and spermine. Cyclen is the typical example of a class of cyclic polyamines. The polyamines are essential molecules in both eukaryotic and prokaryotic cells, and, therefore, have been isolated from all kinds of living organisms, including humans.[1] Especially, the requirement for and the metabolism of polyamines are frequently dysregulated in cancer, and some polyamines can induce diseases caused by neurotoxins.[2] Thus, the polyamines, which are available by chemical synthesis, have been attractive for continuing with the study of diseases.[3]

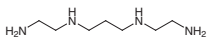
This section shows the typical polyamines and the reagents used for the polyamine chemical synthesis.

Polyamines

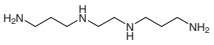
Linear Polyamines

Product No.	Product Name	Unit Size	
B1445	*N*,*N*'-Bis(2-aminoethyl)-1,3-propanediamine		5g
B1952	*N*,*N*'-Bis(3-aminopropyl)ethylenediamine	25mL	500mL
B1814	Bis(hexamethylene)triamine	25g	400g
D0108	Cadaverine	5mL	25mL
D0099	Cadaverine Hydrochloride	5g	25g
D0090	3,3'-Diaminodipropylamine	25mL	500mL
D0493	Diethylenetriamine	25mL	500mL
D3811	*N*,*N*'-Dimethyl-1,3-propanediamine	5g	25g
D0239	Putrescine	25g	400g
D0081	Putrescine Dihydrochloride	25g	500g
S0385	Spermidine Phosphate Hexahydrate		1g
S0068	Spermidine Phosphate	1g	5g
S0069	Spermine Phosphate Hexahydrate	1g	5g
B1468	Spermine Tetrahydrochloride	5g	25g

B1445



B1952



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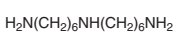

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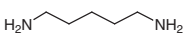

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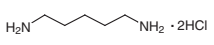

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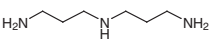

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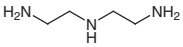

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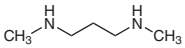

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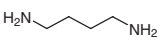

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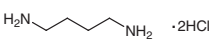

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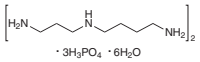

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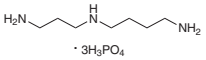

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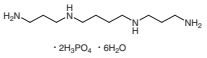

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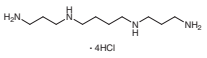
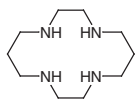


Cyclic Polyamines

Product No.	Product Name	Unit Size		
T1597	Cyclam		1g	5g
T1874	Cyclen		1g	5g
T1426	Cyclen-4HCl		1g	5g
H1070	1,4,7,10,13,16-Hexaazacyclooctadecane			100mg
H1215	Hexacyclen Hexahydrochloride			100mg
T1691	1,4,8,12-Tetraazacyclopentadecane		1g	5g
T1878	1,4,7-Triazacyclononane	200mg	1g	5g
T1600	1,4,7-Triazacyclononane Trihydrochloride		1g	5g

T1597



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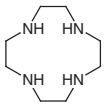
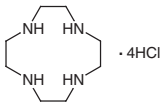


T1426



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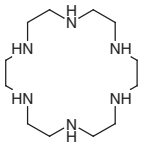

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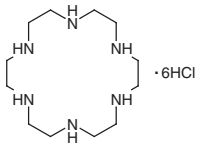

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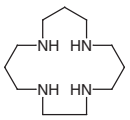

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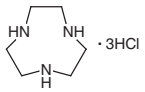
T1600

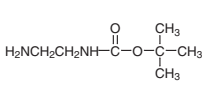


Chemical Building Blocks for Polyamines

N-Boc-diaminoalkanes

Product No.	Product Name	Unit Size		
A1371	*N*-Boc-1,2-diaminoethane	1g	5g	25g
A1372	*N*-Boc-1,3-diaminopropane		1g	5g
A1373	*N*-Boc-1,4-diaminobutane	1g	5g	25g
A1374	*N*-Boc-1,5-diaminopentane		1g	5g
A1375	*N*-Boc-1,6-diaminohexane	1g	5g	25g
B2810	*N*-Boc-2-methyl-1,3-diaminopropane		1g	5g
B3052	*N*-Boc-2,2-dimethyl-1,3-diaminopropane			5g

A1371



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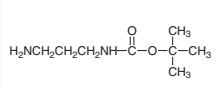

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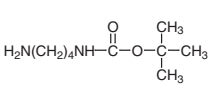

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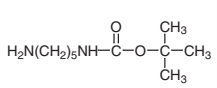

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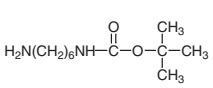

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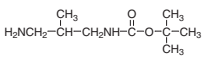

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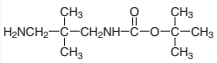
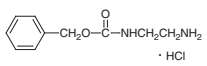


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

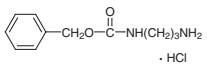
N-Cbz-diaminoalkanes

Product No.	Product Name	Unit Size		
C1511	*N*-Cbz-1,2-diaminoethane Hydrochloride	1g	5g	25g
C1512	*N*-Cbz-1,3-diaminopropane Hydrochloride		1g	5g
C1519	*N*-Cbz-1,4-diaminobutane Hydrochloride		1g	5g
C1520	*N*-Cbz-1,5-diaminopentane Hydrochloride		1g	5g
C1521	*N*-Cbz-1,6-diaminohexane Hydrochloride		1g	5g

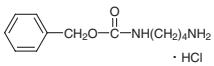
C1511



C1512



C1519



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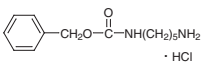

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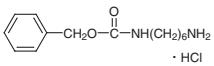
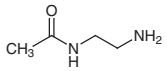


N-Ac-diaminoalkanes

Product No.	Product Name	Unit Size
A0887	*N*-(2-Aminoethyl)acetamide	25g
A2392	*N*-(4-Aminobutyl)acetamide	5g
A2393	*N*-(5-Aminopentyl)acetamide	5g

A0887



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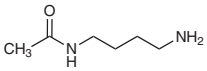

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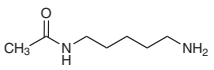
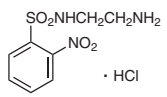


N-(*o*-Ns)-diaminoalkanes

Product No.	Product Name	Unit Size	
A2329	*N*-(*o*-Ns)-1,2-diaminoethane Hydrochloride	1g	5g
A2268	*N*-(*o*-Ns)-1,3-diaminopropane Hydrochloride	1g	5g
A1630	*N*-(*o*-Ns)-1,4-diaminobutane		1g
A1661	*N*-(*o*-Ns)-1,5-diaminopentane Hydrochloride		1g
A1662	*N*-(*o*-Ns)-1,6-diaminohexane Hydrochloride		1g

A2329



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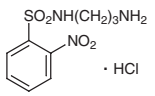

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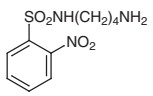

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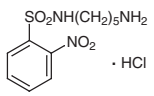

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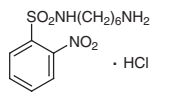
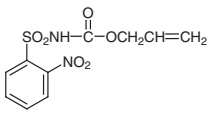


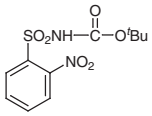
N-(*o*-Ns)-amines

Product No.	Product Name	Unit Size		
A1632	*N*-Alloc-2-nitrobenzenesulfonamide			5g
B2303	*N*-Boc-2-nitrobenzenesulfonamide	1g	5g	25g
C1757	*N*-Cbz-2-nitrobenzenesulfonamide		5g	25g

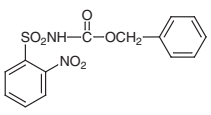
A1632



B2303



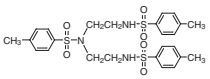
C1757



N-Ts-amines

Product No.	Product Name	Unit Size
T1723	*N*,*N*',*N*''-Tris(*p*-toluenesulfonyl)diethylenetriamine	25g

T1723

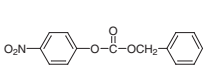


Reagents for Polyamine Chemical Synthesis

N-Protecting Agents

Product No.	Product Name		Unit Size	
C1591	Benzyl 4-Nitrophenyl Carbonate			5g
C0933	Boc-hydrazine		25g	250g
B0916	*N*-Boc-imidazole			10g
D3878	Boc_2O (*ca.* 30% in Dioxane)		100g	500g
D3879	Boc_2O (*ca.* 30% in Tetrahydrofuran)		100mL	500mL
D3880	Boc_2O (*ca.* 30% in Toluene)		100g	500g
D1547	Boc_2O	25g	100g	500g
B0988	2-Boc-oxyimino-2-phenylacetonitrile		5g	25g
B1089	2-Boc-thio-4,6-dimethylpyrimidine		5g	25g
B1969	1-Boc-1,2,4-triazole		5g	25g
C1574	*tert*-Butyl 2,4,5-Trichlorophenyl Carbonate			5g
C0176	Cbz Chloride (30-35% in Toluene)		25mL	500mL
B3021	Cbz Chloride		25g	250g
C1124	*O*-Cbz-*N*-hydroxysuccinimide		25g	250g
C1131	*N*-(2-Chlorobenzyloxycarbonyloxy)succinimide			10g
P1277	Diallyl Dicarbonate		1g	5g
P1281	Dibenzyl Dicarbonate		5g	25g
D1463	2,4-Dinitrophenylsulfenyl Chloride			5g
C0683	*N*-Ethoxycarbonylphthalimide		25g	500g
F0197	Fmoc-Cl	5g	25g	100g
F0239	*N*-(Fmoc-oxy)succinimide		5g	25g
N0363	2-Nitrophenylsulfenyl Chloride		25g	100g
N0142	*o*-Ns-Cl	25g	100g	500g

C1591



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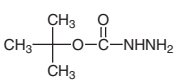

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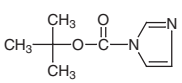
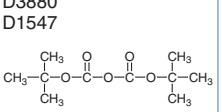


D3878
D3879
D3880
D1547



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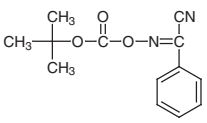

 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

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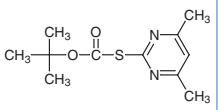

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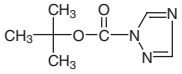

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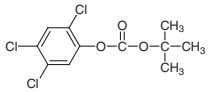

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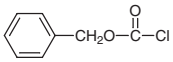

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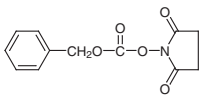

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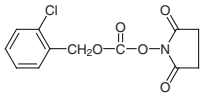

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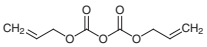

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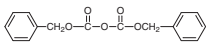

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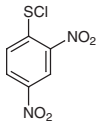

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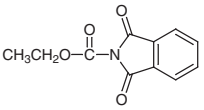

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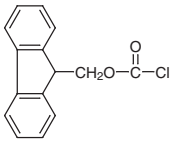

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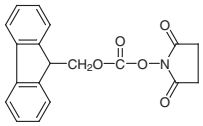

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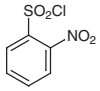
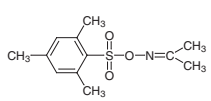


Aminating Agents

Product No.	Product Name			Unit Size
A1441	Acetoxime *O*-(2,4,6-Trimethylphenylsulfonate)		5g	25g
A1632	*N*-Allyloxycarbonyl-2-nitrobenzenesulfonamide			5g
A1137	4-Amino-1,2,4-triazole		25g	250g
A2457	2-Azido-1,3-dimethylimidazolinium Hexafluorophosphate			5g
A1341	Azidomethyl Phenyl Sulfide			5g
B3380	2-Bromoisobutyramide		5g	25g
B2303	*N*-(*tert*-Butoxycarbonyl)-2-nitrobenzenesulfonamide	1g	5g	25g
B1648	*N*-(*tert*-Butoxycarbonyl)-*p*-toluenesulfonamide		10g	25g
B2857	*tert*-Butyl [Bis(4-methoxyphenyl)phosphinyloxy]carbamate		1g	5g
I0510	*tert*-Butyl Methyl Iminodicarboxylate			5g
C1757	*N*-Carbobenzoxy-2-nitrobenzenesulfonamide		5g	25g
I0497	Di-*tert*-butyl Iminodicarboxylate		5g	25g
B1734	Diethyl *N*-(*tert*-Butoxycarbonyl)phosphoramidate			5g
D2361	Diethyl Phosphoramidate			25g
D1899	*N,O*-Dimethylhydroxylamine Hydrochloride	25g	100g	500g
D1672	Diphenylphosphoryl Azide	5g	25g	250g
M1182	Ethyl *O*-Mesitylsulfonylacetohydroxamate [Precursor of the Powerful Aminating Reagent]	1g	5g	25g
H0093	Hexamethylenetetramine		25g	500g
H0258	Hydroxylamine Hydrochloride		25g	500g
H0196	Hydroxylamine Sulfate		25g	500g
H0530	Hydroxylamine-*O*-sulfonic Acid	25g	100g	500g
M0886	*O*-Methylhydroxylamine Hydrochloride (*ca.* 40% in Water, *ca.* 5.4mol/L)		25mL	500mL
M0343	*O*-Methylhydroxylamine Hydrochloride	25g	100g	500g
P1235	Phthalimide DBU Salt			25g
P0403	Phthalimide Potassium Salt		25g	500g
D2479	Sodium Diformylamide			25g
T1184	Trimethylsilylmethyl Azide		1g	5g

A1441



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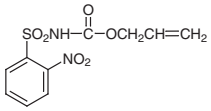

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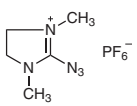

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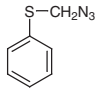
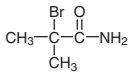
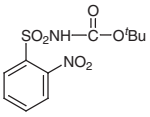
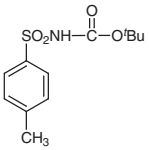
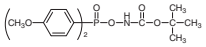
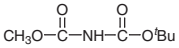
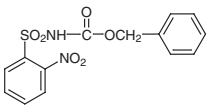
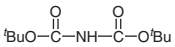
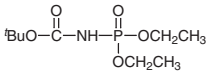
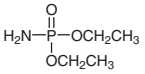
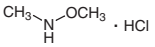
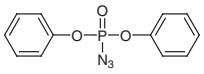
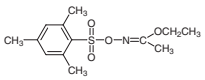
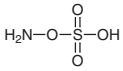
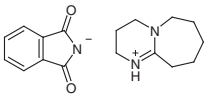
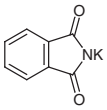
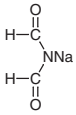
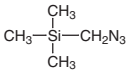


B3380 	B2303 	B1648 	B2857 	I0510 
C1757 	I0497 	B1734 	D2361 	D1899 
D1672 	M1182 	H0093 	H0258	H0196
H0530 	M0886 M0343	P1235 	P0403 	D2479 
T1184 				

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1) S. Bienz, P. Bisegger, A. Guggisberg, M. Hesse, *Nat. Prod. Rep.* **2005**, *22*, 647 (Review); C. Wang, J.-G. Delcros, L. Cannon, F. Konate, H. Carias, J. Biggerstaff, R. A. Gardner, O. Phanstiel IV, *J. Med. Chem.* **2003**, *46*, 5129.
2) E. W. Gerner, F. L. Meyskens Jr, *Nat. Rev. Cancer* **2004**, *4*, 781; R. A. Casero Jr, L. J. Marton, *Nat. Rev. Drug Discov.* **2007**, *6*, 373.
3) T. Fukuyama, M. Cheung, T. Kan, *Synlett* **1999**, 1301; T. Kan, A. Fujiwara, H. Kobayashi, T. Fukuyama, *Tetrahedron* **2002**, *58*, 6267; Y. Hidai, T. Kan, T. Fukuyama, *Tetrahedron Lett.* **1999**, *40*, 4711; Y. Hidai, T. Kan, T. Fukuyama, *Chem. Pharm. Bull.* **2000**, *48*, 1570; T. Kan, A. Fujiwara, H. Kobayashi, T. Fukuyama, *Tetrahedron* **2002**, *58*, 6267; M. Matoba, T. Kajimoto, M. Node, *Synth. Commun.* **2008**, *38*, 1194.

Availability or specification of the listed products are subject to change without prior notice.

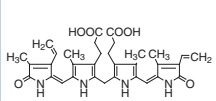
Porphyrins

Porphyrins are the collective term for macrocyclic compounds and their derivatives, composed of four pyrrole rings linked on the *α* position through four methine groups. The central nitrogens form a stable complex with various metals such as iron, magnesium and cobalt. These metal complexes play important roles in biochemical processes. Metal porphyrin derivatives such as hemoglobin, vitamin B_{12}, chlorophyll and cytochromes exist in living organisms. From the point of their specific optical and redox characteristics, their applications to solar cells or catalysts for chemical reactions have been studied.

Porphyrins

Product No.	Product Name	Unit Size	
B0460	Bilirubin	100mg	1g
B3515	Bis(Zinc Porphyrin) (*ca.* 5μmol/L in Dichloromethane) [for CD Spectroscopy]	5mL	25mL
C1630	5-(4-Carboxyphenyl)-10,15,20-triphenylporphyrin		100mg
C0780	Chlorophyll (Total Chlorophyll: *ca.* 6.0%)		25g
D2860	5,15-Diphenylporphyrin		100mg
H0008	Hemin	1g	25g
H1293	Hemoglobin from Swine	25g	100g
M2209	Magnesium Porphyrin		100mg
M1338	5-(4-Methoxycarbonylphenyl)-10,15,20-triphenylporphyrin	100mg	1g
O0234	2,3,7,8,12,13,17,18-Octaethylporphyrin	100mg	1g
O0319	2,3,7,8,12,13,17,18-Octafluoro-5,10,15,20-tetrakis(pentafluorophenyl)porphyrin		100mg
A5020	Oxo[5,10,15,20-tetra(4-pyridyl)porphyrinato]titanium(IV) [Determination of Glucose in Serum and Urine]		100mg
P1364	Pentamethylene Bis[4-(10,15,20-triphenylporphyrin-5-yl)benzoate]dizinc(II) [Reagent for application of the exciton chirality method]	10mg	100mg
P0540	Protoporphyrin Disodium Salt		100mg
S0271	Sodium Copper Chlorophyllin		25g
A5015	TCPP [=Tetrakis(4-carboxyphenyl)porphyrin] [Ultra-high sensitive spectrophotometric reagent for Cu, Cd] [For the simultaneous determination of metals by HPLC]	100mg	1g
T1494	5,10,15,20-Tetrakis(4-aminophenyl)porphyrin		100mg
T1495	5,10,15,20-Tetrakis(4-carboxymethyloxyphenyl)porphyrin		100mg
T1438	5,10,15,20-Tetrakis(2,6-dichlorophenyl)porphyrin		100mg
T1815	5,10,15,20-Tetrakis(3,5-dihydroxyphenyl)porphyrin	100mg	1g
T1832	5,10,15,20-Tetrakis(3,5-dimethoxyphenyl)porphyrin		100mg
T1497	5,10,15,20-Tetrakis(4-hydroxyphenyl)porphyrin		100mg
T1360	5,10,15,20-Tetrakis(4-methoxyphenyl)porphyrin	100mg	1g
T1861	[5,10,15,20-Tetrakis(4-methoxyphenyl)porphyrinato]cobalt(II)	1g	5g
T1730	5,10,15,20-Tetrakis(pentafluorophenyl)porphyrin		100mg
T1729	5,10,15,20-Tetrakis(2,4,6-trimethylphenyl)porphyrin	100mg	1g
T1358	*meso*-Tetraphenylchlorin		100mg
T1359	Tetraphenylporphyrin (Chlorin free)		1g
T2222	5,10,15,20-Tetra(4-pyridyl)porphyrin		1g
A5014	TMPyP [=*α*,*β*,*γ*,*δ*-Tetrakis(1-methylpyridinium-4-yl)porphyrin *p*-Toluenesulfonate] [Ultra-high sensitive spectrophotometric reagent for Cu, Mg] [For the simultaneous determination of metals by HPLC]	100mg	1g
A5012	TPP (=Tetraphenylporphyrin) [Ultra-high sensitive spectrophotometric reagent for Cu]	1g	25g
A5013	TPPS Hydrate (=Tetraphenylporphyrin Tetrasulfonic Acid Hydrate) [Ultra-high sensitive spectrophotometric reagent for transition metals]	100mg	1g
C0449	Vitamin B_{12}	100mg	1g

B0460



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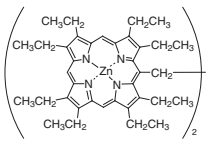

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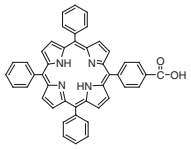

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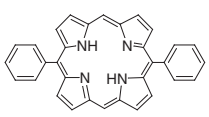

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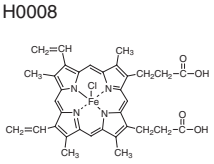

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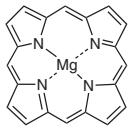
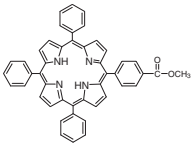


M1338



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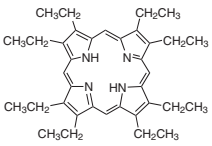

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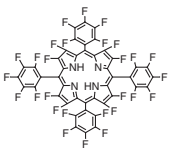

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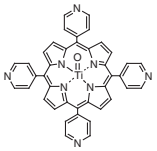

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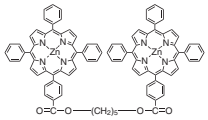

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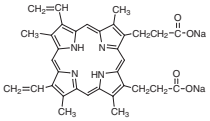

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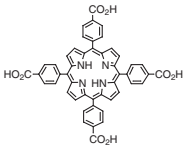

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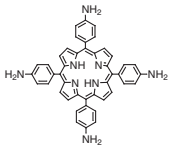

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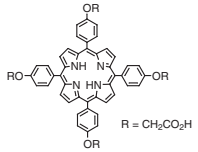

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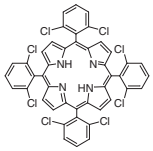

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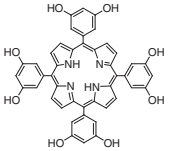

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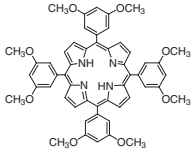

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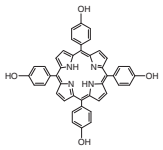

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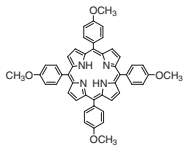

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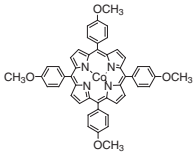

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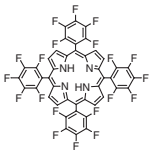

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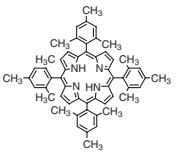

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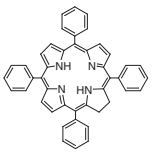

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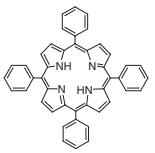

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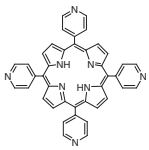

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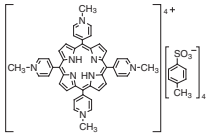

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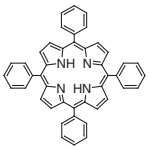

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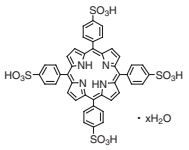


Availability or specification of the listed products are subject to change without prior notice.

Vitamins

Vitamins are a group of organic nutrients required in small quantities for a variety of biological functions which cannot be synthesized in the body. In general, vitamins are classified into thirteen groups in human. Deficiency of some vitamins causes a specific disease. For example, beriberi is caused by a lack of vitamin B_1. The disease is cured by restoring the vitamin to one's diet.

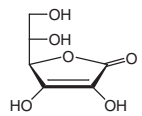
Vitamins are also classified as either water-soluble or fat-soluble vitamins. There are 9 water-soluble vitamins: vitamin B_1 (thiamine), vitamin B_2 (riboflavine), niacin, pantothenic acid, vitamin B_6 (pyridoxine etc.), biotin, folic acid, vitamin B_{12} (cyanocobalamin), and vitamin C (ascorbic acid). The fat-soluble vitamins comprise vitamins A (retinol etc.), D (calciferols etc.), E (tocoferols etc.), and K (phylloquinone etc.).

The followings are vitamins, vitamin related compounds, and vitamin derivatives that can be obtained from TCI.

Vitamins

Product No.	Product Name	Unit Size		
A0537	L-Ascorbic Acid (Vitamin C)		25g	500g
B0463	Biotin (Vitamin H)	100mg	1g	5g
C0005	Calciferol (Vitamin D_2)	1g	5g	25g
P0012	Calcium D-Pantothenate		25g	500g
C0560	β-Carotene		1g	5g
C0314	Cholecalciferol (Vitamin D_3)		1g	5g
C0449	Cyanocobalamin (Vitamin B_{12})		100mg	1g
E0018	Ergosterol (Provitamin D_2)		5g	25g
F0014	Flavin Adenine Dinucleotide Disodium Salt Hydrate		100mg	1g
F0043	Folic Acid Hydrate (Vitamin B_9)			25g
V0103	Menadiol Diacetate (Vitamin K_4)			25g
M0373	Menadione (Vitamin K_3)		25g	250g
N0078	Nicotinamide		25g	500g
N0082	Nicotinic Acid (Vitamin B_3)		25g	500g
P0642	Phylloquinone (Vitamin K_1)		5g	25g
P0559	Pyridoxal Hydrochloride	1g	5g	25g
C0377	Pyridoxal 5-Phosphate Monohydrate		1g	25g
P0560	Pyridoxamine Dihydrochloride Monohydrate		1g	5g
P0561	Pyridoxine Hydrochloride (Vitamin B_6 Hydrochloride)		25g	500g
R0064	Retinoic Acid (Vitamin A Acid)		1g	5g
R0088	13-*cis*-Retinoic Acid		100mg	1g
R0020	Riboflavin (Vitamin B_2)		25g	500g
R0023	Riboflavin 5'-Monophosphate Sodium Salt		5g	25g
A0539	Sodium L-Ascorbate		25g	500g
P0013	Sodium D-Pantothenate		25g	250g
T0181	Thiamine Hydrochloride (Vitamin B_1 Hydrochloride) Hydrate	25g	100g	500g
T0182	Thiamine Nitrate		25g	500g
T0183	Thiamine Pyrophosphate Chloride		5g	25g
T0251	DL-α-Tocopherol (Vitamin E)		25g	250g
T2309	D-α-Tocopherol			25g
T0252	DL-α-Tocopherol Acetate	25g	100g	500g
T2322	D-α-Tocopherol Acetate			25g
T2283	D-α-Tocopherylquinone			500mg

A0537



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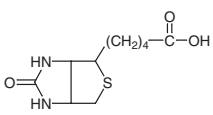

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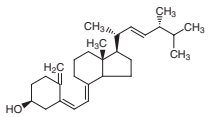

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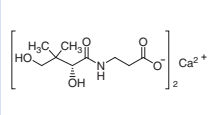

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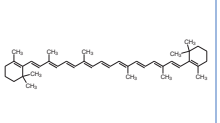

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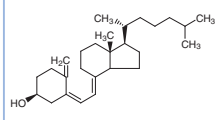

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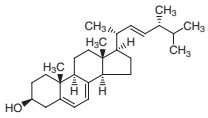

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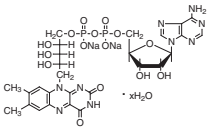

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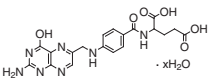

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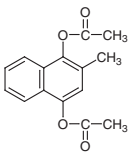

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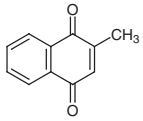

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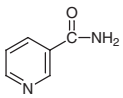

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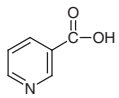

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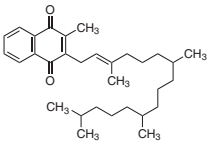

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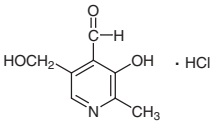

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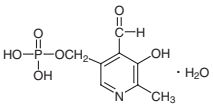

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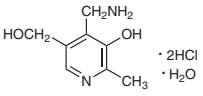

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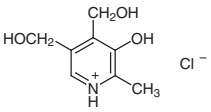

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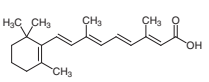

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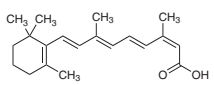

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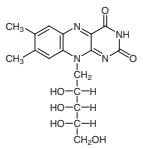

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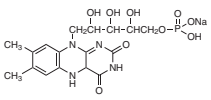

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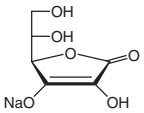

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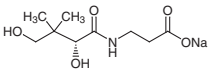

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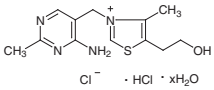

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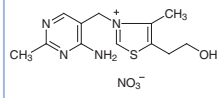

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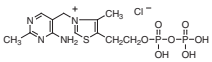

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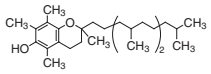

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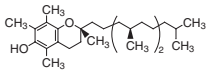

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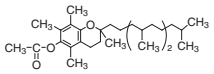

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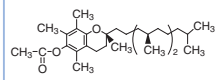

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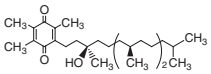


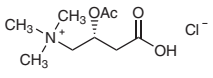
Vitamin Related Compounds

Product No.	Product Name	Unit Size	
A1394	Acetyl-L-carnitine Hydrochloride	5g	25g
A0497	Anthranilic Acid (Vitamin L_1)	25g	500g
C0049	L-Carnitine	5g	25g
C0050	DL-Carnitine Hydrochloride	25g	500g
C3058	L-Carnitine Hydrochloride	5g	25g
C2625	L-Carnitine L-Tartrate	5g	25g
C0326	Choline (48-50% in Water)	25g	500g
C0553	Choline Bitartrate	25g	500g
C0328	Choline Bromide	25g	500g
C0329	Choline Chloride	25g	500g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size		
C0331	Choline Dihydrogen Citrate		25g	500g
C1971	Coenzyme Q_{10}		100mg	1g
D1956	Coenzyme Qo		1g	5g
H0049	Hesperidin	25g	100g	500g
I0848	Idebenone			1g
I0629	*allo*-Inositol			25mg
I0632	1D-*chiro*-Inositol			200mg
I0633	1L-*chiro*-Inositol			200mg
I0628	*epi*-Inositol			200mg
I0630	*muco*-Inositol			100mg
I0040	*myo*-Inositol		25g	500g
I0631	*scyllo*-Inositol		200mg	1g
M0338	Methyl Hesperidine		5g	25g
D0919	β-Nicotinamide Adenine Dinucleotide (β-NAD) Hydrate, oxidized form		1g	5g
D0920	β-Nicotinamide Adenine Dinucleotide Disodium Salt (β-NADH Disodium Salt) Hydrate, reduced form	100mg	1g	5g
N0943	β-Nicotinamide Adenine Dinucleotide Phosphate (β-NADP)			100mg
C0379	β-Nicotinamide Adenine Dinucleotide Phosphate Sodium Salt (β-NADP Sodium Salt) Hydrate, oxidized form		100mg	1g
T0521	β-Nicotinamide Adenine Dinucleotide Phosphate Tetrasodium Salt (β-NADPH Tetrasodium Salt) reduced form			100mg
C0330	Tricholine Citrate (*ca.* 65% in Water)		25g	500g
M0644	Vitamin U Chloride		25g	500g

A1394



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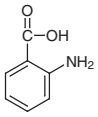

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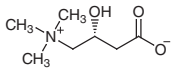

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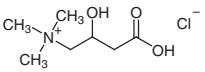

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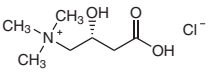

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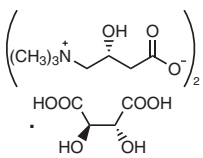

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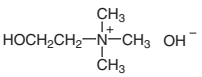

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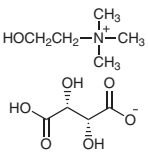

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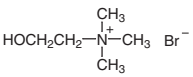

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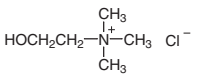

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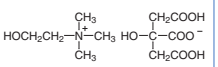

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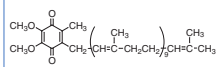

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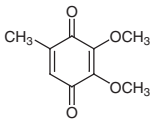

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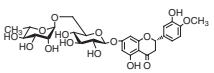

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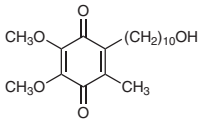

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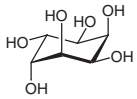

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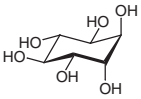

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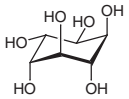

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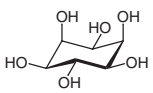

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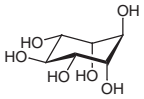

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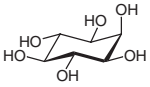

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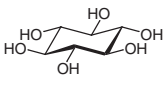

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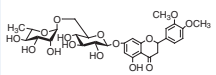

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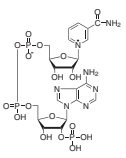

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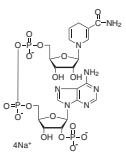

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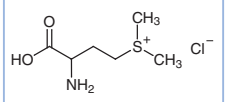
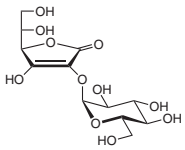


Vitamin Derivatives

Product No.	Product Name	Unit Size	
G0394	AA-2G	1g	5g
A0520	D-Araboascorbic Acid	25g	500g
A2521	L-Ascorbic Acid 2-Phosphate Sesquimagnesium Salt Hydrate	5g	25g
B4711	*S*-Benzoylthiamine *O*-Monophosphate	5g	25g
D0053	4-Deoxypyridoxine Hydrochloride		100mg
D0151	Dibenzoyl Thiamine	1g	25g
A1205	2,6-Di-*O*-butyryl-L-ascorbic Acid		1g
A0757	2,6-Di-*O*-palmitoyl-L-ascorbic Acid		25g
E0926	3-*O*-Ethyl-L-ascorbic Acid	5g	25g
E0833	2-Ethyl-3-hydroxy-6-methylpyridine		5g
H1464	Fenretinide	10mg	100mg
G0451	Glyceryl Ascorbate	5g	25g
I0507	(+)-5,6-*O*-Isopropylidene-L-ascorbic Acid	5g	25g
A0540	6-*O*-Palmitoyl-L-ascorbic Acid		25g
D0073	Proflavine Hemisulfate Hydrate	5g	25g
P2208	Pyridoxine Dicaprylate	5g	25g
P1395	Pyridoxine 3,4-Dipalmitate	5g	25g
R0055	Riboflavin Tetrabutyrate	5g	25g
I0232	Sodium Isoascorbate Monohydrate	25g	500g
A0617	6-*O*-Stearoyl-L-ascorbic Acid		5g
T3108	Tazarotene	10mg	100mg
T0176	Thiamine Disulfide Hydrate		25g
T0900	Thiamine Disulfide Nitrate		25g
T0558	Thioflavine T		25g
T2628	D-α-Tocopherol Succinate	5g	25g
H0726	Trolox	1g	5g

G0394



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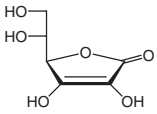

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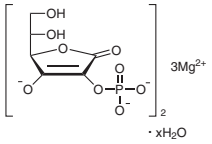

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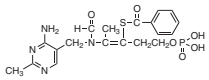

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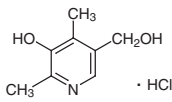

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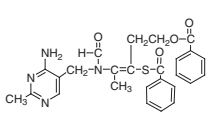

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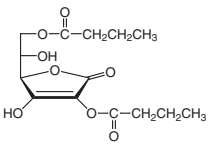

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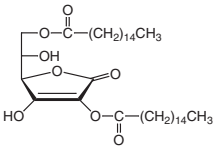

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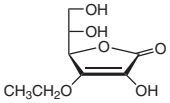

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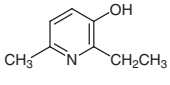

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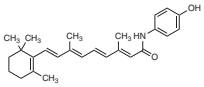

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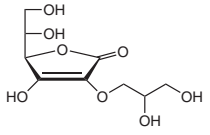

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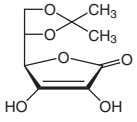

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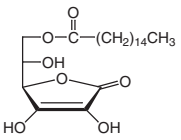

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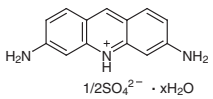

Availability or specification of the listed products are subject to change without prior notice.

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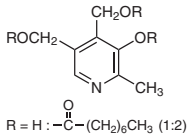

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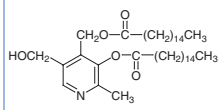

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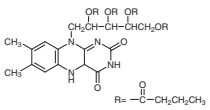

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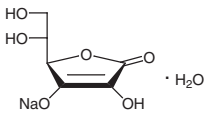

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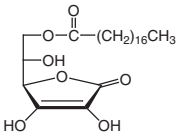

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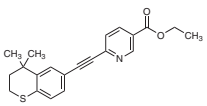

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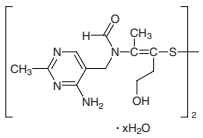

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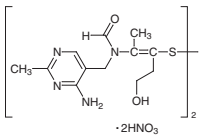

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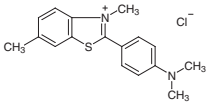

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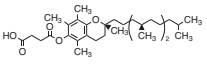

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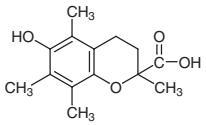


Reference

W. Friedrich, in *Vitamins*, Walter de Gruyter, Berlin, **1988**.

Pharmaceutical Ingredients

for Research and Experimental Use

Pharmaceutical ingredients which show activities against various diseases such as infection and metabolic disorder are included in this section.

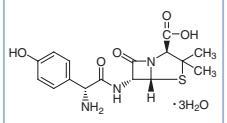
All chemicals in this guide are for testing or research purposes only.

Antibiotic Ingredients

Penicillins

Product No.	Product Name	Unit Size	
A2099	Amoxicillin Trihydrate	5g	25g
A2092	Ampicillin Trihydrate		25g
A0800	6-APA	5g	25g
C2244	Cloxacillin Sodium Salt Monohydrate	1g	5g
O0353	Oxacillin Sodium Salt Monohydrate	5g	25g
P1772	Penicillin G Potassium Salt		25g
P1770	Penicillin G Sodium Salt	1g	5g
P1774	Piperacillin Sodium Salt	1g	5g
S0868	Sulbactam	5g	25g

A2099



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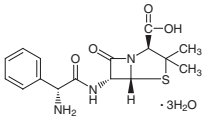

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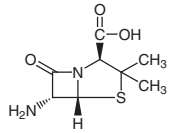

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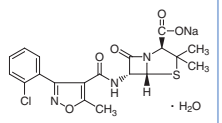

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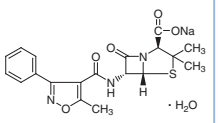

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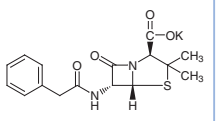

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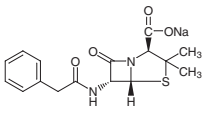

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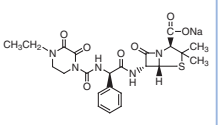

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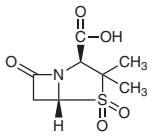

Cephems

Product No.	Product Name	Unit Size	
A1266	7-ACA	5g	25g
A2075	7-ADCA	5g	25g
C2242	Cefazolin Sodium Salt	5g	25g
C2623	Cefcapene Pivoxil Hydrochloride Monohydrate	200mg	1g
C2856	Cefditoren Pivoxil		200mg
C3029	Cefmetazole Sodium Salt	250mg	1g
C2768	Cefoperazone	5g	25g
C2224	Cefotaxime Sodium Salt	5g	25g
C2936	Cefotetan	25mg	250mg
C2598	Cefsulodin Sodium Salt	200mg	1g
C2225	Ceftazidime (contains *ca.* 10% Na_2CO_3)	5g	25g
C2770	Ceftezole	5g	25g
C2622	Ceftizoxime	1g	5g
C2226	Ceftriaxone Disodium Salt Hemiheptahydrate	5g	25g
C2248	Cephalexin Monohydrate	5g	25g
C2769	Cephalothin	5g	25g
C2988	Cephradine Monohydrate	1g	5g
M2129	7-MAC	5g	25g

Availability or specification of the listed products are subject to change without prior notice.

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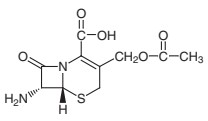

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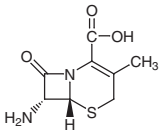

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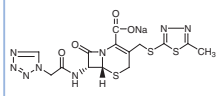

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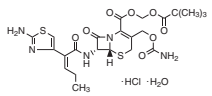

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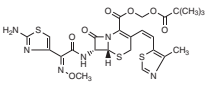

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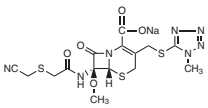

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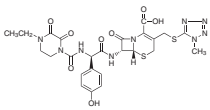

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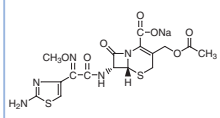

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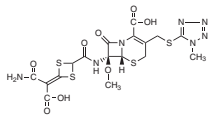

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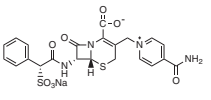

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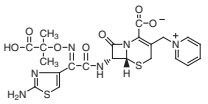

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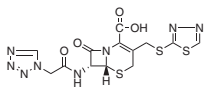

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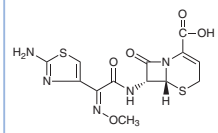

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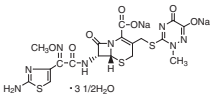

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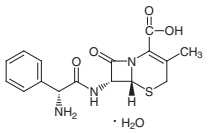

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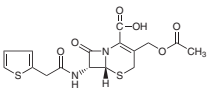

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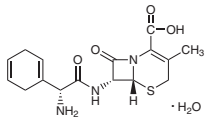

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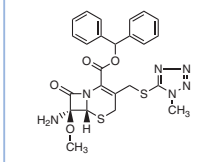
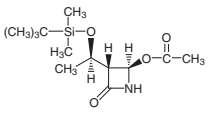


Carbapenems, Monobactams & Other β Lactams

Product No.	Product Name	Unit Size	
A1124	(3*R*,4*R*)-4-Acetoxy-3-[(*R*)-(*tert*-butyldimethylsilyloxy)ethyl]-2-azetidinone	5g	25g
A2466	Aztreonam	500mg	5g
M2279	Meropenem Trihydrate	1g	5g
M2411	4-Methoxybenzyl 3-Chloromethyl-7-(2-phenylacetamido)-3-cephem-4-carboxylate	5g	25g

A1124



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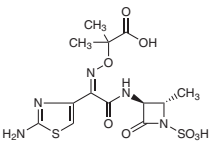

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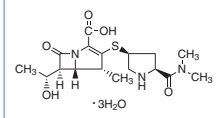

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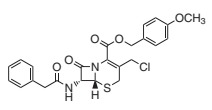
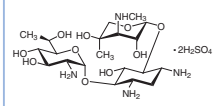


Aminoglycosides

Product No.	Product Name	Unit Size	
F0649	Fradiomycin Sulfate		25g
G0349	G418 Disulfate	1g	5g
G0383	Gentamicin Sulfate	1g	5g
K0047	Kanamycin Monosulfate	5g	25g

Product No.	Product Name	Unit Size	
P2092	Paromomycin Sulfate	1g	5g
S0585	Streptomycin Sulfate	25g	500g
T2503	Tobramycin		5g

G0349



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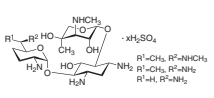

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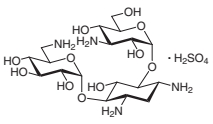

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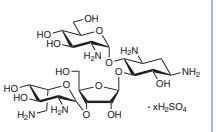

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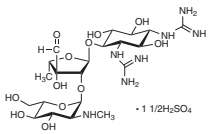

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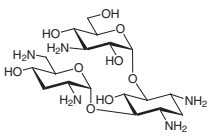
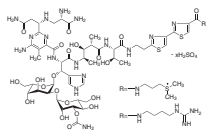


Polypeptides

Product No.	Product Name	Unit Size	
B3972	Bleomycin Sulfate (mixture)	10mg	50mg
C2930	Colistin Sulfate (mixture)	5g	25g
C2408	Cyclosporin A	100mg	1g
D4229	Daptomycin		100mg
P1923	Polymyxin B Sulfate	1g	5g

B3972



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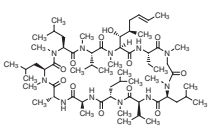
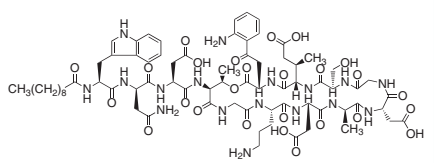
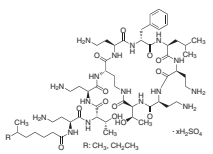


D4229



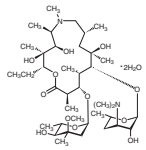
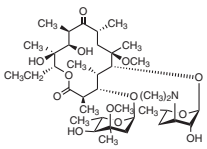
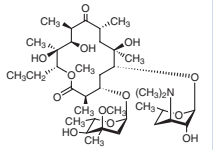
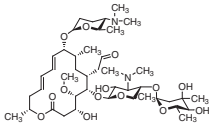
P1923



Macrolides

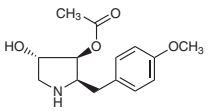
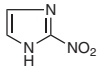
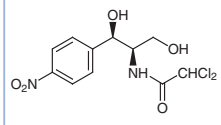
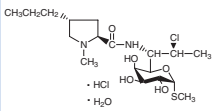
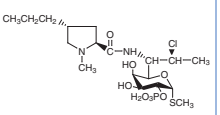
Product No.	Product Name		Unit Size	
A2076	Azithromycin Dihydrate		1g	5g
C2220	Clarithromycin	1g	5g	25g
E0751	Erythromycin		5g	25g
K0046	Leucomycins		5g	25g
S0575	Spiramycin		5g	25g

Availability or specification of the listed products are subject to change without prior notice.

A2076	C2220	E0751	S0575
			

Others

Product No.	Product Name	Unit Size	
A2613	Anisomycin	25mg	100mg
N0891	Azomycin		1g
C2255	Chloramphenicol	25g	250g
C2256	Clindamycin Hydrochloride Monohydrate	5g	25g
C2257	Clindamycin Phosphate	5g	25g
D4532	Daunorubicin Hydrochloride	20mg	100mg
D1564	Dimetridazole	25g	500g
D4193	Doxorubicin Hydrochloride	25mg	100mg
D4116	Doxycycline Hyclate	5g	25g
F0811	Florfenicol	1g	5g
F0889	Fosfomycin Disodium Salt	5g	25g
G0334	Geldanamycin		10mg
L0166	Lincomycin Hydrochloride Monohydrate	5g	25g
M0924	Metronidazole	25g	500g
M2288	Minocycline Hydrochloride	1g	5g
R0079	Rifampicin	5g	25g
R0101	Rifaximin	1g	5g
S0911	Secnidazole	1g	5g
T2525	Tetracycline Hydrochloride	25g	100g
T2802	Thiamphenicol	5g	25g
T3058	Tinidazole	5g	25g
W0007	Wortmannin		20mg

A2613	N0891	C2255	C2256	C2257
				
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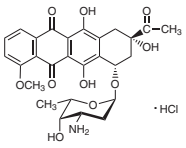	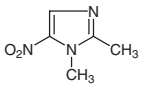	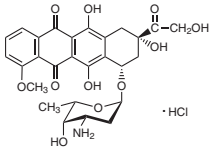	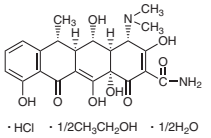	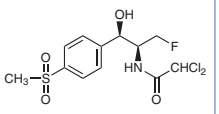
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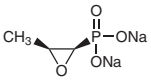	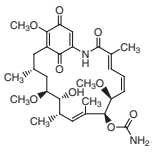	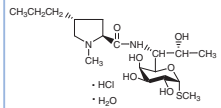	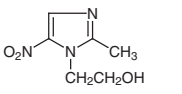	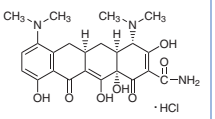

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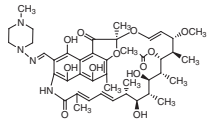

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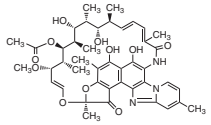

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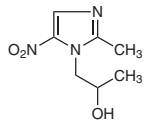

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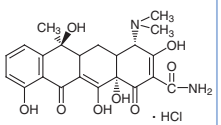

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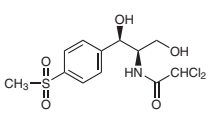

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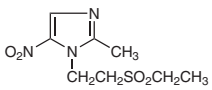

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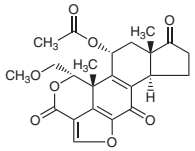
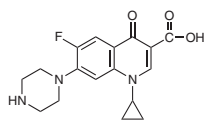


Synthetic Antimicrobial Ingredients

Quinolones

Product No.	Product Name	Unit Size	
C2510	Ciprofloxacin	5g	25g
C2227	Ciprofloxacin Hydrochloride Monohydrate	5g	25g
E0762	Enoxacin Sesquihydrate	5g	25g
E0786	Enrofloxacin	5g	25g
F0646	Fleroxacin	5g	25g
F0832	Flumequine	5g	25g
C2293	Fluoroquinolonic Acid	5g	25g
L0193	Levofloxacin	5g	25g
L0238	Levofloxacin Q-Acid	1g	5g
L0216	Lomefloxacin Hydrochloride	5g	25g
M2240	Marbofloxacin	1g	5g
N0931	Nadifloxacin	200mg	1g
N0490	Nalidixic Acid		25g
N0817	Norfloxacin	5g	25g
O0403	Ofloxacin	5g	25g
P1962	Pazufloxacin Mesylate	1g	5g
P1773	Pipemidic Acid Trihydrate		25g
P2058	Prulifloxacin	1g	5g
S0840	Sarafloxacin Hydrochloride	1g	5g
S0896	Sparfloxacin	5g	25g
T2506	Tosufloxacin *p*-Toluenesulfonate Hydrate	5g	25g

C2510



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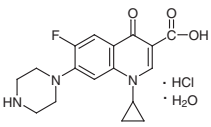

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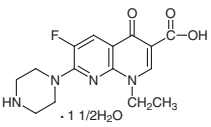

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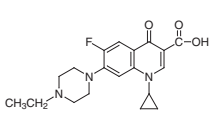

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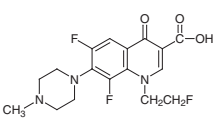

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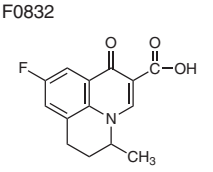

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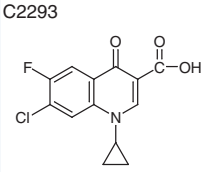

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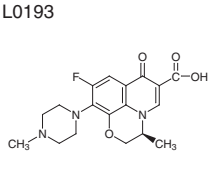

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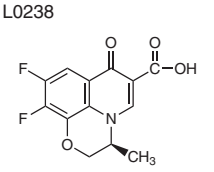

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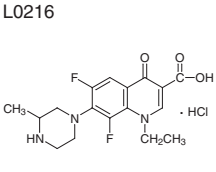
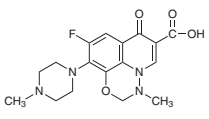


Availability or specification of the listed products are subject to change without prior notice.

M2240



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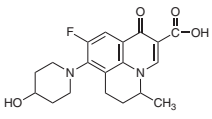

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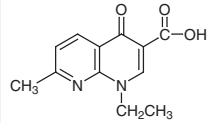

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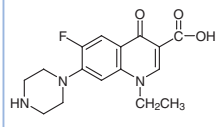

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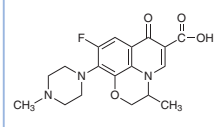

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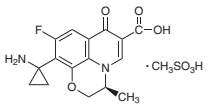

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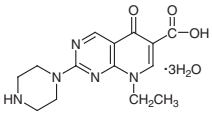

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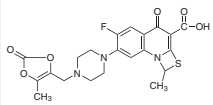

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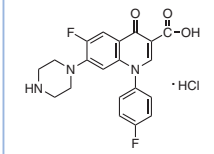

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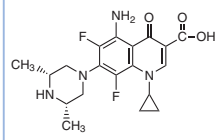

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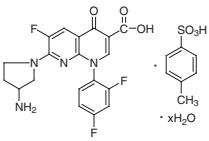
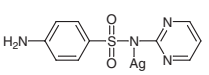


Sulfonamides

Product No.	Product Name	Unit Size	
S0595	Silver Sulfadiazine	5g	25g
S0581	Succinylsulfathiazole Hydrate		25g
S0582	Sulfabenzamide		25g
S0577	Sulfacetamide	25g	250g
S0578	Sulfacetamide Sodium Salt Hydrate	25g	250g
S0579	Sulfadiazine		25g
S0359	Sulfadimethoxine		25g
S0589	Sulfadimethoxine Sodium Salt	5g	25g
S0899	Sulfadoxin	5g	25g
S0464	Sulfaguanidine	25g	500g
S0917	Sulfalene	5g	25g
S0586	Sulfamethazine	25g	250g
S0583	Sulfamethazine Sodium Salt	25g	500g
S0360	Sulfamethizole		25g
S0361	Sulfamethoxazole		25g
S0591	Sulfamethoxypyridazine	5g	25g
S0592	Sulfamonomethoxine		5g
S0119	Sulfanilamide	25g	100g 500g
S0071	Sulfapyridine	25g	500g
S0580	Sulfasalazine		25g
S0272	Sulfathiazole	25g	500g
S0362	Sulfisomidine		1g

S0595



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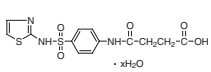

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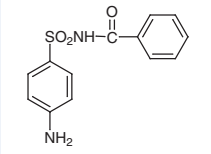

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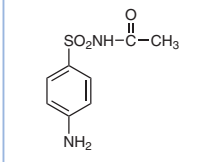

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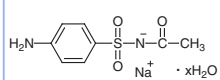
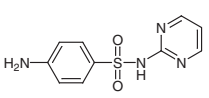


S0579



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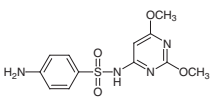

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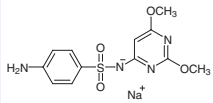

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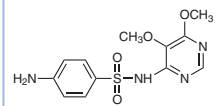

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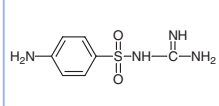

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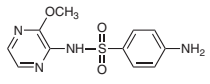

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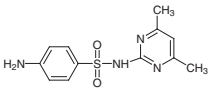

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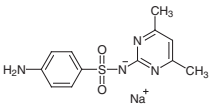

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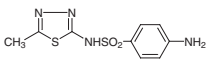

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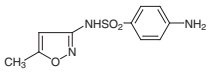

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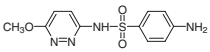

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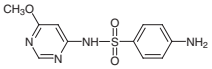

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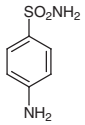

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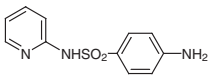

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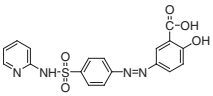

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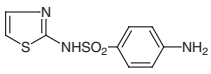

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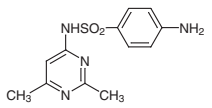
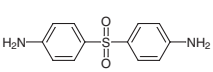


Others

Product No.	Product Name	Unit Size	
D0089	Bis(4-aminophenyl) Sulfone	25g	500g
E1011	(*S*,*S*)-*N*,*N*'-Bis(1-hydroxy-2-butyl)ethylenediamine Dihydrochloride	5g	25g
C2511	Chlorhexidine Diacetate	5g	25g
C1254	Chlorhexidine Dihydrochloride	5g	25g
C2866	Clofazimine	1g	5g
D4192	Decoquinate		1g
D3769	Diazolidinyl Urea	25g	250g
F0821	Furazolidone		25g
H1348	Hymexazol	5g	25g
I0665	Imidazolidinyl Urea	25g	250g
I0138	Isoniazid	25g	500g
L0256	Lumefantrine	5g	25g
M1664	Methotrexate Hydrate	1g	5g
N0883	Nitrofurantoin	25g	100g
O0388	Octenidine Dihydrochloride		5g
O0424	Ormetoprim	1g	5g
P0633	Pyrazinamide		25g
Q0093	Quinoxyfen		200mg
M0632	Sodium Pyrithione (40% in Water, *ca.* 3.3mol/L)	25g	500g
T2286	Trimethoprim		25g
M0633	Zinc Pyrithione	25g	500g

D0089



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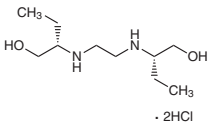

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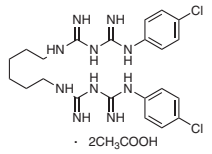

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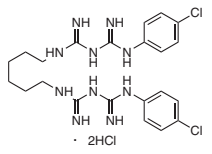

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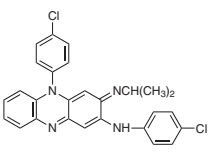

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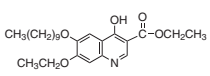

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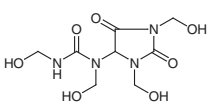

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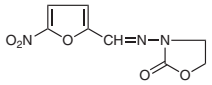

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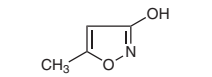

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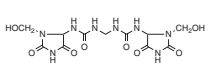

Availability or specification of the listed products are subject to change without prior notice.

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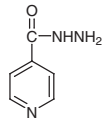

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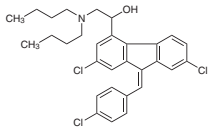

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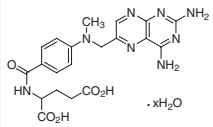

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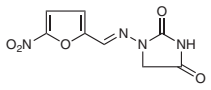

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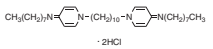

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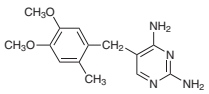

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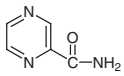

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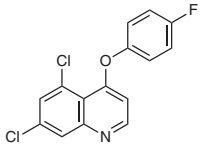

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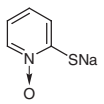

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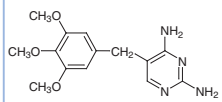

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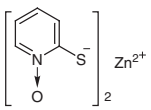
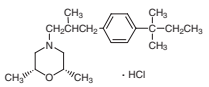


Antifungal Ingredients

Product No.	Product Name	Unit Size	
A2161	Amorolfine Hydrochloride	200mg	1g
A2545	Atovaquone	200mg	1g
B4173	Bifonazole	5g	25g
B3293	Butenafine Hydrochloride	1g	5g
C2025	Climbazole	25g	500g
C2867	Clotrimazole	5g	25g
E0957	Econazole Nitrate	5g	25g
F0677	Fluconazole	1g	5g
F0321	Flucytosine	1g	5g 25g
G0384	(+)-Griseofulvin	5g	25g
I0666	IPBC		25g
I0834	Isoconazole Nitrate	5g	25g
I0732	Itraconazole	5g	25g
K0045	Ketoconazole	1g	5g
D3971	Magnolol	200mg	1g
M1769	Miconazole Nitrate	5g	25g
P2178	Piroctone Olamine	1g	5g
D2049	Terbinafine Hydrochloride	1g	5g
T3059	Tolnaftate	1g	5g
V0116	Voriconazole	100mg	1g

A2161



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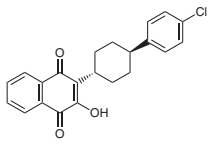

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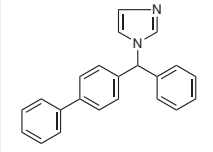

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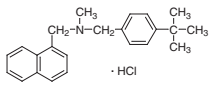

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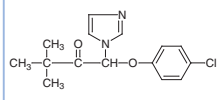

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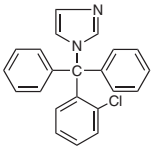

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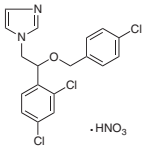

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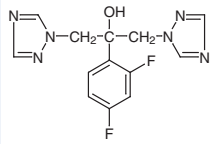

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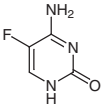

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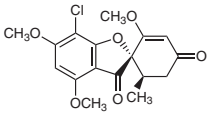
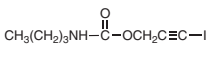
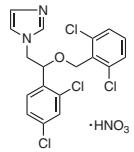
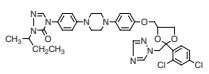
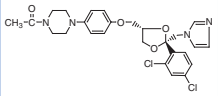
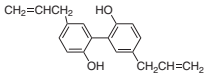
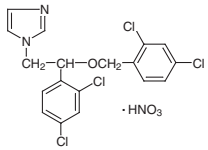
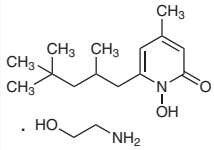
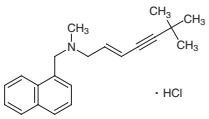
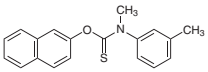
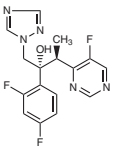
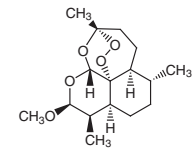
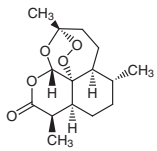
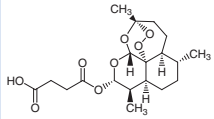
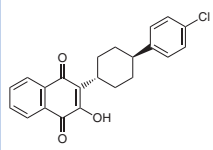
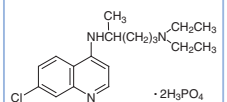
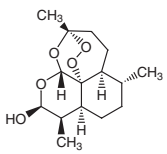
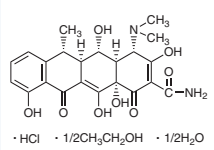
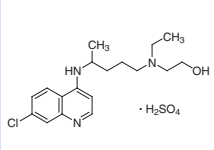
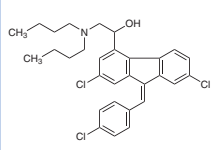
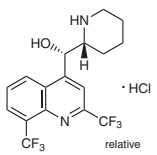


I0666 	I0834 	I0732 	K0045 	D3971 
M1769 	P2178 	D2049 	T3059 	V0116 

Antiprotozoal Ingredients

Product No.	Product Name	Unit Size	
A2190	Artemether	5g	25g
A2118	Artemisinin		5g
A2191	Artesunate	5g	25g
A2545	Atovaquone	200mg	1g
C2301	Chloroquine Diphosphate	25g	500g
D3793	Dihydroartemisinin	1g	5g
D4116	Doxycycline Hyclate	5g	25g
H1306	Hydroxychloroquine Sulfate	5g	25g
L0256	Lumefantrine	5g	25g
M2313	Mefloquine Hydrochloride		1g
M0924	Metronidazole	25g	500g
M2445	Miltefosine Hydrate	100mg	1g
N0964	Nitarsone	200mg	1g
P2092	Paromomycin Sulfate	1g	5g
P2037	Pyrimethamine	1g	5g
Q0056	Quinacrine Dihydrochloride Hydrate		25g
Q0028	Quinine	25g	100g
Q0030	Quinine Hydrochloride Dihydrate		25g
S0911	Secnidazole	1g	5g
S0899	Sulfadoxin	5g	25g
S0917	Sulfalene	5g	25g
T3058	Tinidazole	5g	25g

A2190 	A2118 	A2191 	A2545 	C2301 
D3793 	D4116 	H1306 	L0256 	M2313 

Availability or specification of the listed products are subject to change without prior notice.

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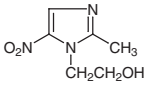

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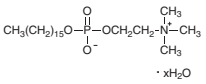

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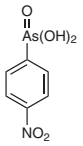

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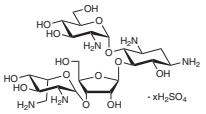

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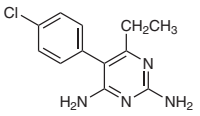

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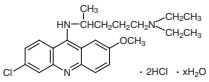

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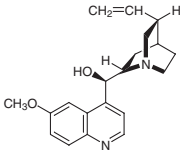

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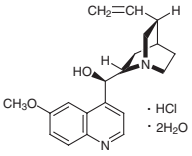

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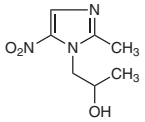

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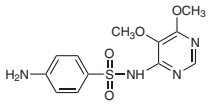

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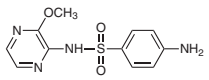

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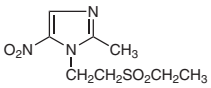
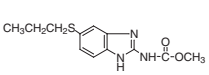


Anthelminthic Ingredients

Product No.	Product Name	Unit Size	
A1943	Albendazole	5g	25g
A2572	Amprolium Hydrochloride	5g	25g
T0865	Bithionol	25g	500g
D1898	Diethylcarbamazine Citrate		10g
D1564	Dimetridazole	25g	500g
F0922	Febantel	1g	5g
F0812	Fenbendazole		25g
F0825	Flubendazole	5g	25g
I0435	Glycalbylamide		25g
L0231	Levamisole Hydrochloride	1g	5g
T1215	Levamisole Hydrochloride	10g	25g
M2273	Mebendazole	5g	25g
M0924	Metronidazole	25g	500g
O0391	Oxfendazole	1g	5g
P0448	Piperazine Adipate	25g	500g
P2125	Praziquantel	5g	25g
R0108	Rafoxanide		1g
S0521	Santonin	5g	25g
S0911	Secnidazole	1g	5g
S0359	Sulfadimethoxine		25g
T0830	Thiabendazole	25g	250g
T3058	Tinidazole	5g	25g
T2826	Triclabendazole	1g	5g

A1943



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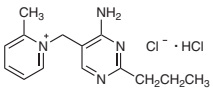

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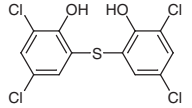

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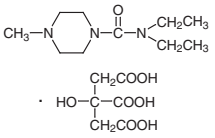

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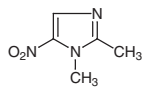

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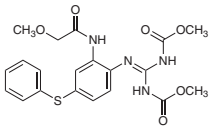

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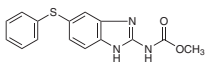

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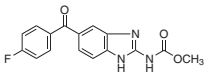

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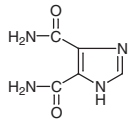

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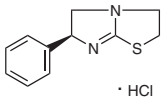

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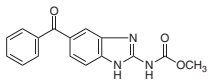

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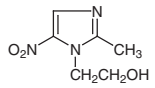

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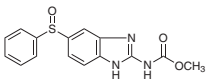

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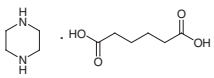

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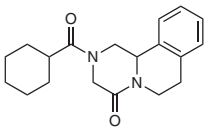

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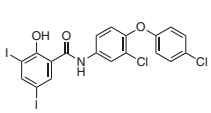

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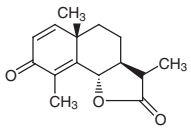

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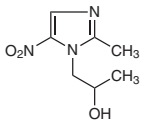

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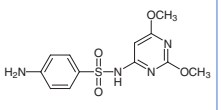

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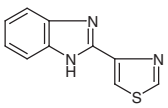

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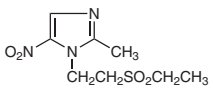

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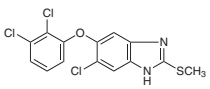


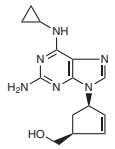
Antiviral Ingredients

Product No.	Product Name	Unit Size		
A2694	Abacavir		1g	5g
A1915	Acyclovir	1g	5g	25g
A2414	Adefovir Dipivoxil		100mg	1g
A0588	Amantadine Hydrochloride	10g	25g	250g
A2232	5-Aza-2'-deoxycytidine		20mg	100mg
A2052	Azidothymidine		1g	5g
B3404	Brivudine		100mg	1g
C2035	Cytarabine			5g
D3066	Didanosine		100mg	500mg
D3065	2',3'-Dideoxyadenosine			100mg
D0964	1-Docosanol		25g	500g
E0997	Efavirenz (This product is only available in Japan.)		5g	25g
E1007	Emtricitabine		25mg	250mg
F0842	Famciclovir		500mg	5g
D4200	Fialuridine			10mg
G0315	Ganciclovir Hydrate		5g	25g
I0258	Idoxuridine	1g	5g	25g
I0747	Imiquimod		100mg	1g
I0037	Inosine		25g	500g
L0217	Lamivudine		100mg	1g
M2399	Mizoribine		50mg	250mg
M2443	Moroxydine Hydrochloride		5g	25g
N0922	Nevirapine			200mg
P2164	Penciclovir		200mg	1g
R0077	Ribavirin		100mg	500mg
R0070	Rimantadine Hydrochloride			5g
R0116	Ritonavir (This product is only available in Japan.)		200mg	1g
D3580	Stavudine		1g	5g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
T3006	Tenofovir Hydrate	1g	5g
T2836	Tilorone Dihydrochloride	100mg	1g
T2511	Trifluorothymidine	100mg	1g
V0111	Valacyclovir Hydrochloride Hydrate	100mg	1g
V0098	Vidarabine Monohydrate	1g	5g
D3581	Zalcitabine		1g
Z0023	Zanamivir Hydrate		100mg

A2694



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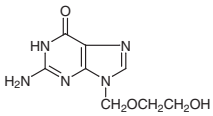

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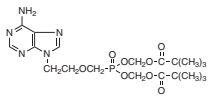

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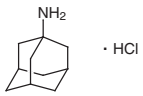

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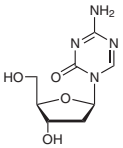

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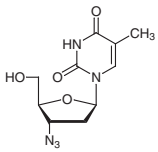

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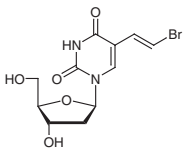

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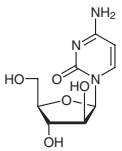

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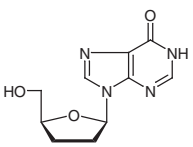

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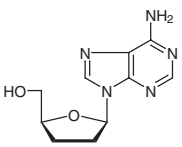

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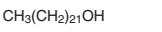

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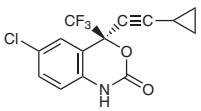

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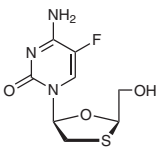

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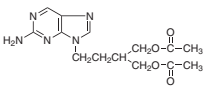

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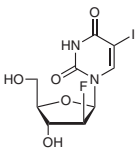

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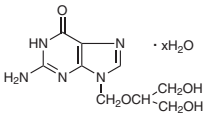

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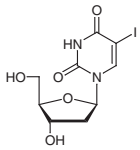

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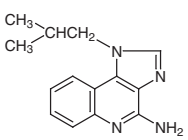

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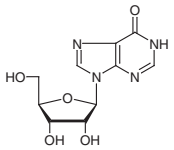

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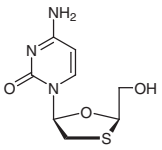

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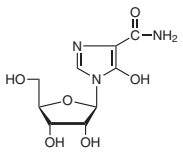

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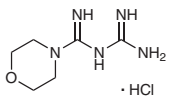

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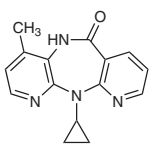

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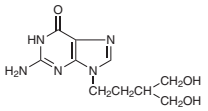

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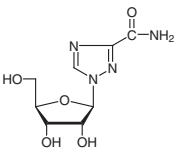

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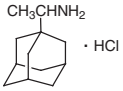

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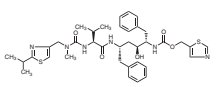

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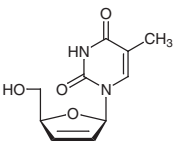

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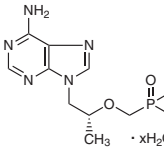

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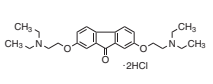

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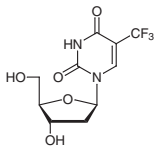

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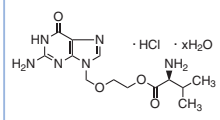

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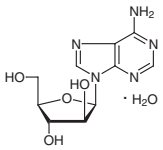

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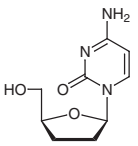

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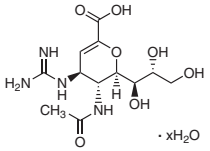
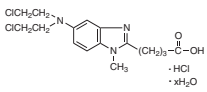


Antitumor Ingredients

Antitumor Alkylating Agents

Product No.	Product Name	Unit Size	
B4033	Bendamustine Hydrochloride Hydrate		200mg
B1022	Busulfan		25g
C2634	Carmustine		100mg
C2939	Chlorambucil	200mg	1g
C2236	Cyclophosphamide Monohydrate	5g	25g
D3634	Dacarbazine	1g	5g
L0251	Lomustine	200mg	1g
N0821	Nimustine Hydrochloride		1g
T2744	Temozolomide	500mg	5g

B4033



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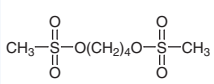

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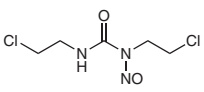

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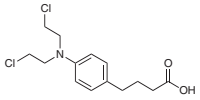

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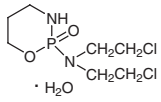

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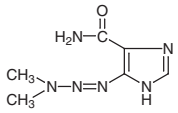

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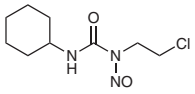

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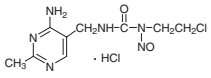

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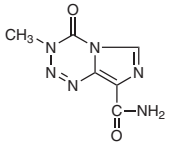
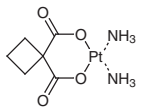


Platinum-containing Antitumor Agents

Product No.	Product Name	Unit Size	
C2043	Carboplatin	100mg	1g
D3371	Cisplatin	100mg	1g
O0372	Oxaliplatin		100mg

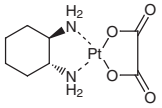
C2043



D3371



O0372



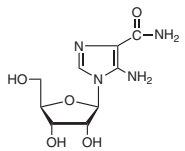
Antitumor Antimetabolites

Product No.	Product Name	Unit Size	
A2528	Acadesine		50mg
A0907	Allopurinol	25g	250g
A0410	Aminopterin Hydrate	25mg	100mg
A2739	9-β-D-Arabinofuranosylguanine Hydrate	10mg	50mg

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
A2033	5-Azacytidine	100mg	1g
A2232	5-Aza-2'-deoxycytidine	20mg	100mg
C2878	Capecitabine	1g	5g
C2663	Carmofur	5g	25g
C2499	Cladribine		50mg
C2500	Clofarabine	20mg	100mg
C2815	Cordycepin Hydrate	25mg	100mg
C2689	Cordycepin		25mg
D4342	5'-Deoxy-5-fluorocytidine	1g	5g
D3579	5'-Deoxy-5-fluorouridine	1g	5g
F0913	Fludarabine Monophosphate	25mg	100mg
F0151	5-Fluorouracil	5g	25g
C2235	Folinic Acid Calcium Salt Hydrate	1g	5g
G0367	Gemcitabine Hydrochloride	100mg	1g
H0310	Hydroxyurea	5g	25g
M0063	6-Mercaptopurine Monohydrate	1g	5g
M1664	Methotrexate Hydrate	1g	5g
P2023	RG 108	50mg	200mg
F0635	Tegafur	5g	25g
T0212	6-Thioguanine	1g	5g
V0098	Vidarabine Monohydrate	1g	5g
Z0022	Zebularine	200mg	1g

A2528



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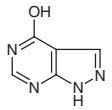

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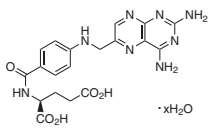

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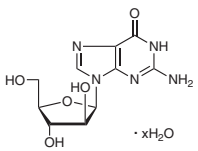

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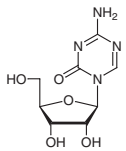

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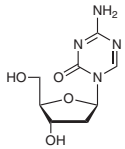

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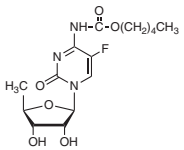

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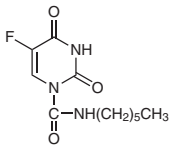

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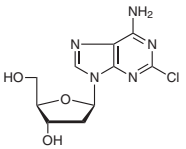

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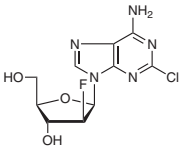

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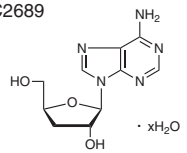

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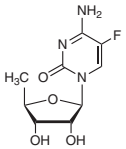

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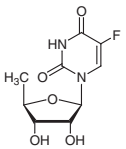

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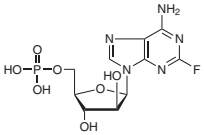

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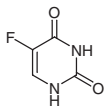

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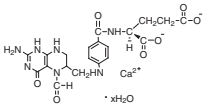

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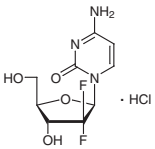

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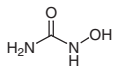

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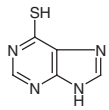

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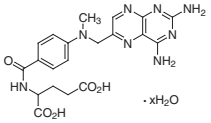

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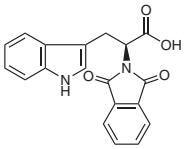

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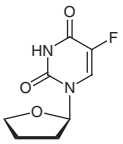

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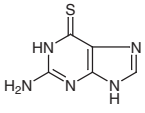

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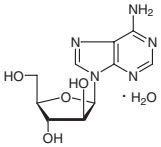

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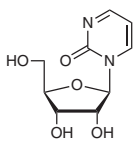
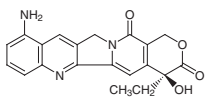


Antitumor Plant Alkaloids and Terpenoids

Product No.	Product Name	Unit Size	
A2063	9-Aminocamptothecin		10mg
C1495	(*S*)-(+)-Camptothecin	100mg	1g
C2520	Combretastatin A4	25mg	250mg
D4148	10-Deacetylbaccatin III	100mg	500mg
D4102	Docetaxel		100mg
E0781	7-Ethylcamptothecin	100mg	1g
E0748	7-Ethyl-10-hydroxycamptothecin	100mg	1g
E0675	Etoposide		100mg
I0714	Irinotecan Hydrochloride Trihydrate		100mg
P1632	Paclitaxel		100mg
N0822	Rubitecan		100mg
T3109	Teniposide	20mg	100mg
T2899	Triptolide		10mg

A2063



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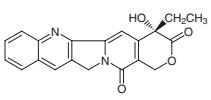

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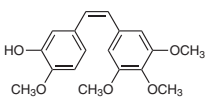

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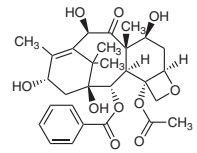

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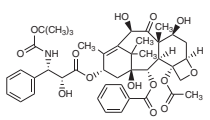

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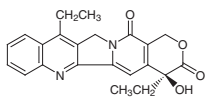

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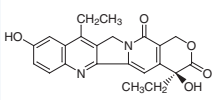

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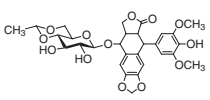

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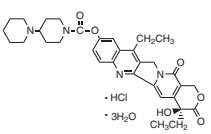

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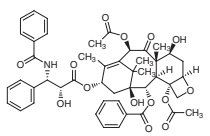

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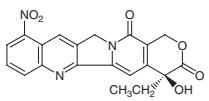

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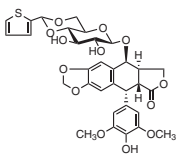

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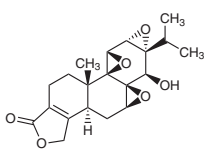
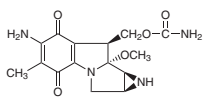


Antitumor Antibiotics

Product No.	Product Name	Unit Size	
M2320	Ametycin	10mg	50mg
B3972	Bleomycin Sulfate (mixture)	10mg	50mg
D4532	Daunorubicin Hydrochloride	20mg	100mg
D4193	Doxorubicin Hydrochloride	25mg	100mg
G0334	Geldanamycin		10mg
I0747	Imiquimod	100mg	1g
W0007	Wortmannin		20mg

M2320



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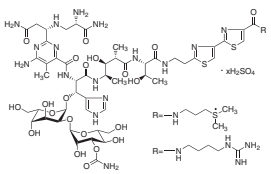

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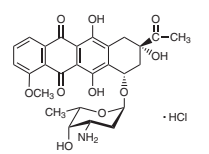

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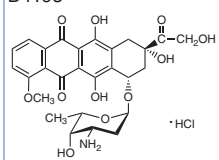
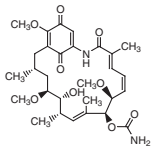


Availability or specification of the listed products are subject to change without prior notice.

G0334



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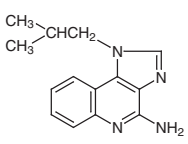

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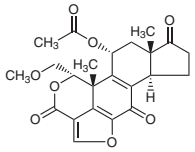
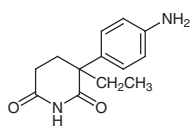


Hormonal Antitumor Agents

Product No.	Product Name	Unit Size	
A1947	DL-Aminoglutethimide	5g	25g
A2370	Anastrozole		100mg
B3206	Bicalutamide	200mg	1g
D1961	Dexamethasone		1g
D4438	Dexamethasone 21-Phosphate Disodium Salt Hydrate	250mg	1g
E0941	Exemestane	200mg	1g
F0675	Finasteride	200mg	1g
F0663	Flutamide	5g	25g
L0248	Letrozole		1g
L0249	Leuprorelin Acetate		25mg
M1964	Medroxyprogesterone Acetate	1g	5g
M1949	Megestrol Acetate	1g	5g
O0441	Ospemifene	100mg	1g
P0637	Prednisolone	1g 5g	25g
P1276	Prednisone	5g	25g
R0109	Raloxifene Hydrochloride		1g
T2510	Tamoxifen Citrate	1g	5g
T2832	Toremifene Citrate	1g	5g

A1947



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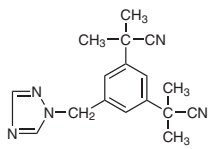

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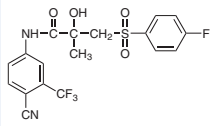

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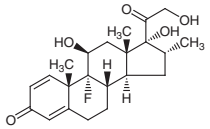

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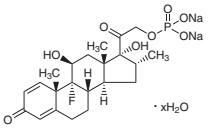

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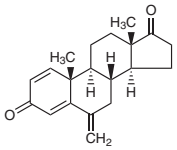

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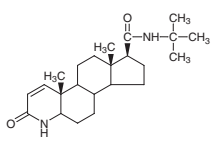

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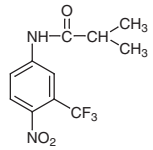

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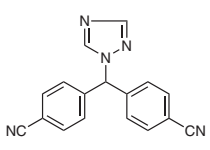

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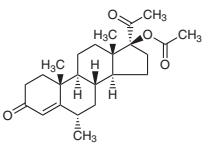

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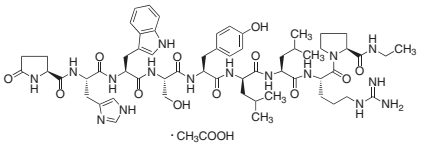

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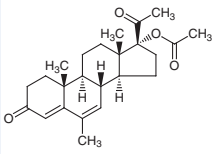

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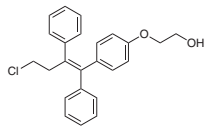
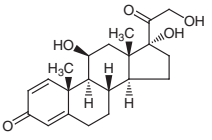
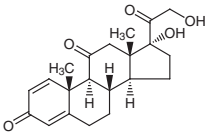


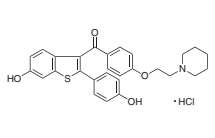
P0637



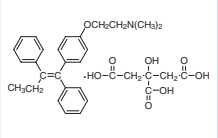
P1276



R0109



T2510



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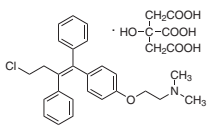
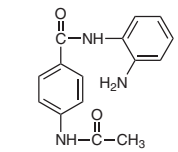


Others

Product No.	Product Name	Unit Size	
A2501	Acetyldinaline	10mg	50mg
H1464	Fenretinide	10mg	100mg
C2243	Gimeracil	1g	5g
H1309	Honokiol	200mg	1g
I0906	Imatinib	100mg	1g
I0936	Imatinib Mesylate	100mg	1g
D4188	M 344	20mg	100mg
M0913	Mesna	10g	25g
M2530	2-Methoxy-β-estradiol	25mg	100mg
M2445	Miltefosine Hydrate	100mg	1g
H1340	NCC-149		5mg
N0914	Norcantharidin		1g
P1905	Piroxicam	2g	10g
P2074	Pomalidomide	25mg	100mg
R0064	Retinoic Acid	1g	5g
T2524	(±)-Thalidomide	1g	5g
T2477	Trichostatin A		10mg
B4000	Ubenimex Hydrochloride		25mg
H1388	Vorinostat		200mg

A2501



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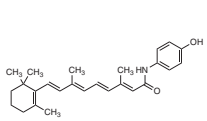

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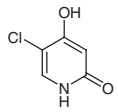

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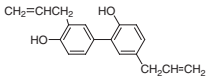

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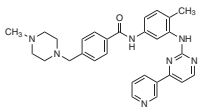

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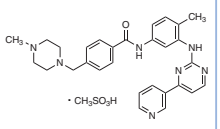

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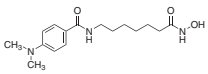

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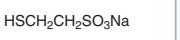

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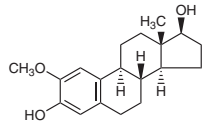

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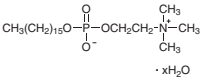

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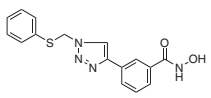
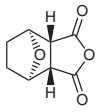


N0914



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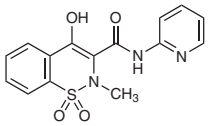

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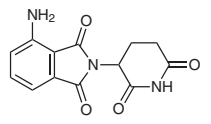

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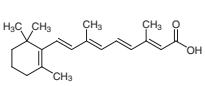

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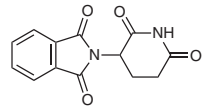

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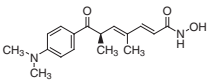

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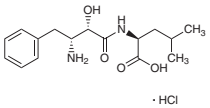

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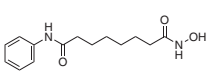


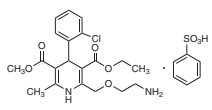
Antihypertensive Ingredients

Product No.	Product Name	Unit Size	
A2353	Amlodipine Besylate	1g	5g
A1414	Atenolol		10g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size		
A2433	Azelnidipine		1g	5g
A2601	Azilsartan		200mg	1g
B4474	Betaxolol Hydrochloride		50mg	250mg
B3994	Bisoprolol Hemifumarate			200mg
C2635	Candesartan Cilexetil		200mg	1g
C1580	Captopril		5g	25g
C3015	Carteolol Hydrochloride		50mg	250mg
C2260	Carvedilol		5g	25g
C2564	Cilnidipine		1g	5g
D1353	Clonidine Hydrochloride		1g	5g
D4082	Delapril Hydrochloride		1g	5g
D3662	(+)-*cis*-Diltiazem Hydrochloride		5g	25g
D4126	Doxazosin Mesylate		100mg	1g
E1010	Enalapril Maleate		1g	5g
E0905	Eplerenone			200mg
F0814	Felodipine		1g	5g
F0674	Fenofibrate	5g	25g	100g
G0414	Guanfacine Hydrochloride		100mg	1g
H0409	Hydralazine Hydrochloride			25g
I0730	Indapamide		1g	5g
I0859	Irbesartan		1g	5g
I0876	Isradipine			25mg
L0276	Lacidipine		200mg	1g
L0220	Lisinopril Dihydrate		1g	5g
L0232	Losartan Potassium		5g	25g
M2225	Manidipine Dihydrochloride		1g	5g
D1817	Methyldopa Sesquihydrate		5g	25g
M2555	Metoprolol Tartrate		5g	25g
M1389	Minoxidil		1g	5g
M2660	Moxonidine		200mg	1g
N0954	Nebivolol Hydrochloride		20mg	100mg
N0635	Nicardipine Hydrochloride		5g	25g
N0528	Nifedipine		10g	25g
N0899	Nilvadipine		1g	5g
N0896	Nimodipine		1g	5g
N0900	Nisoldipine		1g	5g
P1985	Phentolamine Mesylate		100mg	1g
P0938	Prazosin Hydrochloride		100mg	1g
P0995	Propranolol Hydrochloride		25g	250g
R0007	Reserpine		1g	5g
S0260	Spironolactone		1g	5g
T2861	Telmisartan		1g	5g
T2751	Terazosin Hydrochloride Dihydrate		100mg	1g
T2905	Timolol Maleate			200mg
U0085	Urapidil		1g	5g
V0112	Valsartan		1g	5g

A2353



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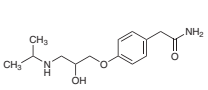

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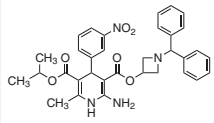

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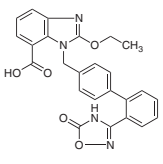

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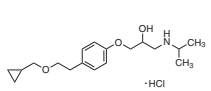

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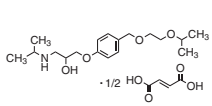

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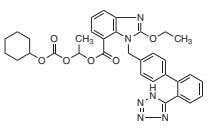

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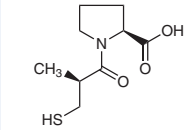
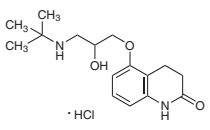
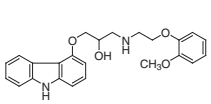


C3015



C2260



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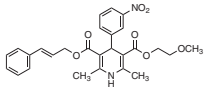
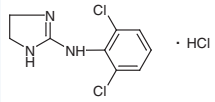
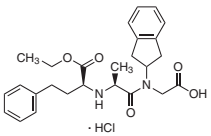


D1353



D4082



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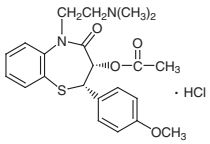

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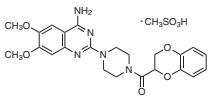

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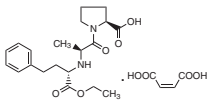

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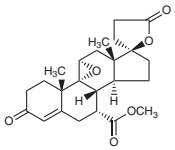

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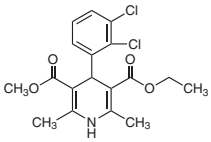

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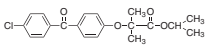
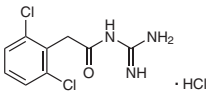
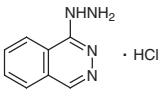


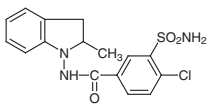
G0414



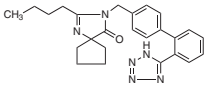
H0409



I0730



I0859



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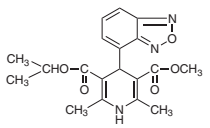
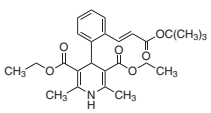
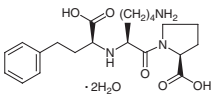


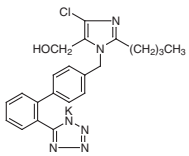
L0276



L0220



L0232



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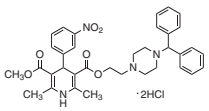

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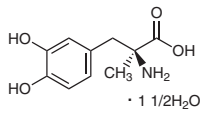

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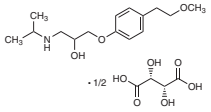

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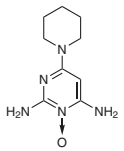

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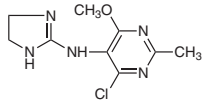

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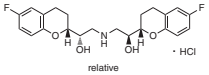

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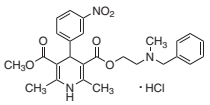

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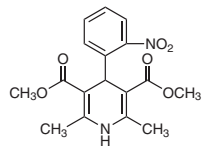

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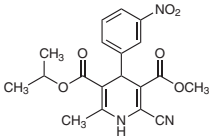

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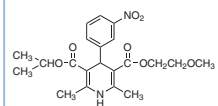

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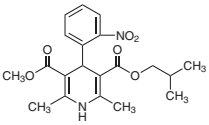

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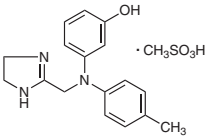

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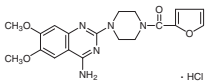

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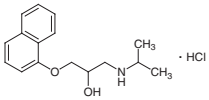

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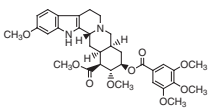

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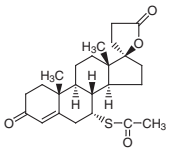

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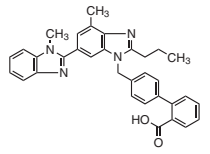

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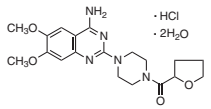

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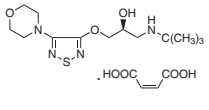

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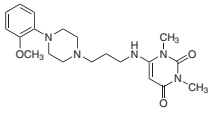

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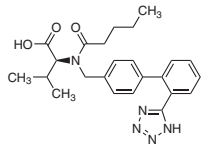
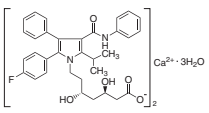


Availability or specification of the listed products are subject to change without prior notice.

Antilipemic Ingredients

Product No.	Product Name	Unit Size		
A2476	Atorvastatin Calcium Salt Trihydrate		1g	5g
B3611	Benazepril Hydrochloride		1g	5g
B3346	Bezafibrate		5g	25g
C2667	Ciprofibrate		1g	5g
C0941	Clofibrate		25g	500g
E0853	Ethyl *all cis*-5,8,11,14,17-Eicosapentaenoate (stabilized with Tocopherols)			25g
F0674	Fenofibrate	5g	25g	100g
F0820	Fluvastatin Sodium Salt Hydrate		1g	5g
G0368	Gemfibrozil		5g	25g
L0214	Lovastatin		5g	25g
M2275	Mevastatin		1g	5g
N0082	Nicotinic Acid		25g	500g
P1796	Pravastatin Sodium		100mg	500mg
P2002	Probucol		5g	25g
S0509	Simvastatin		100mg	1g

A2476



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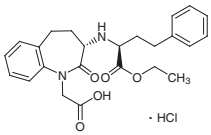

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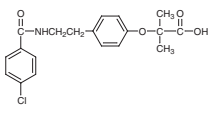

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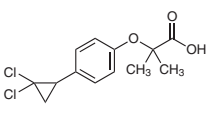

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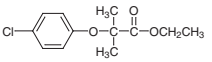

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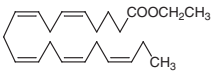

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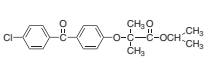

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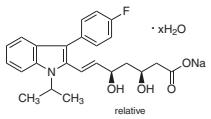

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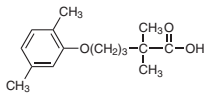

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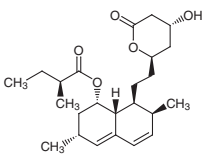

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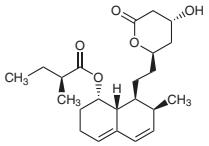

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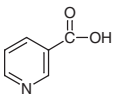

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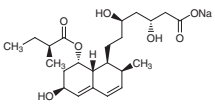

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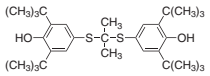

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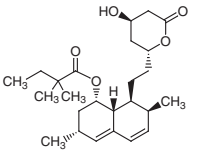
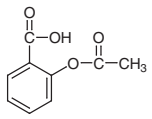


Antithrombotic Ingredients

Antiplatelet Agents

Product No.	Product Name	Unit Size	
A2262	Acetylsalicylic Acid	25g	500g
C2587	Cilostazol	1g	5g
C2556	(*S*)-(+)-Clopidogrel Sulfate	1g	5g
D2195	Ethyl *cis*-4,7,10,13,16,19-Docosahexaenoate		100mg
E0853	Ethyl *all cis*-5,8,11,14,17-Eicosapentaenoate (stabilized with Tocopherols)		25g
C2884	MY-5445	20mg	100mg
O0419	Ozagrel Hydrochloride Hydrate	1g	5g
P2040	Prasugrel		200mg
S0943	Seratrodast	100mg	1g
T3110	Ticlopidine Hydrochloride	5g	25g

A2262



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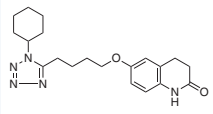

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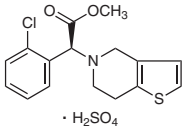

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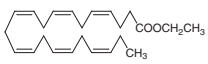

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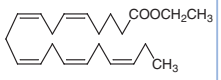

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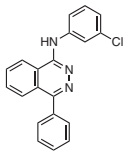

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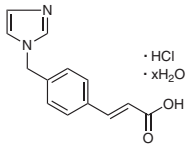

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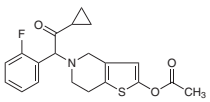

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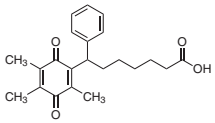

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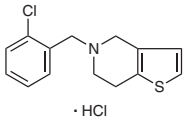
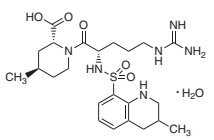


Anticoagulant Agents

Product No.	Product Name	Unit Size	
A2705	Argatroban Monohydrate		25mg
H0393	Heparin Sodium Salt from Hog intestine	100mg	1g
N0959	Nafamostat Mesylate	20mg	100mg
W0005	Warfarin Sodium (contains Isopropyl Alcohol)	5g	25g

A2705



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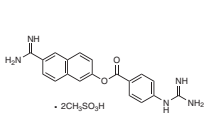

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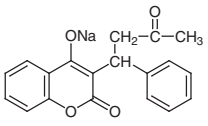
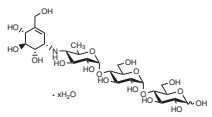
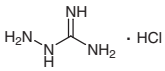
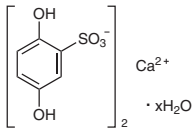
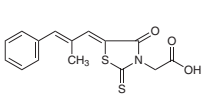
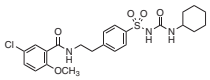
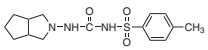
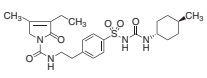
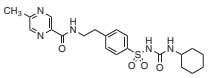
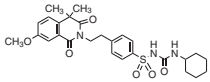
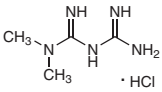
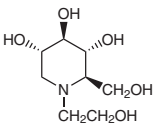
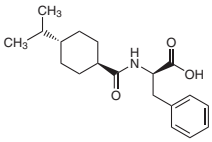
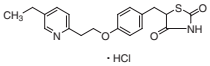
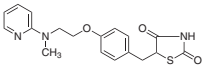
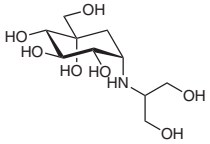


Antidiabetic Ingredients

Product No.	Product Name	Unit Size	
A2485	Acarbose Hydrate	1g	5g
A1129	Aminoguanidine Hydrochloride	25g	500g
C2789	Calcium Dobesilate Hydrate		1g
E0906	Epalrestat	1g	5g
G0382	Glibenclamide	5g	25g
G0381	Gliclazide		5g
G0395	Glimepiride	1g	5g
G0369	Glipizide	1g	5g
G0332	Gliquidone	1g	5g
M2009	Metformin Hydrochloride	25g	100g
M2302	Miglitol	1g	5g
N0912	Nateglinide	500mg	5g
P1901	Pioglitazone Hydrochloride	5g	25g
R0106	Rosiglitazone	200mg	1g
V0119	Voglibose		100mg

Availability or specification of the listed products are subject to change without prior notice.

A2485 	A1129 	C2789 	E0906 	G0382 
G0381 	G0395 	G0369 	G0332 	M2009 
M2302 	N0912 	P1901 	R0106 	V0119 

Neurotransmitter Agent Ingredients

Product No.	Product Name			Unit Size
A2359	Acamprosate Calcium			1g
A0084	Acetylcholine Chloride		25g	500g
A2606	Agomelatine			1g
A0588	Amantadine Hydrochloride	10g	25g	250g
A2450	Amisulpride		100mg	1g
A0908	Amitriptyline Hydrochloride			25g
A2499	Amoxapine		1g	5g
A2496	Aripiprazole		1g	5g
A2357	Atomoxetine Hydrochloride		100mg	1g
A0754	Atropine		5g	25g
A0550	Atropine Sulfate Monohydrate		5g	25g
B3343	Baclofen		5g	25g
E1046	BIA 2-093		200mg	1g
B1890	(+)-Bicuculline		25mg	100mg
C1095	Carbamazepin		10g	25g
C2450	Carbidopa Monohydrate		100mg	1g
C3020	Chlormethiazole Hydrochloride		200mg	1g
C2481	Chlorpromazine Hydrochloride		5g	25g
C2370	Citalopram Hydrobromide		1g	5g
E0958	(*S*)-Citalopram Oxalate		200mg	1g
C2547	Clozapine		100mg	1g
D4337	(*S*)-*N*-Despropyl Pramipexole		1g	5g
D4125	Domperidone		200mg	1g
D4099	Donepezil Hydrochloride		1g	5g
D4626	Doxepin Hydrochloride	1g	5g	25g
D4235	Droxidopa		50mg	200mg
D4223	Duloxetine Hydrochloride		1g	5g
E0746	Ethosuximide		5g	25g
E1076	Etizolam	50mg	250mg	1g
F0958	Flumazenil		25mg	100mg
F0750	Fluoxetine Hydrochloride		1g	5g
F0736	Flupirtine Maleate Salt		100mg	1g
F0858	Fluvoxamine Maleate		1g	5g
A0282	GABA	25g	100g	500g
G0318	Gabapentin		5g	25g
G0405	Gaboxadol Hydrochloride			25mg
G0293	Galantamine Hydrobromide		100mg	1g
G0392	Glycopyrrolate			100mg

Product No.	Product Name	Unit Size
G0401	Granisetron Hydrochloride	200mg 1g
H0912	Haloperidol	5g 25g
H0155	Homatropine Hydrobromide	1g 25g
I0926	Iloperidone	25mg 100mg 1g
I0907	Ipratropium Bromide Monohydrate	200mg 1g
I0893	Iproniazid	200mg 1g
I0140	Iproniazid Phosphate	Price on request
I0871	Isoguvacine Hydrochloride	25mg
I0948	Itopride Hydrochloride	5g 25g
L0241	Lamotrigine	1g 5g
D0600	Levodopa	5g 25g
L0245	Lomerizine Dihydrochloride	200mg 1g
M2527	Maprotiline Hydrochloride	1g 5g
M2460	Meclofenoxate Hydrochloride	1g 5g
M2622	Melperone	25mg 100mg
D3608	Memantine Hydrochloride	5g 25g
D1817	Methyldopa Sesquihydrate	5g 25g
M2645	*N*-Methyl Paroxetine	200mg 1g
M2218	Metoclopramide	5g 25g
M2623	Mianserin Hydrochloride	200mg 1g
M2133	Milnacipran Hydrochloride	50mg 500mg
M2151	Mirtazapine	100mg 1g
M2252	Molindone Hydrochloride	100mg 1g
N0358	Neostigmine Bromide	5g 25g
N0447	Neostigmine Methyl Sulfate	5g 25g
N0420	Nipecotie Acid	25g 500g
N0957	Nortriptyline Hydrochloride	5g
O0393	Olanzapine	1g 5g
O0407	Ondansetron Hydrochloride Dihydrate	1g 5g
O0406	Orphenadrine Hydrochloride	5g 25g
O0363	Oxcarbazepine	5g 25g
P1897	Paliperidone	200mg 1g
P2051	Palonosetron Hydrochloride	200mg 1g
P1977	Paroxetine Hydrochloride Hemihydrate	1g 5g
P0776	Pentobarbital Sodium Salt	25g
P1970	Perphenazine	5g 25g
P0890	Phenobarbital Sodium Salt (contains 5% Isopropyl Alcohol at maximum)	25g
D0894	Phenytoin	25g 500g
N0998	Picamilon	5g
P2054	Piribedil	200mg 1g
P2073	Pramipexole Dihydrochloride Monohydrate	100mg 1g
P1906	Primidone	5g 25g
P2156	Proparacaine Hydrochloride	1g 5g
Q0092	Quetiapine Hemifumarate	5g 25g
R0007	Reserpine	1g 5g
A2423	Riluzole	5g 25g
R0070	Rimantadine Hydrochloride	5g
R0087	Risperidone	50mg 500mg
R0093	Rivastigmine L-Tartrate	1g 5g
R0099	Rocuronium Bromide	100mg
R0110	Rolipram	50mg 250mg
R0143	Rufinamide	25mg 100mg 1g
S0935	Safinamide	25mg 100mg
S0021	Scopolamine Hydrobromide Trihydrate	1g 10g
S0231	Scopolamine Methyl Bromide	1g
S0230	Scopolamine Methyl Nitrate	1g 5g
S0507	Sertraline Hydrochloride	1g 5g
S0932	Sibutramine Hydrochloride Monohydrate	1g 5g
I0821	(*S*)-(-)-Sulpiride	5g 25g
S0851	Sumatriptan Succinate	100mg 1g
T2839	Tetrabenazine	200mg 1g
T2919	Thiocolchicoside	20mg
T3165	Tiagabine Hydrochloride	50mg 250mg
T2527	Tizanidine Hydrochloride	5g 25g
A2602	Tramiprosate	5g 25g
T2849	Trifluoperazine Dihydrochloride	5g 25g
T2743	Tropisetron Hydrochloride	1g 5g
S0894	Valproic Acid Sodium Salt	25g 100g

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
V0110	Venlafaxine Hydrochloride	1g	5g
Z0032	Ziprasidone Hydrochloride Monohydrate	50mg	250mg
Z0024	Zolmitriptan	200mg	1g
Z0018	Zopiclone	100mg	1g

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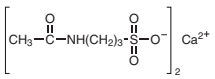

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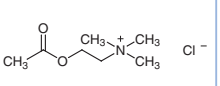

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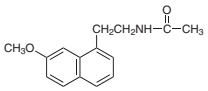

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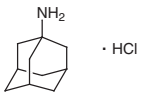

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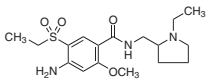

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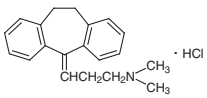

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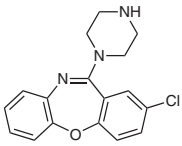

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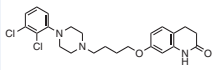

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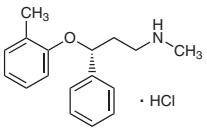

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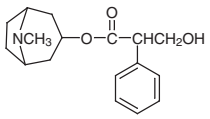

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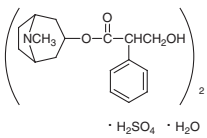

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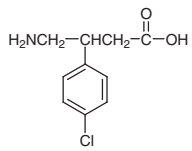

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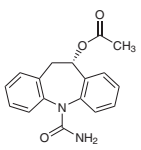

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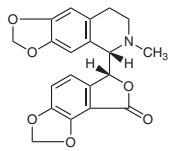

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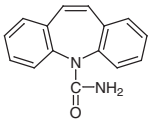

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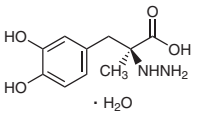

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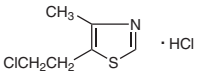

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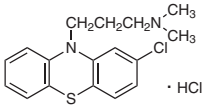

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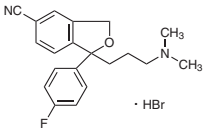

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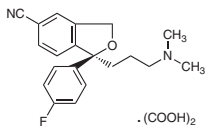

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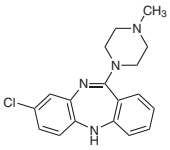

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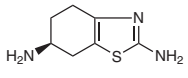

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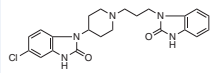

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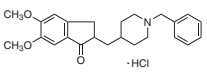

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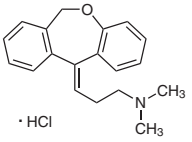

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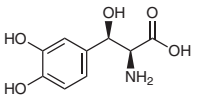

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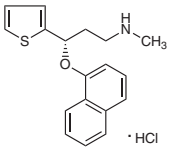

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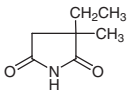

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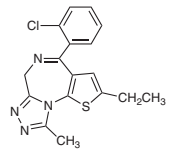

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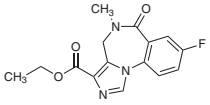

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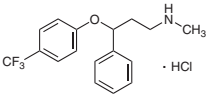

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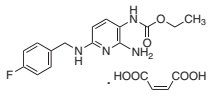

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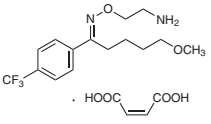

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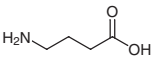

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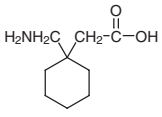

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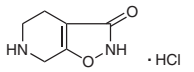

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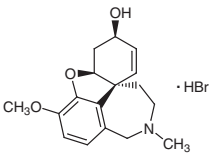

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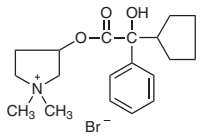

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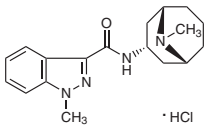

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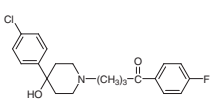

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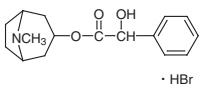

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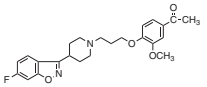

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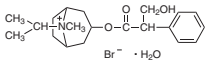

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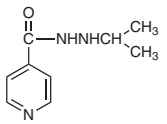

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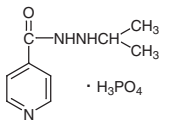

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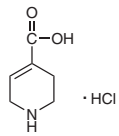

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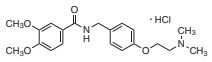

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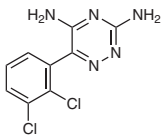

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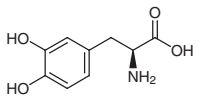

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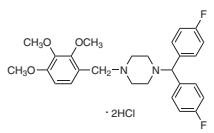

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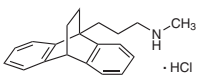

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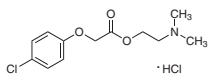

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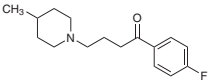

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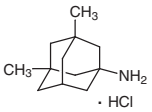

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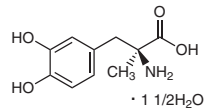

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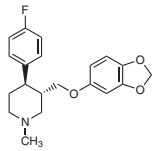

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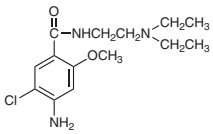

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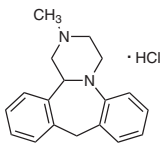

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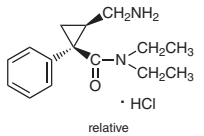

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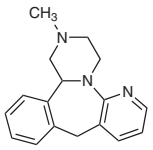

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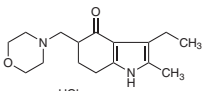

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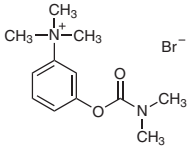

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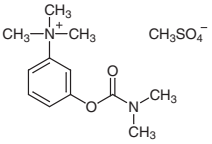

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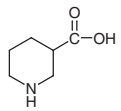

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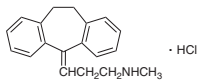

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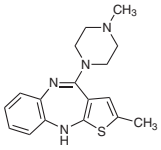

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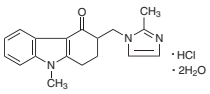

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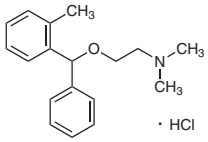

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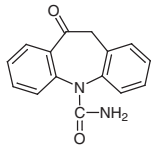

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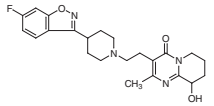

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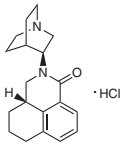

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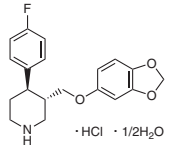

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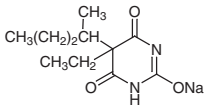

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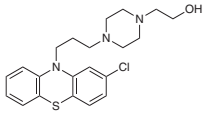

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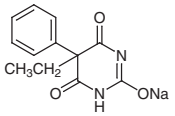
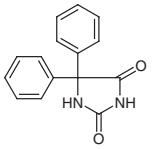


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

D0894



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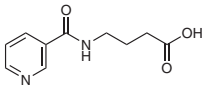

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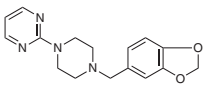

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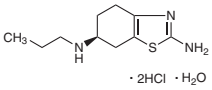

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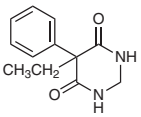

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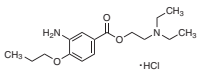

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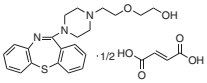

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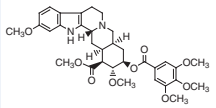

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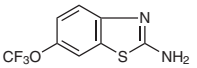

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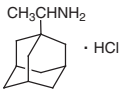

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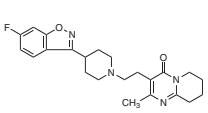

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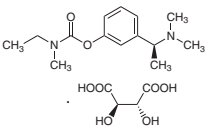

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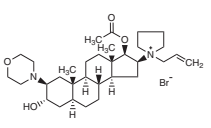

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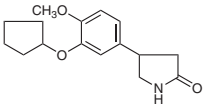

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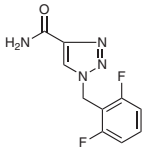

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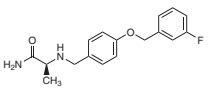

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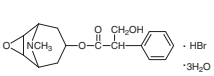

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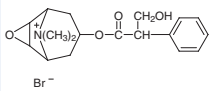

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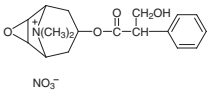

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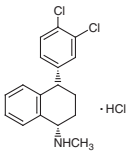

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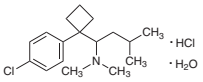

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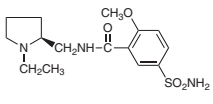

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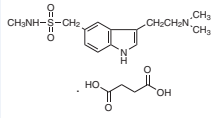

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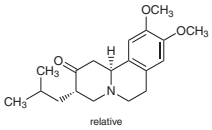

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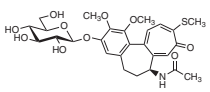

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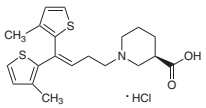

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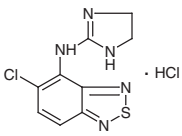

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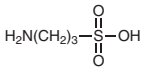

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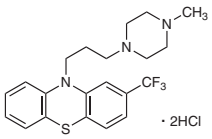

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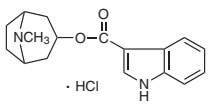

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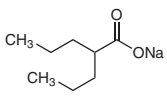

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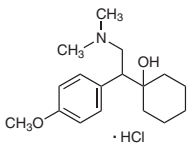

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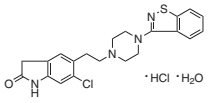

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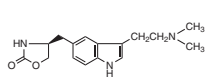

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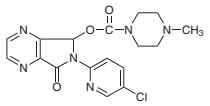
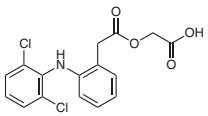
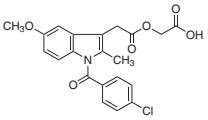
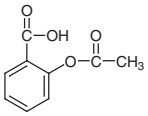
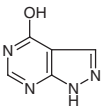
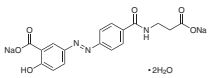
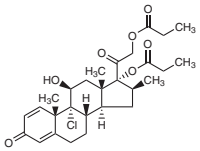
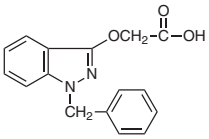
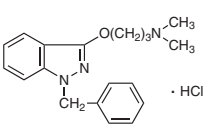
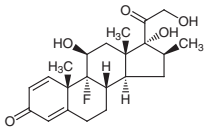
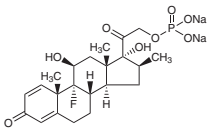
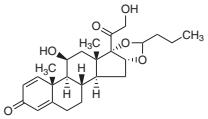
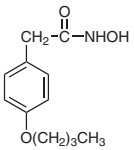
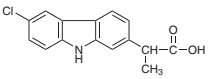
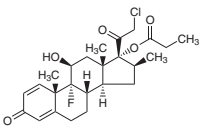
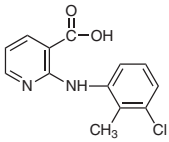
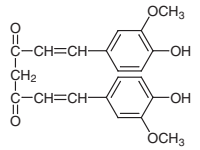
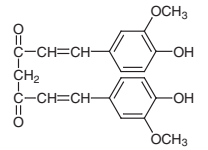
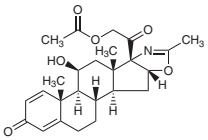
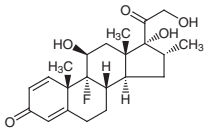
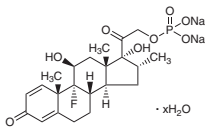
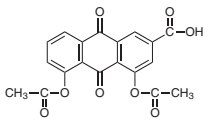
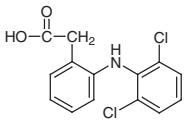
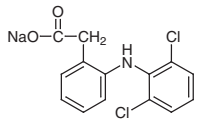
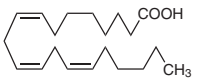
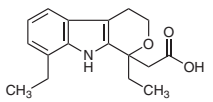
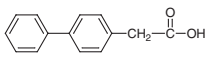
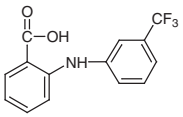
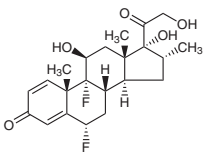
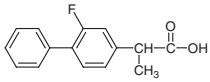
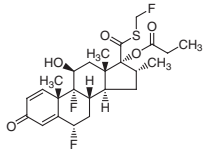
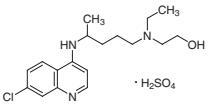
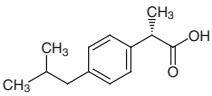
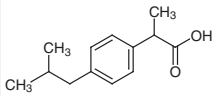
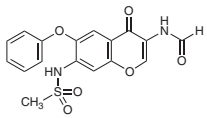
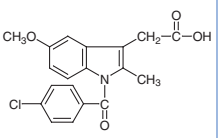
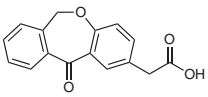
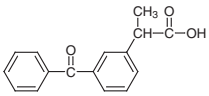
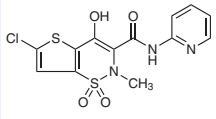
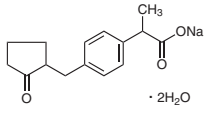
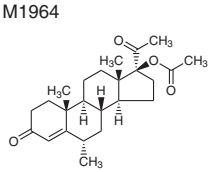


Anti-inflammatory Ingredients

Product No.	Product Name	Unit Size	
A2484	Aceclofenac	1g	5g
A2452	Acemetacin	5g	25g

Product No.	Product Name	Unit Size		
A2262	Acetylsalicylic Acid		25g	500g
A0907	Allopurinol		25g	250g
B4121	Balsalazide Disodium Salt Dihydrate		1g	5g
B4464	Beclometasone Dipropionate			1g
B4223	Bendazac		1g	5g
B3751	Benzydamine Hydrochloride		5g	25g
B1837	Betamethasone		1g	5g
B4110	Betamethasone 21-Phosphate Disodium Salt			1g
B3909	Budesonide		200mg	1g
B4179	Bufexamac			5g
C2701	Carprofen		1g	5g
C2612	Clobetasol 17-Propionate		1g	5g
C2619	Clonixin			25g
C2302	Curcumin (Synthetic)		5g	25g
C0434	Curcumin (Natural)		1g	25g
D4523	Deflazacort		1g	5g
D1961	Dexamethasone			1g
D4438	Dexamethasone 21-Phosphate Disodium Salt Hydrate		250mg	1g
D4061	Diacerein		1g	5g
D3748	Diclofenac			25g
D2508	Diclofenac Sodium Salt			25g
E0640	*all cis*-8,11,14-Eicosatrienoic Acid		10mg	50mg
E0858	Etodolac		5g	25g
B1278	Felbinac		25g	250g
T2354	Flufenamic Acid		25g	500g
F0945	Flumetasone		200mg	1g
F0371	Flurbiprofen		5g	25g
F0525	Fluticasone Propionate			100mg
H1306	Hydroxychloroquine Sulfate		5g	25g
I0549	(*S*)-(+)-Ibuprofen		1g	5g
I0415	Ibuprofen	25g	100g	500g
I0945	Iguratimod		25mg	250mg
I0655	Indomethacin	25g	100g	500g
D4242	Isoxepac		1g	5g
K0038	Ketoprofen		25g	250g
L0239	Lornoxicam		1g	5g
L0252	Loxoprofen Sodium Salt Dihydrate		5g	25g
M1964	Medroxyprogesterone Acetate		1g	5g
M1959	Meloxicam		5g	25g
A0317	Mesalazine		25g	500g
M1664	Methotrexate Hydrate		1g	5g
S0015	Methyl Salicylate		25g	500g
M2354	Mometasone Furoate		200mg	1g
M1021	Naproxen		25g	500g
N0932	Nepafenac		200mg	1g
N0984	Nimesulide		1g	5g
O0377	Oxaprozin		5g	25g
P1871	Pirfenidone		100mg	1g
P1905	Piroxicam		2g	10g
P2074	Pomalidomide		25mg	100mg
P0637	Prednisolone	1g	5g	25g
P1283	Prednisolone Acetate			5g
D3918	Prednisolone 21-Phosphate Disodium Salt			5g
P1276	Prednisone		5g	25g
S0906	Sulindac Sulfide			25mg
T3101	Talniflumate		200mg	1g
T2524	(±)-Thalidomide		1g	5g
C2064	Tolfenamic Acid			25g
T2899	Triptolide			10mg
Z0021	Zaltoprofen		1g	5g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2484 	A2452 	A2262 	A0907 	B4121 
B4464 	B4223 	B3751 	B1837 	B4110 
B3909 	B4179 	C2701 	C2612 	C2619 
C2302 	C0434 	D4523 	D1961 	D4438 
D4061 	D3748 	D2508 	E0640 	E0858 
B1278 	T2354 	F0945 	F0371 	F0525 
H1306 	I0549 	I0415 	I0945 	I0655 
D4242 	K0038 	L0239 	L0252 	M1964 

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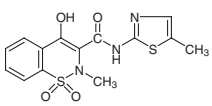

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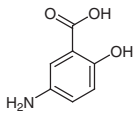

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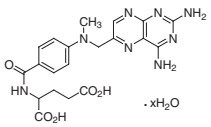

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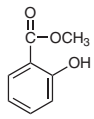

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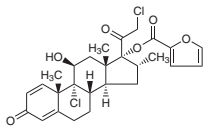

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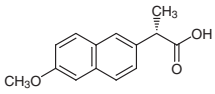

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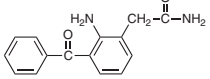

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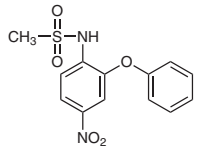

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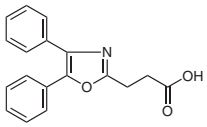

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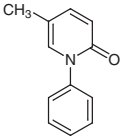

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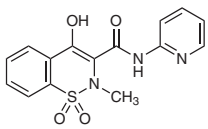

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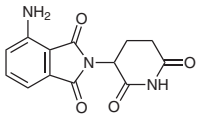

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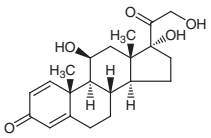

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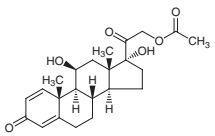

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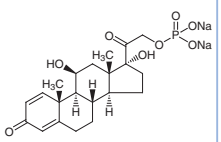

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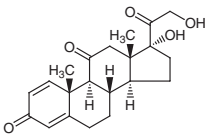

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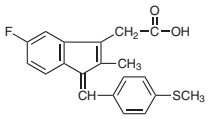

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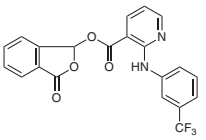

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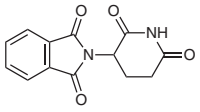

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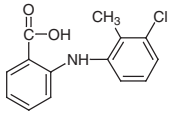

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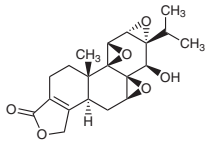

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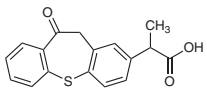


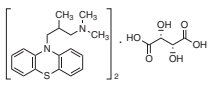
Anti-allergic Ingredients

Histamine Receptor Antagonists

Product No.	Product Name			Unit Size
A2813	Alimemazine Tartrate	100mg	1g	5g
A2132	Antazoline Hydrochloride			25g
A2340	Azelastine Hydrochloride		100mg	1g
C3057	Carbinoxamine Maleate		5g	25g
C2316	Cetirizine Dihydrochloride		5g	25g
C0873	Chlorpheniramine Maleate			25g
D3787	Desloratadine		100mg	1g
D0423	Diphenhydramine Hydrochloride		25g	500g
E0925	Ebastine		1g	5g
E0936	Emedastine Difumarate		200mg	1g
E0799	Epinastine Hydrochloride		100mg	1g
F0698	Fexofenadine Hydrochloride		1g	5g
K0048	Ketotifen Fumarate		1g	5g
L0264	Levocetirizine Dihydrochloride		1g	5g
L0223	Loratadine		100mg	1g
O0361	Olopatadine Hydrochloride			1g
P2029	Promethazine Hydrochloride		25g	100g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2813



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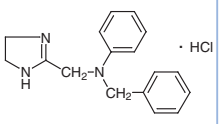

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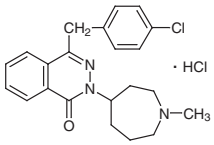

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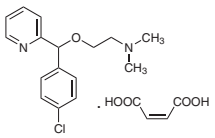

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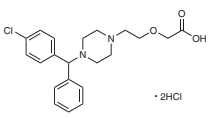

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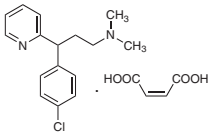

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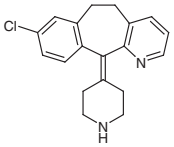

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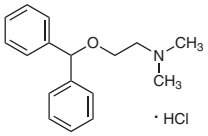

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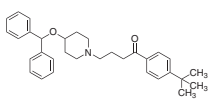

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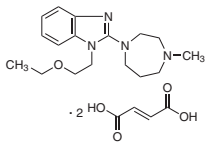

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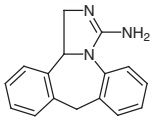

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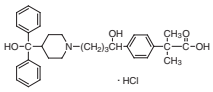

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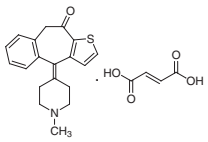

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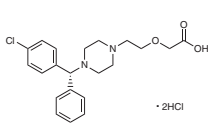

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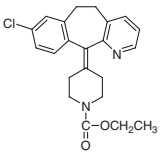

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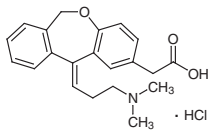

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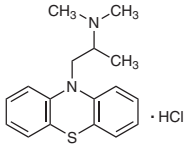
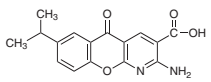


Chemical Mediator Release Inhibitors

Product No.	Product Name	Unit Size	
A2401	Amlexanox	1g	5g
C2521	Cromolyn Disodium Salt Hydrate	5g	25g
I0740	Ibudilast	20mg	100mg
P1995	Pemirolast Potassium Hydrate	1g	5g
T2935	Tranilast	1g	5g

A2401



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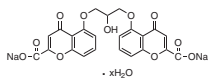

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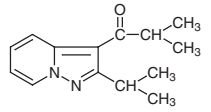

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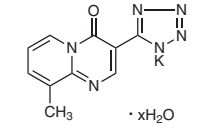

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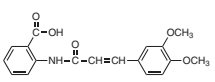
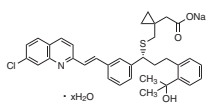


Leukotriene Receptor Antagonists

Product No.	Product Name	Unit Size	
M2340	Montelukast Sodium Hydrate	200mg	1g
P2115	Pranlukast	25mg	100mg
Z0029	Zafirlukast		100mg

M2340



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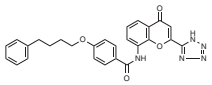

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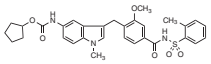
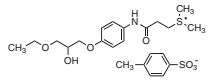


Th2 Cytokine Production Inhibitors

Product No.	Product Name	Unit Size	
S0875	Suplatast Tosylate	100mg	1g

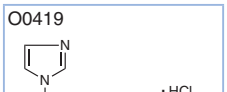
S0875



Thromboxane Synthase (TBXS) Inhibitors

Product No.	Product Name	Unit Size	
O0419	Ozagrel Hydrochloride Hydrate	1g	5g

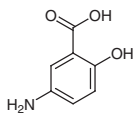
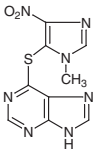
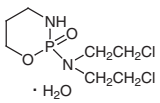
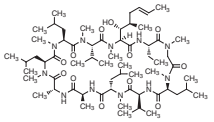
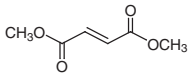
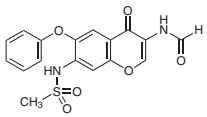
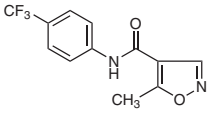
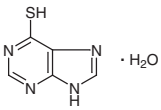
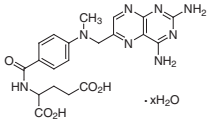
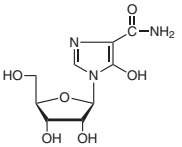
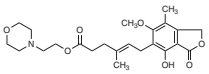
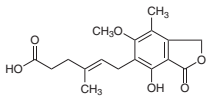
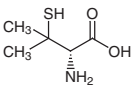
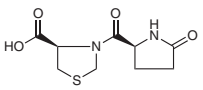
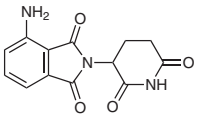
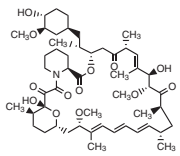
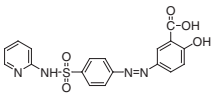
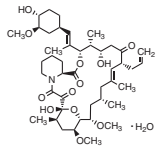
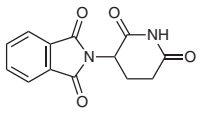
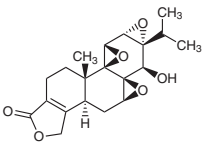
O0419



Immunosuppressant Ingredients

Product No.	Product Name	Unit Size	
A0317	Mesalazine	25g	500g
A2069	Azathioprine	5g	25g
C2236	Cyclophosphamide Monohydrate	5g	25g
C2408	Cyclosporin A	100mg	1g
F0069	Dimethyl Fumarate	25g	500g
I0945	Iguratimod	25mg	250mg
L0250	Leflunomide	200mg	1g
M0063	6-Mercaptopurine Monohydrate	1g	5g
M1664	Methotrexate Hydrate	1g	5g
M2399	Mizoribine	50mg	250mg
M2387	Mycophenolate Mofetil	100mg	1g
M2216	Mycophenolic Acid		1g
P0147	D-Penicillamine	5g	25g
P2147	Pidotimod	5g	25g
P2074	Pomalidomide	25mg	100mg
R0097	Rapamycin		25mg
S0580	Sulfasalazine		25g
M2258	Tacrolimus Monohydrate	10mg	50mg
T2524	(±)-Thalidomide	1g	5g
T2899	Triptolide		10mg

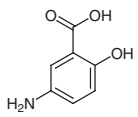
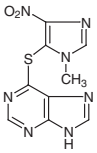
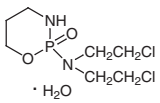
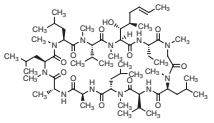
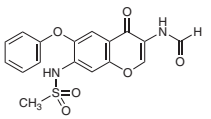
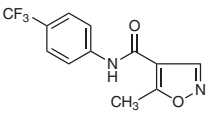
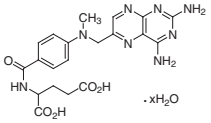
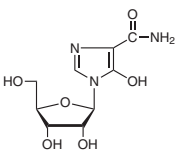
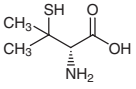
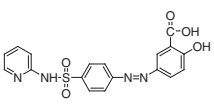
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A0317 	A2069 	C2236 	C2408 	F0069 
I0945 	L0250 	M0063 	M1664 	M2399 
M2387 	M2216 	P0147 	P2147 	P2074 
R0097 	S0580 	M2258 	T2524 	T2899 

Anti-rheumatoid Arthritis Ingredients

Disease Modifying Anti-rheumatics (DMARDs)

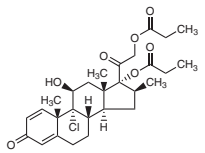
Product No.	Product Name	Unit Size	
A0317	Mesalazine	25g	500g
A2069	Azathioprine	5g	25g
C2236	Cyclophosphamide Monohydrate	5g	25g
C2408	Cyclosporin A	100mg	1g
I0945	Iguratimod	25mg	250mg
L0250	Leflunomide	200mg	1g
M1664	Methotrexate Hydrate	1g	5g
M2399	Mizoribine	50mg	250mg
P0147	D-Penicillamine	5g	25g
S0580	Sulfasalazine		25g

A0317 	A2069 	C2236 	C2408 	I0945 
L0250 	M1664 	M2399 	P0147 	S0580 

Corticosteroids

Product No.	Product Name	Unit Size		
B4464	Beclometasone Dipropionate			1g
B1837	Betamethasone		1g	5g
B4110	Betamethasone 21-Phosphate Disodium Salt			1g
C0389	Cortisone Acetate	1g	5g	25g
D1961	Dexamethasone			1g
D4438	Dexamethasone 21-Phosphate Disodium Salt Hydrate		250mg	1g
F0945	Flumetasone		200mg	1g
H0533	Hydrocortisone		1g	25g
M1665	6α-Methylprednisolone		1g	5g
P0637	Prednisolone	1g	5g	25g
T2303	Triamcinolone			1g
T2308	Triamcinolone Acetonide		1g	5g

B4464



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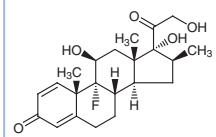

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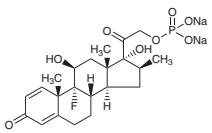

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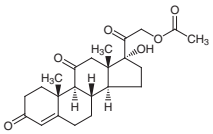

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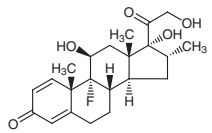

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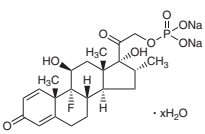

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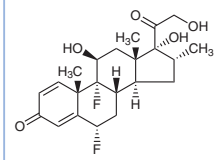

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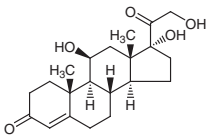

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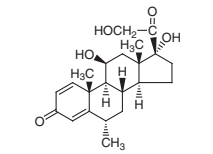

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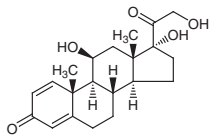

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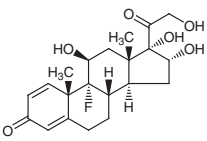
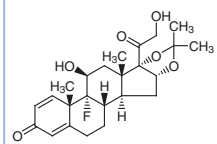


T2308

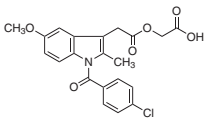


Non-steroidal Anti-inflammatory Agents (NSAIDs)

Product No.	Product Name	Unit Size		
A2452	Acemetacin		5g	25g
A2262	Acetylsalicylic Acid		25g	500g
D2508	Diclofenac Sodium Salt			25g
E0858	Etodolac		5g	25g
B1278	Felbinac		25g	250g
F0372	Fenoprofen Calcium Salt Dihydrate			25g
T2354	Flufenamic Acid		25g	500g
F0371	Flurbiprofen		5g	25g
I0415	Ibuprofen	25g	100g	500g
I0655	Indomethacin	25g	100g	500g
K0038	Ketoprofen		25g	250g
L0239	Lornoxicam		1g	5g
L0252	Loxoprofen Sodium Salt Dihydrate		5g	25g
M1782	Mefenamic Acid		25g	500g
M1959	Meloxicam		5g	25g
M1021	Naproxen		25g	500g
O0377	Oxaprozin		5g	25g
P1905	Piroxicam		2g	10g
S0906	Sulindac Sulfide			25mg
C2064	Tolfenamic Acid			25g
Z0021	Zaltoprofen		1g	5g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A2452



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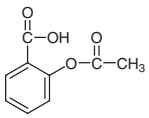

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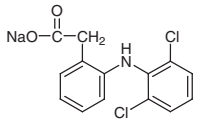

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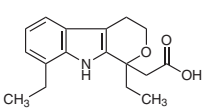

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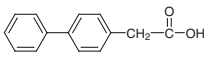

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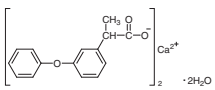

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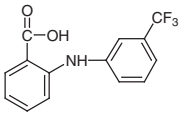

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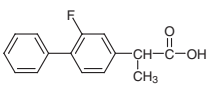

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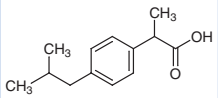

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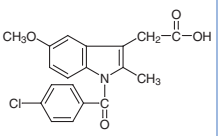

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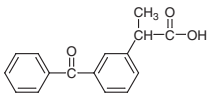

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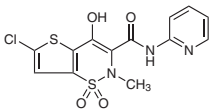

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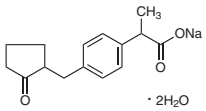

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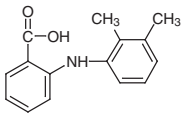

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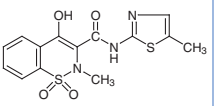

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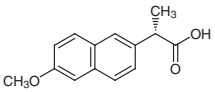

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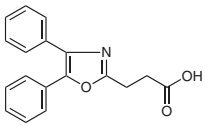

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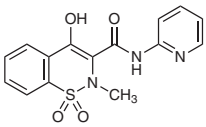

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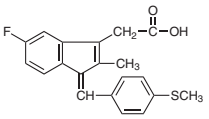

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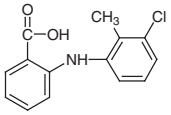

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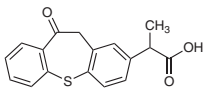
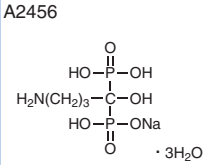


Anti-osteoporosis Ingredients

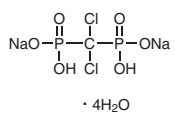
Bone Resorption Inhibitors

Product No.	Product Name	Unit Size	
A2456	Alendronic Acid Monosodium Salt Trihydrate	5g	25g
D4160	Clodronic Acid Disodium Salt Tetrahydrate	1g	5g
D4159	Etidronic Acid Disodium Salt Hydrate	5g	25g
S0877	Ibandronic Acid Sodium Salt	1g	5g
M2360	Minodronic Acid Monohydrate		25mg
D3921	Pamidronic Acid Disodium Salt Hydrate	100mg	1g
M2289	Risedronic Acid Monosodium Salt Hemipentahydrate	100mg	1g
D4167	Tiludronic Acid Disodium Salt		25mg
Z0031	Zoledronic Acid Monohydrate	1g	5g

A2456



D4160



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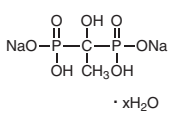
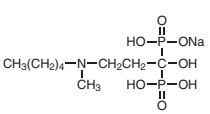


S0877



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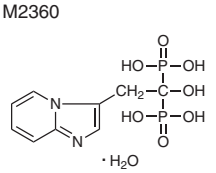

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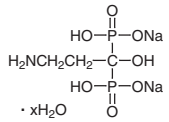

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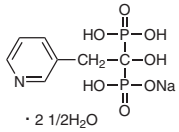

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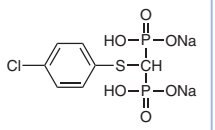

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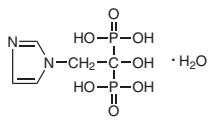
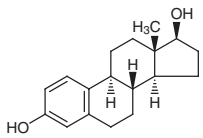


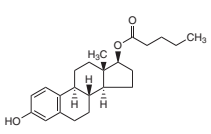
Estrogens

Product No.	Product Name	Unit Size		
E0025	β-Estradiol	1g	5g	25g
E0876	β-Estradiol 17-Valerate		1g	5g
E0218	Estriol		100mg	1g
E0026	Estrone		1g	5g
N0777	Nandrolone			100mg
T2330	Tibolone			1g

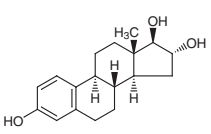
E0025



E0876



E0218



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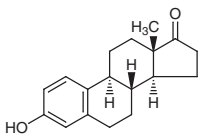
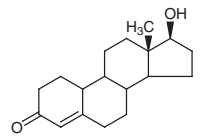


N0777



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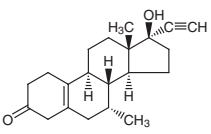
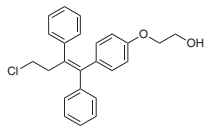


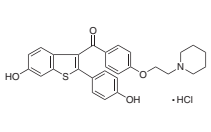
Selective Estrogen Receptor Modulators (SERM)

Product No.	Product Name	Unit Size	
O0441	Ospemifene	100mg	1g
R0109	Raloxifene Hydrochloride		1g
T2510	Tamoxifen Citrate	1g	5g

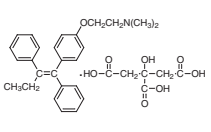
O0441



R0109



T2510

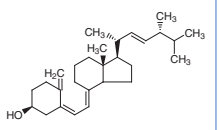


Vitamins

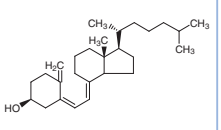
Product No.	Product Name	Unit Size		
C0005	Calciferol	1g	5g	25g
C0314	Cholecalciferol		1g	5g
E0018	Ergosterol		5g	25g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

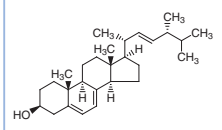
C0005



C0314



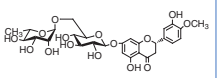
E0018



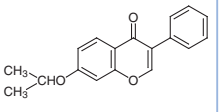
Flavonoids

Product No.	Product Name	Unit Size		
H0049	Hesperidin	25g	100g	500g
I0669	Ipriflavone		5g	25g

H0049



I0669



Other Pharmaceutical Ingredients

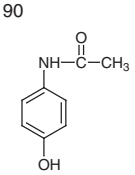
Product No.	Product Name	Unit Size	
H0190	Acetaminophen	25g	500g
A2598	Acetazolamide	25g	100g
A2549	Adapalene	200mg	1g
A2498	Adiphenine Hydrochloride	5g	25g
A0173	L-Adrenaline	1g	5g	25g
A2591	Alfuzosin Hydrochloride	100mg	1g
A2491	Aloe Emodin	100mg	1g
A2360	Ambroxol Hydrochloride	5g	25g
A2425	Amezinium Methyl Sulfate	1g	5g
C2691	4-Amino-*α*-(*tert*-butylaminomethyl)-3,5-dichlorobenzyl Alcohol Hydrochloride		100mg
A2805	Aminophylline	25g	100g
A2530	Amiodarone Hydrochloride	1g	5g
A2394	Aniracetam	1g	5g
D1876	Antipyrine	25g	500g
A2844	Apronal	5g	25g
A1414	Atenolol		10g
A2566	Atracurium Besylate (mixture of isomers)		200mg
B4564	Bambuterol Hydrochloride	1g	5g
B4711	Benfotiamine	5g	25g
B4099	Benzbromarone	1g	5g
A0271	Benzocaine	25g	500g
B0450	Berberine Chloride Hydrate	5g	25g
B4385	2,3-Bis(4-hydroxyphenyl)propionitrile	10mg	50mg
B4132	Brimonidine	200mg	1g
B4054	Bromhexine Hydrochloride		25g
B3647	Buflomedil Hydrochloride		5g
B3925	Bupivacaine Hydrochloride	5g	25g
B3649	Bupropion Hydrochloride	1g	5g
C2578	Carazolol	200mg	1g
C0050	DL-Carnitine Hydrochloride	25g	500g
C3058	L-Carnitine Hydrochloride	5g	25g
C2745	Cetilistat	1g	5g
D0563	Chrysazin		25g
C1252	Cimetidine		25g
C2767	Creatinol Phosphate	5g	25g
D3996	Dantrolene Sodium Salt Hydrate	1g	5g
D4163	Desogestrel		100mg
D4331	Detomidine Hydrochloride		200mg

Product No.	Product Name	Unit Size
D4227	Dexrazoxane	100mg
D2203	Dibutyl Squarate	5g 25g
D0542	Digitoxin	100mg
D1828	Digoxin	100mg 1g
D2633	Dihydroergotamine Mesylate	100mg 1g
D1247	Dihydroergotamine Tartrate	100mg 1g
D4179	Dimethocaine	1g 5g
D3600	Diprophylline	25g 500g
D2274	Dipyridamole	5g 25g
D4189	Dorzolamide Hydrochloride	200mg
D4302	Doxofylline	1g 25g
D4209	Drospirenone	200mg
E0946	Ebselen	25mg 100mg
M0687	Edaravone	25g 500g
E0947	Eflornithine Hydrochloride Monohydrate	200mg
E1026	Erdosteine	1g 5g
E0875	β-Estradiol 17-Cypionate	1g 5g
E0040	Ethisterone	1g 5g
E0381	Etilefrine Hydrochloride	25g
H0402	Etofylline	25g 500g
E0897	Etomidate	100mg 500mg
F0530	Famotidine	5g 25g
F0839	Fasudil Hydrochloride	100mg
F0847	Febuxostat	1g
F0675	Finasteride	200mg 1g
F0717	Flavoxate Hydrochloride	5g 25g
F0691	Fluoromethyl 1,1,1,3,3,3-Hexafluoroisopropyl Ether	5g
F0182	Furosemide	5g 25g
G0404	Gestodene	100mg 1g
G0436	Gestrinone	100mg
G0414	Guanfacine Hydrochloride	100mg 1g
H0008	Hemin	1g 25g
H0685	α-Hexylcinnamaldehyde	25mL 500mL
H1274	Hydrochlorothiazide	5g 25g
H0206	2-Hydroxybenzoic Acid	25g 500g
I0946	Ibutilide Hemifumarate	20mg 100mg
C2485	Isoflurane	5g 25g
I0260	Isoproterenol Hydrochloride	5g 25g
I0407	Isosorbide	25g 100g 500g
I0847	Ivabradine Hydrochloride	200mg 1g
N0966	KB-R 7943	10mg 50mg
L0233	Lansoprazole	1g 5g
L0262	Latanoprost	10mg 50mg
L0234	Levetiracetam	1g 5g
L0156	Lidocaine	25g 500g
L0096	Lobeline Hydrochloride	1g
L0246	Lynestrenol	1g
M2674	Malotilate	1g 5g
M1105	Melatonin	1g 5g
M2560	Mepivacaine Hydrochloride	1g 5g
M2578	Metaxalone	1g 5g
M2254	Methocarbamol	5g 25g
M2040	Mexiletine Hydrochloride	1g 5g
M2288	Minocycline Hydrochloride	1g 5g
M1389	Minoxidil	1g 5g
M2524	Molsidomine	1g 5g
N0832	Naftopidil	5g
N0542	Naphazoline Hydrochloride	10g
N0904	Nicergoline	100mg
N0837	Nicorandil	1g 5g
N0933	Nizatidine	5g 25g
O0359	Omeprazole	5g 25g
O0437	Omeprazole Sulfide	200mg 1g
O0381	Orlistat	100mg 1g
O0417	Ornidazole	5g 25g
O0398	Oxiracetam	1g 5g
P1876	Paeoniflorin	100mg
P2066	Pantoprazole Sulfide	1g 5g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name	Unit Size		
P2050	Pentoxifylline		5g	25g
P1864	Picloram		5g	25g
P1871	Pirfenidone		100mg	1g
P2038	Prilocaine Hydrochloride		1g	5g
P1975	Probenecid			25g
P1961	Procaine		5g	25g
D0617	Propofol		25g	500g
P1884	Prostaglandin E_2		1mg	10mg
H1430	Proxyphylline		5g	25g
P1654	Pseudoephedrine Hydrochloride			25g
R0115	Rabeprazole Sodium Salt		100mg	1g
R0103	Racecadotril			1g
R0109	Raloxifene Hydrochloride			1g
R0073	Ranitidine Hydrochloride		5g	25g
R0112	Ranolazine Dihydrochloride		1g	5g
R0085	Rebamipide	1g	5g	25g
R0114	Ritodrine Hydrochloride		250mg	1g
R0107	Rizatriptan Benzoate		50mg	250mg
R0120	Romifidine			50mg
S0531	Salbutamol Hemisulfate	1g	5g	25g
H0603	Sodium Hyaluronate from Cockscomb		100mg	1g
S0944	Solifenacin Succinate		25mg	100mg
S0260	Spironolactone		1g	5g
S0905	Stiripentol		1g	5g
S0875	Suplatast Tosylate		100mg	1g
T2749	Tamsulosin Hydrochloride		100mg	1g
T3108	Tazarotene		10mg	100mg
T2701	Teprenone [mixture of (5*E*,9*E*,13*E*)- and (5*Z*,9*E*,13*E*)- isomers]		1g	5g
T2789	Tetracaine		5g	25g
T1688	Tetracaine Hydrochloride		5g	25g
B0479	Tetraethylthiuram Disulfide		25g	500g
T0179	Theophylline	25g	100g	500g
T2941	Theophylline-7-acetic Acid			25g
M0868	Thiamazole			25g
T2614	Tiopronin		5g	25g
T2978	Tiropramide Hydrochloride		1g	5g
B3806	Tolazoline		5g	25g
T1319	Tolperisone Hydrochloride			25g
T2755	Topiramate		1g	5g
T2538	Torsemide		1g	5g
A0236	Tranexamic Acid		5g	25g
T2935	Tranilast		1g	5g
T1288	Triamterene			25g
T0941	Tricaine			25g
T1318	Trichloromethiazide			10g
T3049	Trimebutine		5g	25g
T2726	Trimetazidine Dihydrochloride		5g	25g
T2267	Trioxsalen		1g	5g
T1470	Tropicamide			10g
T2909	Troxipide		1g	5g
T2954	Tulobuterol Hydrochloride			100mg
V0063	Valethamate Bromide			1g
V0120	Vecuronium Bromide Hydrate			100mg
V0115	Vinpocetine		100mg	1g
X0009	Xanthotoxin		100mg	1g
X0059	Xylazine Hydrochloride		5g	25g
X0063	Xylometazoline Hydrochloride		1g	5g
Z0026	Zonisamide		200mg	1g

H0190



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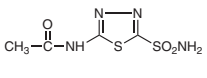

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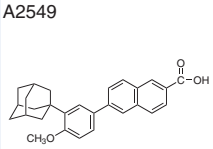

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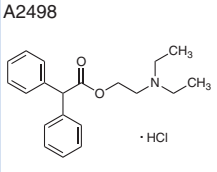

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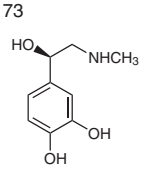

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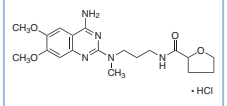

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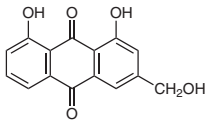

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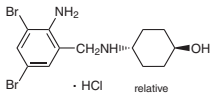

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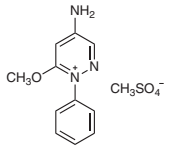

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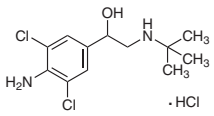

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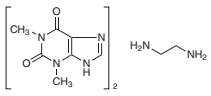

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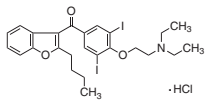

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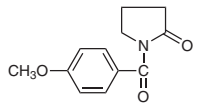

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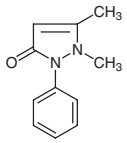

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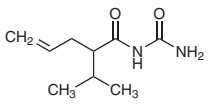

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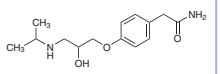

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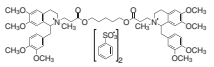

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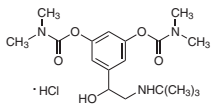

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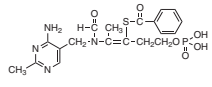

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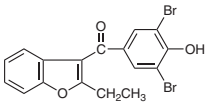

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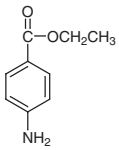

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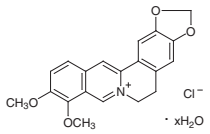

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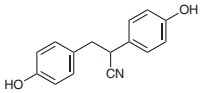

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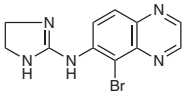

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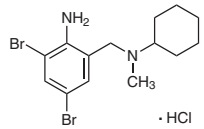

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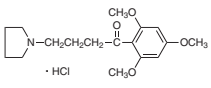

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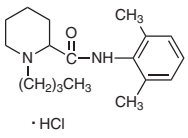

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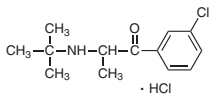

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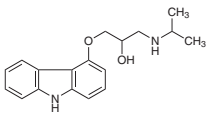

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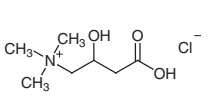

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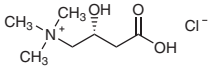

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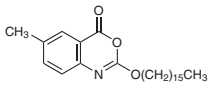

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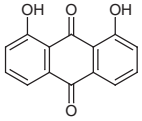

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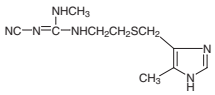

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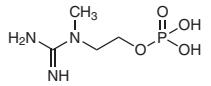

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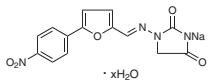

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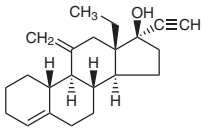

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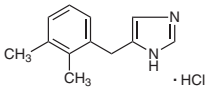

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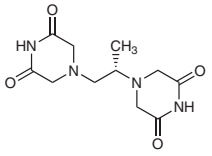

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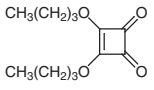

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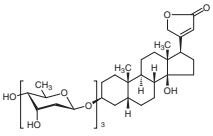

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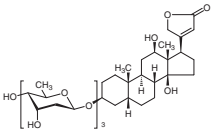

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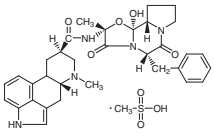

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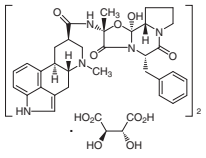

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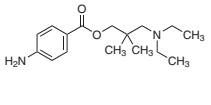
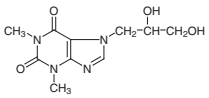
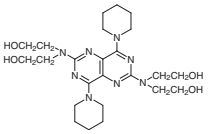
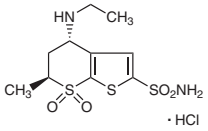
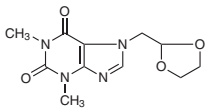
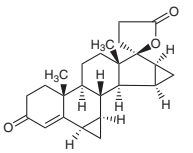
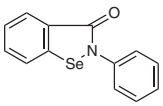
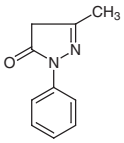
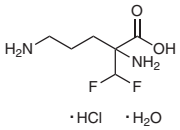
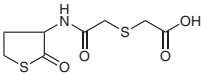
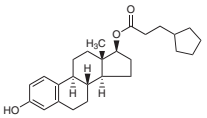
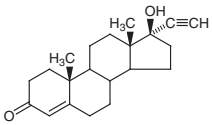
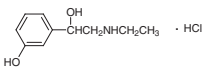
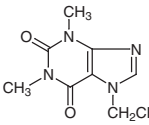
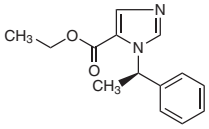
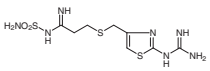
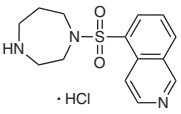
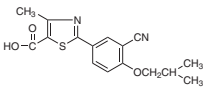
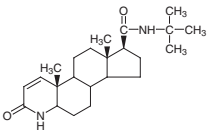
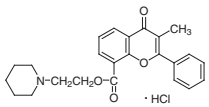
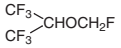
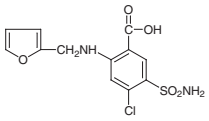
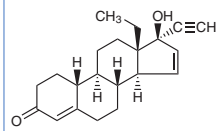
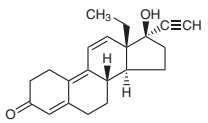
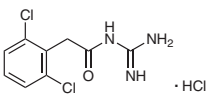
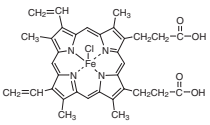
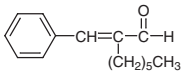
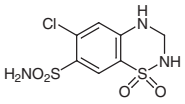
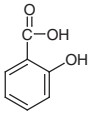
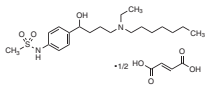
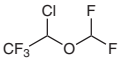
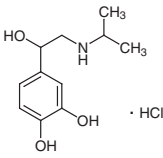
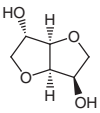
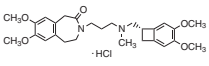
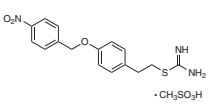
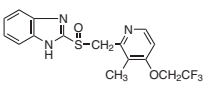
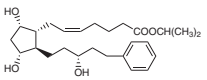
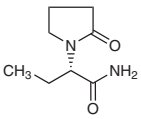
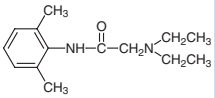
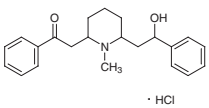
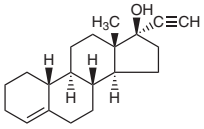


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

D3600 	D2274 	D4189 	D4302 	D4209 
E0946 	M0687 	E0947 	E1026 	E0875 
E0040 	E0381 	H0402 	E0897 	F0530 
F0839 	F0847 	F0675 	F0717 	F0691 
F0182 	G0404 	G0436 	G0414 	H0008 
H0685 	H1274 	H0206 	I0946 	C2485 
I0260 	I0407 	I0847 	N0966 	L0233 
L0262 	L0234 	L0156 	L0096 	L0246 

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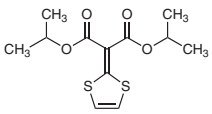

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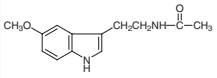

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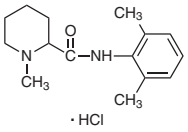

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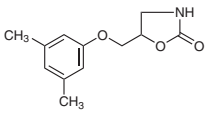

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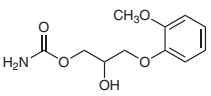

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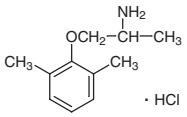

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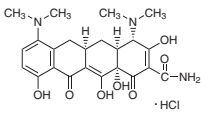

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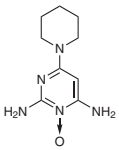

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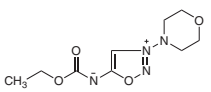

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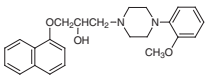

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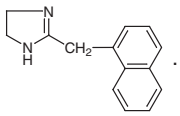

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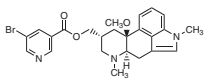

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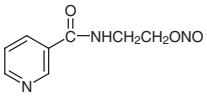

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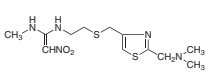

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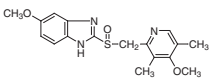

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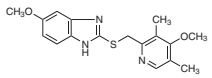

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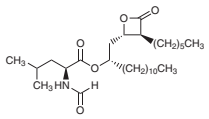

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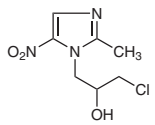

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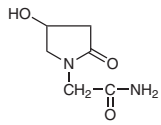

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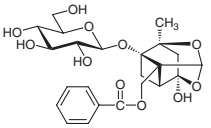

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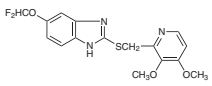

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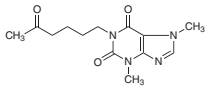

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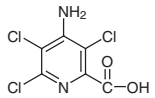

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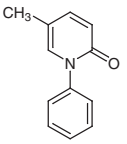

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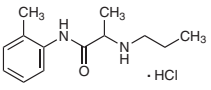

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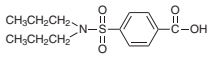

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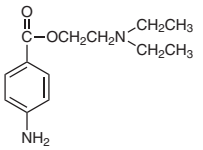

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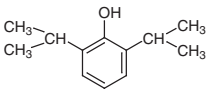

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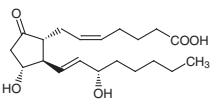

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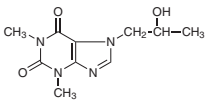

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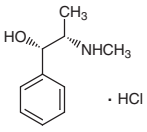

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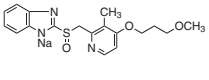

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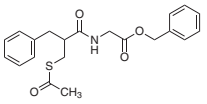

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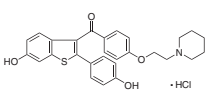

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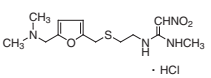

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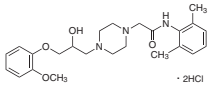

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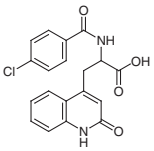

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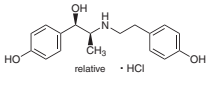

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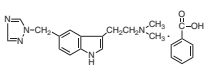

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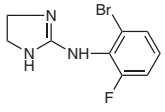

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

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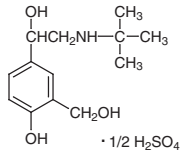

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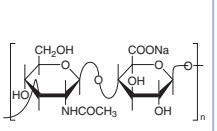

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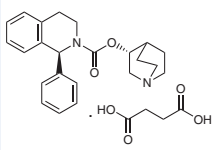

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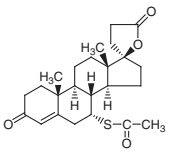

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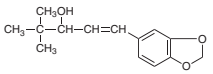

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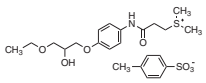

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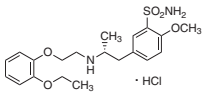

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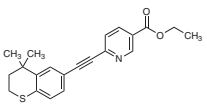

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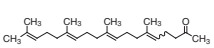

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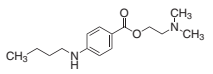

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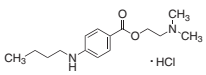

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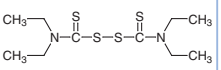

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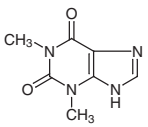

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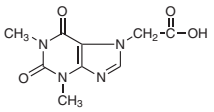

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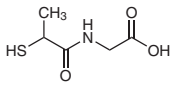

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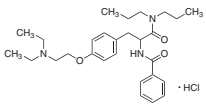

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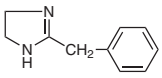

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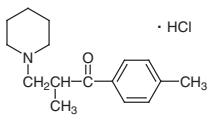

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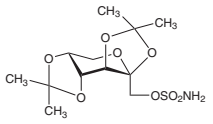

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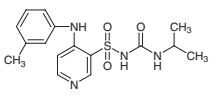

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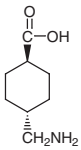

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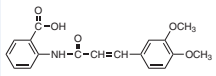

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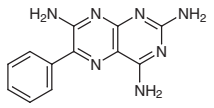

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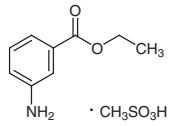

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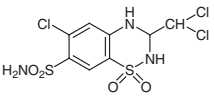

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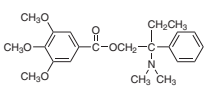

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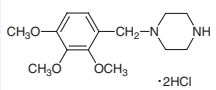

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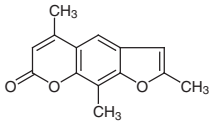

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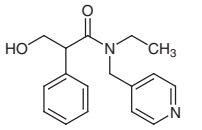

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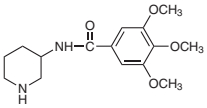

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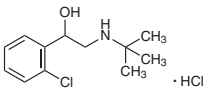

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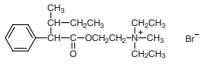

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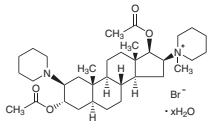

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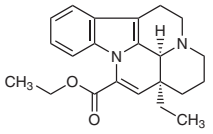

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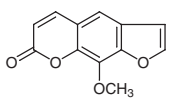

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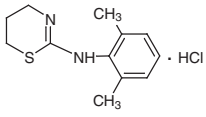

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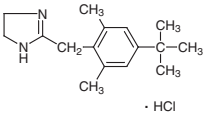

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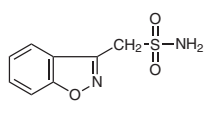


Drug Delivery System (DDS)

A Drug Delivery System (DDS) can help improve drug absorption, extend the effective lifetime of a drug in the body, and deliver the drug specifically to the affected area. A DDS can thus maximize the effect of drugs.

Examples include prodrugs developed for improving drug solubility, absorbability and retention. In addition, macromolecular carriers have been actively investigated to deliver or target drugs to the affected area.

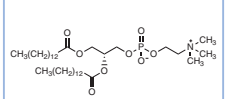
Prodrug Ingredients

Product No.	Product Name	Unit Size	
A2452	Acemetacin	5g	25g
A2069	Azathioprine	5g	25g
A2052	Azidothymidine	1g	5g
C2635	Candesartan Cilexetil	200mg	1g
C1580	Captopril	5g	25g
C2663	Carmofur	5g	25g
C2236	Cyclophosphamide Monohydrate	5g	25g
D2235	2'-Deoxy-5-fluorouridine	100mg 500mg	1g
D4235	Droxidopa	50mg	200mg
E1010	Enalapril Maleate	1g	5g
F0842	Famciclovir	500mg	5g
D0600	Levodopa	5g	25g
L0214	Lovastatin	5g	25g
L0252	Loxoprofen Sodium Salt Dihydrate	5g	25g
M2275	Mevastatin	1g	5g
M2524	Molsidomine	1g	5g
P1906	Primidone	5g	25g
R0087	Risperidone	50mg	500mg
S0509	Simvastatin	100mg	1g
S0580	Sulfasalazine		25g
F0635	Tegafur	5g	25g
V0111	Valacyclovir Hydrochloride Hydrate	100mg	1g

Phospholipids for preparing Liposomes

Product No.	Product Name	Unit Size	
D3924	1,2-Dimyristoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4249	1,2-Dimyristoyl-*sn*-glycero-3-phosphoethanolamine		250mg
D3946	1,2-Dimyristoyl-*sn*-glycero-3-phospho-*rac*-(1-glycerol) Sodium Salt		1g
D4250	1,2-Dioleoyl-*sn*-glycero-3-phosphocholine		250mg
D3925	1,2-Dipalmitoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4213	1,2-Dipalmitoyl-*sn*-glycero-3-phosphoethanolamine		250mg
D3926	1,2-Distearoyl-*sn*-glycero-3-phosphocholine	200mg	1g
D4214	1,2-Distearoyl-*sn*-glycero-3-phosphoethanolamine		250mg

D3924



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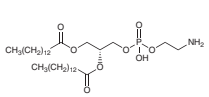
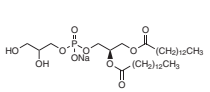
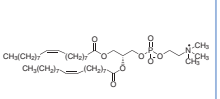


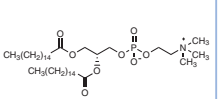
D3946



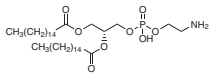
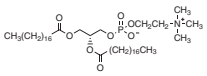
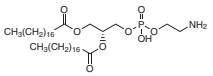
D4250



D3925



The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

D4213	D3926	D4214
		

Natural Polymers

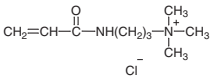
Product No.	Product Name		Unit Size
A0198	Albumin from Dried Egg White, crude		25g
A0197	Albumin from Human, crystal	100mg	1g
A0194	Albumin from Human, fraction V		1g
A0196	Albumin from Milk	25g	500g
A0733	Alginic Acid	25g	500g
C0045	Carboxymethyl Cellulose Sodium n≈500	25g	500g
C0603	Carboxymethyl Cellulose Sodium n≈1050	25g	500g
C1805	ι-Carrageenan	25g	500g
C1804	κ-Carrageenan	25g	500g
C2871	λ-Carrageenan	1g	5g
C0594	Casein Sodium from Milk	25g	500g
C0072	Chitin	25g	250g
C2395	Chitosan (5-20mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)	25g	500g
C2396	Chitosan (50-100mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)	25g	100g
C0831	Chitosan (200-600mPa·s, 0.5% in 0.5% Acetic Acid at 20℃)	25g	500g
C0335	Chondroitin Sulfate Sodium Salt	25g	100g
D3672	Dermatan Sulfate Sodium Salt	20mg	100mg
D1448	Dextran 40 (*Mw.=ca.* 40,000)	25g	500g
D1449	Dextran 70 (*Mw.=ca.* 70,000)	25g 100g	500g
E0265	Ethyl Cellulose [9-11mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]	25g	500g
E0072	Ethyl Cellulose [18-22mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]	25g	500g
E0266	Ethyl Cellulose [45-55mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]	25g	500g
E0290	Ethyl Cellulose [90-110mPa·s, 5% in Toluene + Ethanol (80:20) at 25℃]	25g	500g
H0393	Heparin Sodium Salt from Hog intestine	100mg	1g
H0242	Hydroxyethyl Cellulose (200-300mPa·s, 2% in Water at 20℃)	25g	500g
H0418	Hydroxyethyl Cellulose (800-1,500mPa·s, 2% in Water at 20℃)	25g	500g
H0392	Hydroxyethyl Cellulose (4,500-6,500mPa·s, 2% in Water at 25℃)	25g	500g
H0473	Hydroxypropyl Cellulose (3-6mPa·s, 2% in Water at 20℃)	25g	500g
H0474	Hydroxypropyl Cellulose (6-10mPa·s, 2% in Water at 20℃)	25g	500g
H0386	Hydroxypropyl Cellulose (150-400mPa·s, 2% in Water at 20℃)	25g	500g
H0475	Hydroxypropyl Cellulose (1,000-4,000mPa·s, 2% in Water at 20℃)	25g	500g
L0088	Laminaran from Eisenia Bicyclis	1g	25g
M0290	Methyl Cellulose (13-18mPa·s, 2% in Water at 20℃)	25g	500g
M0291	Methyl Cellulose (20-30mPa·s, 2% in Water at 20℃)	25g	500g
M0292	Methyl Cellulose (80-120mPa·s, 2% in Water at 20℃)	25g	500g
M0293	Methyl Cellulose (350-550mPa·s, 2% in Water at 20℃)	25g	500g
M0294	Methyl Cellulose (1,000-1,800mPa·s, 2% in Water at 20℃)	25g	500g
M0185	Methyl Cellulose (3,500-5,600mPa·s, 2% in Water at 20℃)	25g	500g
M0295	Methyl Cellulose (7,000-10,000mPa·s, 2% in Water at 20℃)	25g	500g
P0024	Pectin from Citrus	25g	500g
P0978	Pullulan		25g
H0603	Sodium Hyaluronate from Cockscomb	100mg	1g

Monomers for Synthetic Polymers

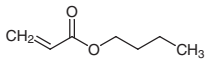
Product No.	Product Name	Unit Size	
A1493	(3-Acrylamidopropyl)trimethylammonium Chloride (74-76% in Water) (stabilized with MEHQ)	25mL	500mL
A0142	Butyl Acrylate (stabilized with MEHQ)	25mL	500mL
M0081	Butyl Methacrylate (stabilized with HQ)	25mL	500mL
B0767	γ-Butyrolactone	25mL	500mL
C0702	ε-Caprolactone	25mL	500mL
D2623	Diethylene Glycol Monovinyl Ether (stabilized with KOH)	25mL	500mL

Product No.	Product Name			Unit Size
D1091	*N*,*N*-Dimethylacrylamide (stabilized with MEHQ)		25g	500g
A1235	2-(Dimethylamino)ethyl Acrylate (stabilized with MEHQ)		25g	500g
M0082	2-(Dimethylamino)ethyl Methacrylate (stabilized with MEHQ)	25mL	100mL	500mL
D1785	*N*-[3-(Dimethylamino)propyl]acrylamide (stabilized with MEHQ)		25g	500g
D1919	*N*-(3-Dimethylaminopropyl)methacrylamide (stabilized with MEHQ)	25g	100g	500g
D3821	1,3-Dioxan-2-one		5g	25g
E0652	2-(2-Ethoxyethoxy)ethyl Acrylate (stabilized with MEHQ)		25g	500g
E0518	Ethylene Glycol Monovinyl Ether (stabilized with KOH)		25mL	500mL
H1262	*N*-(2-Hydroxyethyl)acrylamide (stabilized with MEHQ)		25g	500g
M0085	2-Hydroxyethyl Methacrylate (stabilized with MEHQ)		25g	500g
I0401	*N*-Isopropylacrylamide (stabilized with MEHQ)	25g	100g	500g
L0091	DL-Lactide		25g	100g
L0115	L-(-)-Lactide		25g	250g
M0918	Methacroylcholine Chloride (*ca.* 80% in Water) (stabilized with MEHQ)		25g	500g
M2359	3-[[2-(Methacryloyloxy)ethyl]dimethylammonio]propionate			1g
M2005	2-(Methacryloyloxy)ethyl 2-(Trimethylammonio)ethyl Phosphate		1g	5g
D0587	DL-Mevalonolactone			100mg
P0525	Propylene Carbonate		25g	500g
M1158	3-Sulfopropyl Methacrylate Potassium Salt		25g	500g
V0039	δ-Valerolactone	25g	100g	500g
A0045	Vinyl Acetate Monomer (stabilized with HQ)			500mL
V0026	1-Vinyl-2-pyrrolidone (stabilized with *N*,*N*'-Di-*sec*-butyl-*p*-phenylenediamine)		25mL	500mL

A1493



A0142



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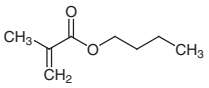


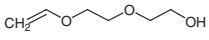
B0767



C0702



D2623



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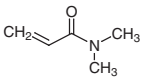

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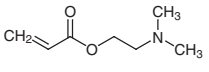

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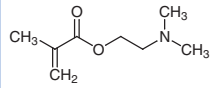

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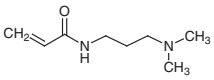

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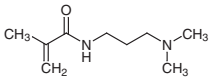
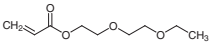


D3821



E0652



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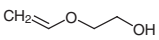

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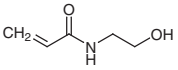

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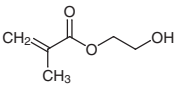

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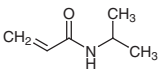

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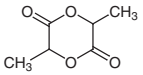

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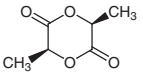

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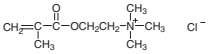

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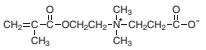

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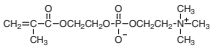

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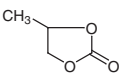
P0525



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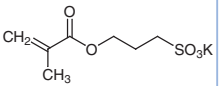
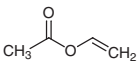


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

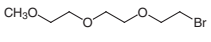
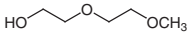
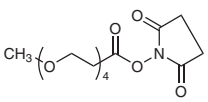
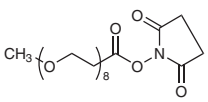
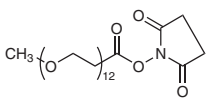
V0039	A0045	V0026
		

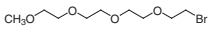
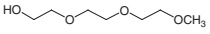
Polyethyleneglycols (PEG)

Product No.	Product Name	Unit Size	
P0840	Polyethylene Glycol 200	25g	500g
H0543	Polyethylene Glycol 300	25g	500g
N0443	Polyethylene Glycol 400	25g	500g
P1187	Polyethylene Glycol 600	25g	500g
P2034	Polyethylene Glycol 2,000	25g	500g
P0885	Polyethylene Glycol 4,000	25g	500g
P0903	Polyethylene Glycol 6,000	25g	500g
P2183	Polyethylene Glycol Monomethyl Ether 400	100g	500g
P2184	Polyethylene Glycol Monomethyl Ether 550	100g	500g
P2185	Polyethylene Glycol Monomethyl Ether 1000	100g	500g
P2186	Polyethylene Glycol Monomethyl Ether 2000	100g	500g
P2187	Polyethylene Glycol Monomethyl Ether 4000	100g	500g

PEGylation Reagents

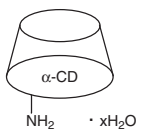
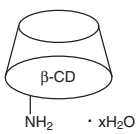
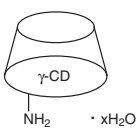
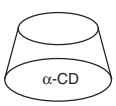
Product No.	Product Name		Unit Size
D2903	Decaethylene Glycol Monomethyl Ether		100mg
D3831	Diethylene Glycol 2-Bromoethyl Methyl Ether	5g	25g
M0537	Diethylene Glycol Monomethyl Ether (stabilized with BHT)	25mL	500mL
D2904	Dodecaethylene Glycol Monomethyl Ether	100mg	1g
H1046	Heptaethylene Glycol Monomethyl Ether	1g	5g
H0808	Hexaethylene Glycol Monomethyl Ether	1g	5g 25g
M2186	Methyl-PEG_4-NHS Ester		25mg
M2187	Methyl-PEG_8-NHS Ester		25mg
M2188	Methyl-PEG_{12}-NHS Ester		25mg
N0699	Nonaethylene Glycol Monomethyl Ether	500mg	1g
O0296	Octaethylene Glycol Monomethyl Ether	1g	5g
P1159	Pentaethylene Glycol Monomethyl Ether	1g	5g
T1372	Tetraethylene Glycol Monomethyl Ether	5g	25g
T2634	Triethylene Glycol 2-Bromoethyl Methyl Ether	5g	25g
T0709	Triethylene Glycol Monomethyl Ether	25mL	500mL

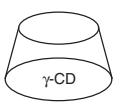
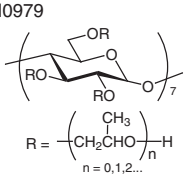
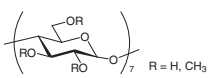
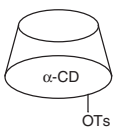
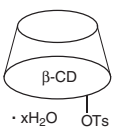
D2903	D3831	M0537	D2904	H1046
$HO(CH_2CH_2O)_{10}CH_3$			$HO(CH_2CH_2O)_{12}CH_3$	$HO(CH_2CH_2O)_7CH_3$
H0808	**M2186**	**M2187**	**M2188**	**N0699**
$H(OCH_2CH_2)_6OCH_3$				$H(OCH_2CH_2)_9OCH_3$

O0296	P1159	T1372	T2634	T0709
$HO(CH_2CH_2O)_8CH_3$	$H(OCH_2CH_2)_5OCH_3$	$H(OCH_2CH_2)_4OCH_3$		

Cyclodextrins

Product No.	Product Name	Unit Size		
A2122	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-*α*-cyclodextrin Hydrate		200mg	1g
A1916	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-*β*-cyclodextrin Hydrate		200mg	1g
A2123	3A-Amino-3A-deoxy-(2A*S*,3A*S*)-γ-cyclodextrin Hydrate			1g
C0776	*α*-Cyclodextrin	10g	25g	100g
C0777	*β*-Cyclodextrin			25g
C0869	γ-Cyclodextrin	5g	25g	100g
H0979	Hydroxypropyl-*β*-cyclodextrin		25g	100g
M1356	Methyl-*β*-cyclodextrin (mixture of several Methylated)		25g	250g
M1956	Mono-2-*O*-(*p*-toluenesulfonyl)-*α*-cyclodextrin			1g
M1741	Mono-2-*O*-(*p*-toluenesulfonyl)-*β*-cyclodextrin Hydrate			1g
M1957	Mono-2-*O*-(*p*-toluenesulfonyl)-γ-cyclodextrin			1g
M1644	Mono-6-*O*-(*p*-toluenesulfonyl)-*α*-cyclodextrin		200mg	1g
M1381	Mono-6-*O*-(*p*-toluenesulfonyl)-*β*-cyclodextrin			200mg
M1645	Mono-6-*O*-(*p*-toluenesulfonyl)-γ-cyclodextrin			200mg
T1094	Trimethyl-*β*-cyclodextrin			1g

A2122	A1916	A2123	C0776	C0777
				
(2A*S*, 3A*S*)-α-CD	(2A*S*, 3A*S*)-β-CD	(2A*S*, 3A*S*)-γ-CD		

C0869	H0979	M1356	M1956	M1741
				

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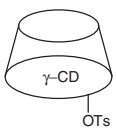	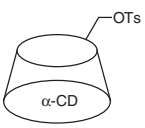	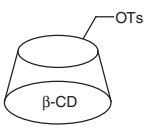	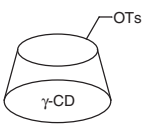	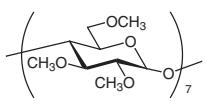

Reference

V. V. Ranade, J. B. Cannon, in *Drug Delivery Systems*, 3rd ed., CRC Press, **2011**.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Preparing Animal Disease Model

Animal models of human diseases are used to investigate the pharmacology or effect/efficacy of active ingredients during the course of research and development (R&D) of health products such as pharmaceuticals and health foods.

Disease-model animals are important for R&D and are selected because they mirror a specific human disease.

The chemical compound-inducing method is useful for preparing disease-model animals (including mouse, rat and dog). This section contains the reagents required for preparing various disease-model animals such as cancer models, central nervous system related disease models, inflammation/immune disease models, and adult disease models for your R&D.

Reagents for Carcinogenic Models

Product No.	Product Name	Unit Size		
A0076	2-AAF		5g	25g
B0085	3,4-Benzopyrene (purified by sublimation)		100mg	1g
D0677	7,12-Dimethylbenz[*a*]anthracene		1g	5g
D0741	1,2-Dimethylhydrazine Dihydrochloride			25g
E0025	*β*-Estradiol	1g	5g	25g
N0250	4-Nitroquinoline *N*-Oxide		1g	5g
N0466	*N*-Nitrosomorpholine		5g	25g
T0149	Pristane			5mL

Reagents for Central Nervous System Disease Models

Product No.	Product Name	Unit Size	
A0781	Arachidonic Acid	100mg	500mg
B1890	(+)-Bicuculline	25mg	100mg
D3371	Cisplatin	100mg	1g
C2236	Cyclophosphamide Monohydrate	5g	25g
D4193	Doxorubicin Hydrochloride	25mg	100mg
F0151	5-Fluorouracil	5g	25g
D3685	Paraquat	1g	5g
P0046	1,5-Pentamethylenetetrazole	10g	25g
R0007	Reserpine	1g	5g
R0090	Rotenone	5g	25g
S0021	Scopolamine Hydrobromide Trihydrate	1g	10g
S0249	Strychnine		25g

Reagents for Inflammation & Immunity Disorder Models

Product No.	Product Name	Unit Size		
H0190	Acetaminophen		25g	500g
A2035	Acetic Acid			300mL
A2262	Acetylsalicylic Acid		25g	500g
A0149	Adenine		25g	250g
A0150	Adenine Hydrochloride Hemihydrate			25g
A0151	Adenine Sulfate Dihydrate			25g
A0648	2-Aminoethanethiol		25g	500g
A0296	2-Aminoethanethiol Hydrochloride	25g	100g	500g
A2530	Amiodarone Hydrochloride		1g	5g
A0781	Arachidonic Acid		100mg	500mg
B3972	Bleomycin Sulfate (mixture)		10mg	50mg
M1149	Capsaicin (Natural)			1g
M0900	Capsaicin (Synthetic)			10g
C0596	Carbamylcholine Chloride		10g	25g
C0162	1-Chloro-2,4-dinitrobenzene		25g	500g
D3371	Cisplatin		100mg	1g

Product No.	Product Name	Unit Size
C1949	Citric Acid	500g
C0370	β-Citronellol	25mL 500mL
C0421	Croton Oil	25mL
C2236	Cyclophosphamide Monohydrate	5g 25g
D0558	DDC	1g 5g 25g
D0835	2,4-Dinitrofluorobenzene	25g 500g
D4193	Doxorubicin Hydrochloride	25mg 100mg
F0151	5-Fluorouracil	5g 25g
G0007	D-(+)-Galactosamine Hydrochloride	1g 5g
H0146	Histamine Dihydrochloride	1g 5g 25g
H0147	Histamine Diphosphate Hydrate	1g 5g
H1202	Hydrochloric Acid (1mol/L)	500mL
H1203	Hydrochloric Acid (2mol/L)	500mL
I0655	Indomethacin	25g 100g 500g
L0250	Leflunomide	200mg 1g
C0598	Methyl 4-Chloro-2-methylphenoxyacetate	25g
I0190	1-Naphthyl Isothiocyanate	5g 25g
T1340	Picrylsulfonic Acid Hydrate	5g
T0149	Pristane	5mL
P2077	Psoralen	20mg 100mg
S0370	Serotonin Hydrochloride	5g 25g
S0542	Sodium Hydroxide (1mol/L in Water)	500mL
S0543	Sodium Hydroxide (2mol/L in Water)	500mL
T0187	Thioacetamide	25g 100g 500g
C0307	TNCB (wetted with *ca.* 15% Water, containing 5g on a dry weight basis)	5g
T0264	Tolylene Diisocyanate (2,4- ≈80%, 2,6- ≈20%)	25g 500g

Reagents for Life-style related Disease Models

Product No.	Product Name	Unit Size
A0626	Adenosine 5'-Diphosphate Disodium Salt Hydrate	100mg 1g
A0781	Arachidonic Acid	100mg 500mg
D0047	Deoxycorticosterone Acetate	1g
D1828	Digoxin	100mg 1g
D4193	Doxorubicin Hydrochloride	25mg 100mg
N0661	H-Arg(NO_2)-OMe・HCl	5g 25g
H0160	DL-Homocystine	25g
I0260	Isoproterenol Hydrochloride	5g 25g
I0261	Isoproterenol Sulfate Dihydrate	25g
N0078	Nicotinamide	25g 500g
S0091	Ouabain Octahydrate	1g 5g
O0164	Potassium Oxonate	5g 25g
P0995	Propranolol Hydrochloride	25g 250g
R0041	Rose Bengal	25g

Reagents for Pain & Itch Models

Product No.	Product Name	Unit Size
A2035	Acetic Acid	300mL
A0157	Adenosine 5'-Triphosphate Disodium Salt Hydrate	1g 25g
M1149	Capsaicin (Natural)	1g
M0900	Capsaicin (Synthetic)	10g
C2301	Chloroquine Diphosphate	25g 500g
D0835	2,4-Dinitrofluorobenzene	25g 500g
E0037	Ethynylestradiol	1g 5g
H0146	Histamine Dihydrochloride	1g 5g 25g
H0147	Histamine Diphosphate Hydrate	1g 5g
O0372	Oxaliplatin	100mg
P1632	Paclitaxel	100mg
P1884	Prostaglandin E_2	1mg 10mg
P1885	Prostaglandin $F_{2\alpha}$	1mg 10mg
R0007	Reserpine	1g 5g
S0370	Serotonin Hydrochloride	5g 25g

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Reagents for Other Disease Models

Product No.	Product Name	Unit Size		
A2035	Acetic Acid			300mL
A0157	Adenosine 5'-Triphosphate Disodium Salt Hydrate		1g	25g
C0596	Carbamylcholine Chloride		10g	25g
C2236	Cyclophosphamide Monohydrate		5g	25g
C0315	Deoxycholic Acid		25g	100g
C0316	Deoxycholic Acid Sodium Salt			25g
G0366	Glyoxylic Acid (*ca.* 50% in Water, *ca.* 9mol/L)		25mL	500mL
M1360	*N*-Methyl-D-aspartic Acid			100mg
P0183	Phenylhydrazine	25g	100g	500g
T1340	Picrylsulfonic Acid Hydrate			5g

Epigenetics

It has been demonstrated that cells retain information and regulate the expression of all gene sequences at various stages of growth and differentiation. The results of research into DNA methylation and histone modification have shed light on the mechanisms underlying epigenetics and hold promise for application to cancer and/or regenerative treatments.

DNA Methylation Inhibitors

Product No.	Product Name	Unit Size		
A2033	5-Azacytidine		100mg	1g
A2232	5-Aza-2'-deoxycytidine		20mg	100mg
C0002	Caffeic Acid		5g	25g
C0181	Chlorogenic Acid Hydrate		1g	5g
E0694	(-)-Epigallocatechin Gallate Hydrate			100mg
G0272	Genistein		100mg	1g
H0409	Hydralazine Hydrochloride			25g
A1163	Procaine Hydrochloride			25g
P2023	RG 108		50mg	200mg
Z0022	Zebularine		200mg	1g

Histone Deacetylase (HDAC) Inhibitors

Product No.	Product Name	Unit Size		
A2501	Acetyldinaline		10mg	50mg
D4188	M 344		20mg	100mg
H1340	NCC-149			5mg
S0519	Sodium Butyrate		25g	100g
S0892	Splitomicin		200mg	1g
T2477	Trichostatin A			10mg
P0823	Valproic Acid	25mL	100mL	500mL
S0894	Valproic Acid Sodium Salt		25g	100g
H1388	Vorinostat			200mg

Histone Deacetylase (HDAC) Activators

Product No.	Product Name	Unit Size		
B3803	Butein		100mg	1g
P1928	Piceatannol		100mg	1g
P0042	Quercetin Hydrate			25g
R0071	Resveratrol	1g	5g	25g

Histone Demethylase Inhibitors

Product No.	Product Name	Unit Size	
B4211	BIX 01294 Trihydrochloride Hydrate		25mg
D4015	Daminozide	5g	25g
D4078	NCDM-32b		5mg
P0553	2,4-Pyridinedicarboxylic Acid Hydrate	5g	25g

Methylated Nucleosides

Product No.	Product Name	Unit Size		
D4220	2'-Deoxy-5-(hydroxymethyl)cytidine		50mg	200mg
D3610	2'-Deoxy-5-methylcytidine	100mg	500mg	5g
M1931	5-Methylcytidine			1g

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References

1) A. D. Goldberg, C. D. Allis, E. Bernstein, *Cell* **2007**, *128*, 635.
2) S. Virani, J. A. Colacino, J. H. Kim, L. S. Rozek, *ILAR J*. **2012**, *53*, 359.
3) R. B Meagher, *Epigenetics Chromatin* **2014**, *7*, 37.

Regenerative Medicine Research

Advances in cell engineering now allow alteration of the genetic and physiological functions of cells by artificial modification. Regenerative medicine is an application of cell engineering technologies and is a topic of extensive research utilizing embryonic stem cells (ES cells) and induced pluripotent stem cells (iPS cells), which can differentiate into various types of cells.

The components of the culture medium, molecules that induce cell differentiation, and compounds that promote cell self-renewal or reprogramming are included in this section.

Product No.	Product Name	Unit Size		
A2528	Acadesine			50mg
A0537	L-Ascorbic Acid		25g	500g
A2521	L-Ascorbic Acid 2-Phosphate Sesquimagnesium Salt Hydrate		5g	25g
A2033	5-Azacytidine		100mg	1g
A2232	5-Aza-2'-deoxycytidine		20mg	100mg
A2052	Azidothymidine		1g	5g
B2836	Betulinic Acid		100mg	1g
B4006	BIO		5mg	25mg
B4211	BIX 01294 Trihydrochloride Hydrate			25mg
C0380	Colchicine (contains 5% Ethyl Acetate at maximum)		500mg	5g
C2826	Cyclic Pifithrin-α Hydrobromide		20mg	100mg
D4257	DAPT			25mg
D1961	Dexamethasone			1g
D4228	Dibutyl cAMP Sodium Salt			25mg
D0798	DMSO		25g	500g
D4102	Docetaxel			100mg
D4193	Doxorubicin Hydrochloride		25mg	100mg
E0694	(-)-Epigallocatechin Gallate Hydrate			100mg
E0959	5-(4-Ethylbenzylidene)rhodanine (This product is unavailable in the U.S.)			25mg
F0839	Fasudil Hydrochloride			100mg
F0750	Fluoxetine Hydrochloride		1g	5g
F0855	Forskolin		10mg	50mg
G0334	Geldanamycin			10mg
G0384	(+)-Griseofulvin		5g	25g
H0533	Hydrocortisone		1g	25g
I0868	Indirubin			25mg
I0655	Indomethacin	25g	100g	500g
I0260	Isoproterenol Hydrochloride		5g	25g
J0009	Jervine			10mg
L0050	Linolenic Acid			25mL
M2410	LY 294002			25mg
M2460	Meclofenoxate Hydrochloride		1g	5g
M2009	Metformin Hydrochloride		25g	100g
M2373	Myoseverin			10mg
P1632	Paclitaxel			100mg
A2529	PD 98059			10mg
P2088	Phenethyl Caffeate		25mg	250mg
P0773	L-*O*-Phosphoserine		5g	25g
P2048	Pifithrin-μ		10mg	100mg
P0478	Progesterone		5g	25g
P0481	L-Proline		25g	250g
D0081	Putrescine Dihydrochloride		25g	500g
P0582	Pyruvic Acid Sodium Salt		25g	500g
R0064	Retinoic Acid		1g	5g
B1468	Spermine Tetrahydrochloride		5g	25g
D3580	Stavudine		1g	5g
A5014	TMPyP [=α,β,γ,δ-Tetrakis(1-methylpyridinium-4-yl)porphyrin *p*-Toluenesulfonate]		100mg	1g
T2477	Trichostatin A			10mg
T0453	3,3',5-Triiodo-L-thyronine			100mg
P0823	Valproic Acid	25mL	100mL	500mL

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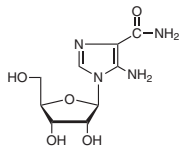
A2528



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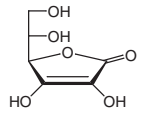

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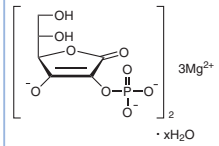

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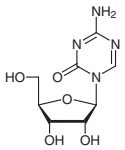

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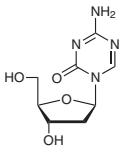

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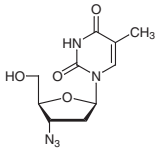

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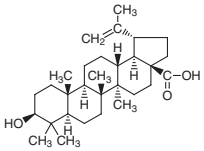

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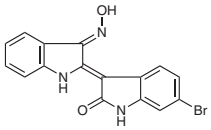

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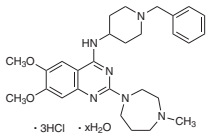

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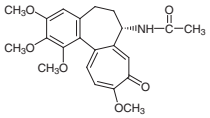

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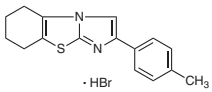

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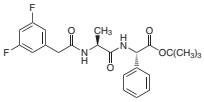

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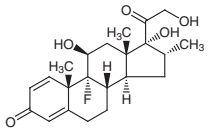

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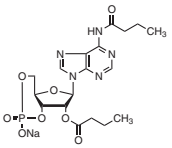

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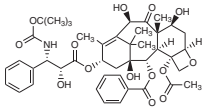

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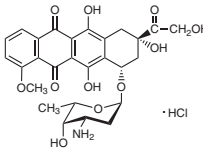

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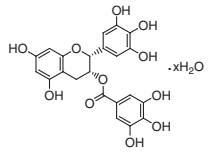

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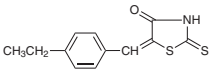

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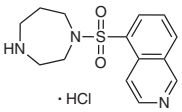

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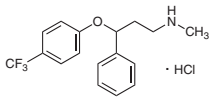

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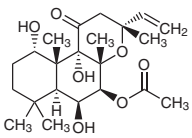

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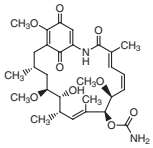

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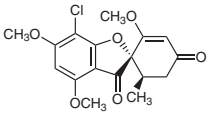

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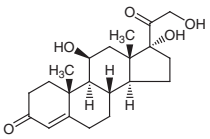

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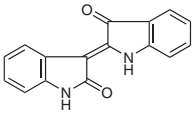

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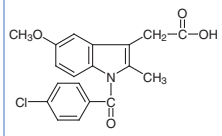

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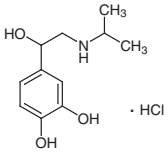

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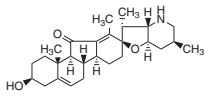

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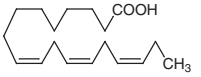

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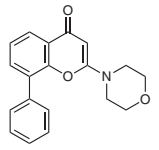

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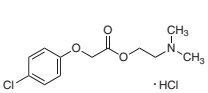

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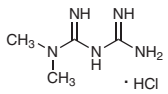

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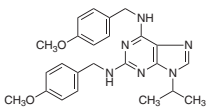

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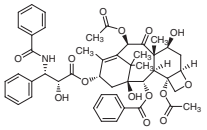

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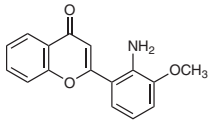

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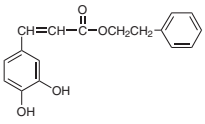

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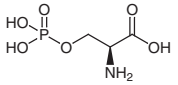

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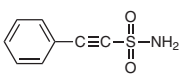

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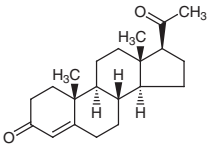
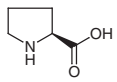
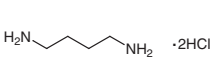
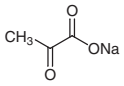
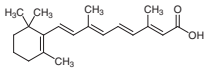
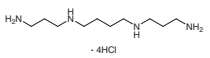
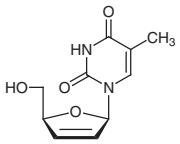
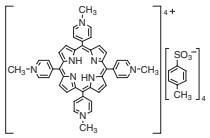
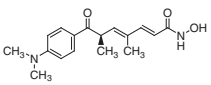
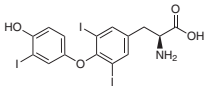
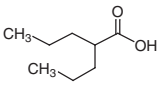


P0481 	D0081 	P0582 	R0064 	B1468 
D3580 	A5014 	T2477 	T0453 	P0823 

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Reactive Oxygen Species (ROS), Reactive Nitrogen Species (RNS), Oxidative/Nitrosative Stress Research

Reactive oxygen species (ROS) are more active than oxygen (O_2) in air and include superoxide radical ($O_2^{\bullet -}$), hydroxyl radical ($HO^{\bullet}$), hydrogen peroxide (H_2O_2), and singlet oxygen ($^1O_2$). Reactive nitrogen species (RNS) are active nitrogen oxide molecules such as nitric oxide (NO) and peroxynitrite ($ONOO^-$).

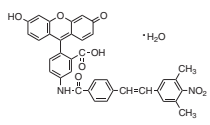
ROS, RNS and their derived free radicals are believed to be the cause of DNA and protein damage *in vivo*, inducing aging and diseases. Moreover, it is well known that NO is produced *in vivo* from arginine by nitric oxide synthase (NOS) and plays important roles in vascular relaxation, biological defense, neurotransmission modulation, and the immune system. It was recently demonstrated that NO also mediates the oxidation and nitrosation of proteins.

ROS/RNS Generators

Nitric Oxide (NO) Donors

Product No.	Product Name	Unit Size	
D3959	Flu-DNB Monohydrate		5mg
M2524	Molsidomine	1g	5g
D0516	*N*-Nitrosodiethylamine	5mL	25mL
D0899	*N*-Nitrosodiphenylamine	25g	500g
R0086	Ruthenium(II) Nitrosyl Chloride Monohydrate		1g

D3959



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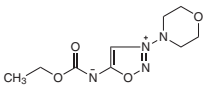

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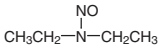

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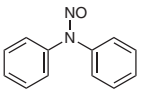

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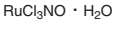
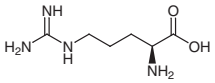


Nitric Oxide Synthase (NOS) Substrates

Product No.	Product Name			Unit Size
A0526	L-(+)-Arginine	25g	100g	500g
A0528	L-(+)-Arginine Hydrochloride		25g	500g

A0526



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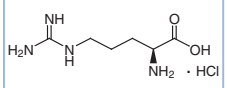
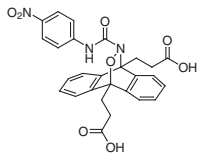


Nitroxyl (HNO) Donors

Product No.	Product Name	Unit Size
D3929	9,10-Dihydro-9,10-bis(2-carboxyethyl)-*N*-(4-nitrophenyl)-10,9-(epoxyimino)anthracene-12-carboxamide	100mg

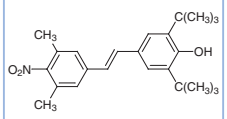
D3929



Peroxynitrite (ONOO) Donors

Product No.	Product Name	Unit Size
D3958	3,5-Di-*tert*-butyl-4-hydroxy-3',5'-dimethyl-4'-nitro-*trans*-stilbene	10mg

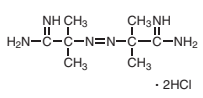
D3958



Free Radical Generators

Product No.	Product Name	Unit Size
A2735	AAPH	25g

A2735

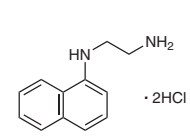


ROS/RNS Detection Reagents

Griess Method

Product No.	Product Name	Unit Size
N0869	*N*-(1-Naphthyl)ethylenediamine Dihydrochloride	5g
S0833	Sulfanilamide	5g

N0869



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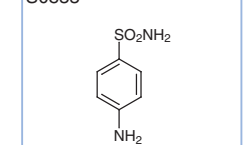
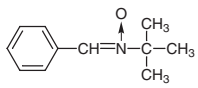


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

ESR Method

Product No.	Product Name	Unit Size	
B1701	*N*-*tert*-Butyl-*α*-phenylnitrone	1g	5g
C1406	3-Carboxy-PROXYL Free Radical		1g
D3068	DEPMPO		50mg
D2362	DMPO	1g	5g
A5440	PTIO (=2-Phenyl-4,4,5,5-tetramethylimidazoline-3-oxide-1-oxyl)	1g	5g

B1701



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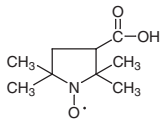

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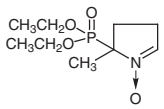

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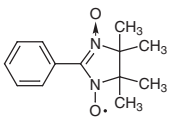
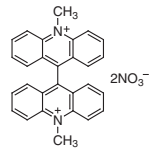


Chemiluminescent Method

Product No.	Product Name	Unit Size	
B1203	Lucigenin	1g	5g
A5301	Luminol	1g	25g
A5309	MCLA		10mg

B1203



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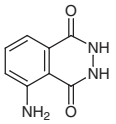

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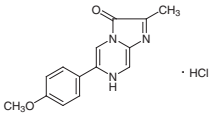
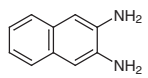


Chromogenic Method

Product No.	Product Name	Unit Size	
D1045	2,3-Diaminonaphthalene	1g	5g
D4313	DPPH Free Radical	1g	5g
D2404	DPPP	100mg	1g
N0052	1-Naphthylamine	25g	100g
D0844	Nitro Blue Tetrazolium	100mg	1g
R0012	Resorufin	1g	5g
S0120	Sulfanilic Acid	25g	500g
S0832	Sulfanilic Acid Sodium Salt Hydrate		5g

D1045



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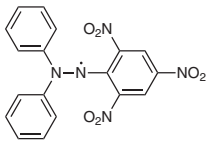

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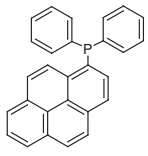

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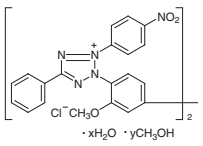

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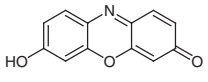

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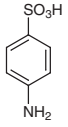

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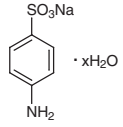
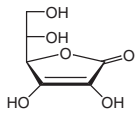


Other Related Reagents

Product No.	Product Name	Unit Size	
A0537	L-Ascorbic Acid	25g	500g
H0311	Hypoxanthine		25g
H0726	Trolox	1g	5g
X0004	Xanthine		25g

A0537



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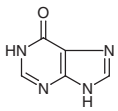

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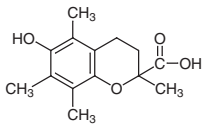

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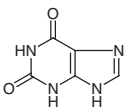

ROS/RNS-related Enzyme Inhibitors

Nitric Oxide Synthase (NOS) Inhibitors

Product No.	Product Name	Unit Size	
A0309	Aminoguanidine Sulfate Hydrate	25g	500g
P0644	Ammonium 1-Pyrrolidinecarbodithioate	25g	250g
C0018	L-Canavanine Sulfate Hydrate		100mg
D1321	2,4-Diamino-6-hydroxypyrimidine		25g
E0182	*S*-Ethylisothiourea Hydrobromide		25g
H0912	Haloperidol	5g	25g
M1105	Melatonin	1g	5g
M0442	*S*-Methylisothiourea Sulfate	25g	500g
M1365	$N^{(\omega)}$-Monomethyl-L-arginine Acetate		100mg
N0660	$N^{(\omega)}$-Nitro-L-arginine	5g	25g
N0661	$N^{(\omega)}$-Nitro-L-arginine Methyl Ester Hydrochloride	5g	25g
N0399	6-Nitroindazole	25g	250g
N0827	7-Nitroindazole	1g	5g
T2982	TRIM		1g

Xanthine Oxidase (XO) Inhibitors

Product No.	Product Name	Unit Size	
A2699	AHPP		100mg
A0907	Allopurinol	25g	250g
B4099	Benzbromarone	1g	5g
F0847	Febuxostat		1g
P0409	Phytic Acid (*ca.* 50% in Water, *ca.* 1.1mol/L)	25g	500g

NADPH Oxidase (NOX) Inhibitors

Product No.	Product Name	Unit Size		
H0261	Apocynin	25g	100g	500g
E0946	Ebselen		25mg	100mg

Catalase Inhibitors

Product No.	Product Name	Unit Size	
A0432	3-Amino-1,2,4-triazole	25g	500g

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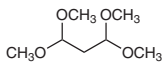
Lipid Peroxide Detection Reagents

Product No.	Product Name	Unit Size
T2833	Malonaldehyde Bis(dimethyl Acetal)	5g
T2834	2-Thiobarbituric Acid	5g

T2833



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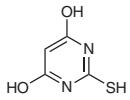
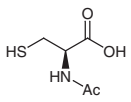


Antioxidants

Product No.	Product Name	Unit Size		
A0905	*N*-Acetyl-L-cysteine		25g	250g
A0648	2-Aminoethanethiol		25g	500g
A0296	2-Aminoethanethiol Hydrochloride	25g	100g	500g
A0537	L-Ascorbic Acid		25g	500g
B4223	Bendazac		1g	5g
D0228	BHT		25g	500g
B0460	Bilirubin		100mg	1g
B3803	Butein		100mg	1g
B3773	4-Butylresorcinol			1g
C0002	Caffeic Acid		5g	25g
C2488	Carnosic Acid		20mg	100mg
C0560	*β*-Carotene		1g	5g
C0181	Chlorogenic Acid Hydrate		1g	5g
C1971	Coenzyme Q_{10}		100mg	1g
C0393	*trans-p*-Coumaric Acid	25g	100g	500g
C2302	Curcumin (Synthetic)		5g	25g
C0434	Curcumin (Natural)		1g	25g
C0515	L-Cysteine	25g	100g	500g
C0517	L-Cysteine Hydrochloride Monohydrate		25g	500g
D3908	Diosmin		5g	25g
D1320	Dithioerythritol		5g	25g
E0946	Ebselen		25mg	100mg
E0375	Ellagic Acid Dihydrate		5g	25g
E0890	(-)-Epicatechin Gallate		20mg	100mg
E0694	(-)-Epigallocatechin Gallate Hydrate			100mg
E0237	Ethoxyquin		25g	500g
A0232	Eugenol		25mL	500mL
H0267	*trans*-Ferulic Acid		25g	250g
G0011	Gallic Acid Hydrate		25g	500g
G0371	Gnetol			100mg
G0074	GSH reduced form		1g	10g
M0121	Guaiacol		25g	500g
H0049	Hesperidin	25g	100g	500g
I0848	Idebenone			1g
I0496	3-Indolemethanol		5g	25g
I0822	Isoliquiritigenin		100mg	1g
I0804	Isorhapontigenin			100mg
K0018	Kaempferol Hydrate		100mg	1g
L0276	Lacidipine		200mg	1g
L0124	Linoleic Acid		5g	25g
L0058	DL-*α*-Lipoic Acid		5g	25g
L0207	(*R*)-*α*-Lipoic Acid	5g	25g	100g
T2682	Luteolin		1g	5g
M1105	Melatonin		1g	5g
M0058	2-Mercaptoethanol		25g	500g
H0216	Methyl 4-Hydroxybenzoate		25g	500g

Product No.	Product Name	Unit Size		
D0800	Nordihydroguaiaretic Acid		1g	5g
O0180	Oleic Acid		5mL	25mL
O0172	γ-Oryzanol		25g	250g
O0373	Oxyresveratrol		100mg	1g
P2088	Phenethyl Caffeate		25mg	250mg
P1966	Phloretin		1g	5g
P1928	Piceatannol		100mg	1g
P1878	Piceid		1g	5g
P2002	Probucol		5g	25g
G0018	Propyl Gallate		25g	500g
P1924	Pterostilbene		100mg	1g
T2650	Pyrogallol-5-carboxaldehyde		1g	5g
R0071	Resveratrol	1g	5g	25g
R0089	Rhapontigenin			100mg
S0442	L-Selenomethionine		1g	5g
S0418	Sesamol		25g	250g
S0508	Silybin (mixture of Silybin A and Silybin B)			25g
A0539	Sodium L-Ascorbate		25g	500g
S0271	Sodium Copper Chlorophyllin			25g
T0251	DL-α-Tocopherol		25g	250g
T2309	D-α-Tocopherol			25g
T0252	DL-α-Tocopherol Acetate	25g	100g	500g
T2322	D-α-Tocopherol Acetate			25g
H0726	Trolox		1g	5g

A0905



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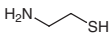

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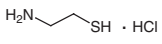

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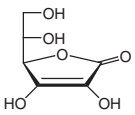

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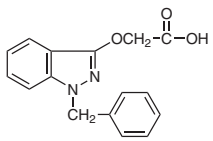

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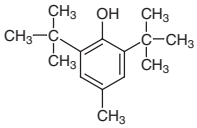

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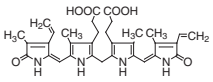

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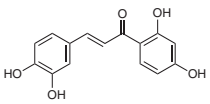

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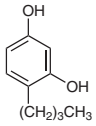

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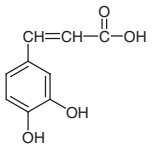

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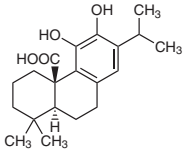

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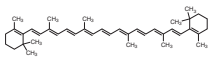

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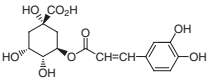

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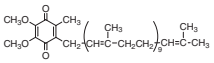

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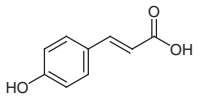

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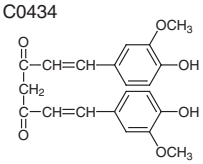

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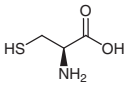

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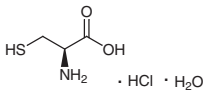

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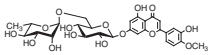

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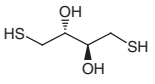

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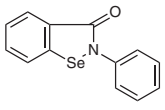

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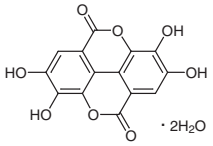

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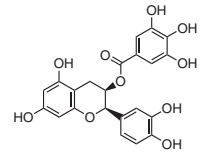

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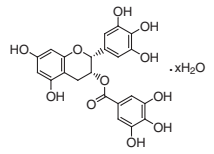

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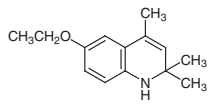
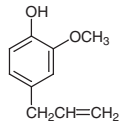
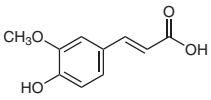
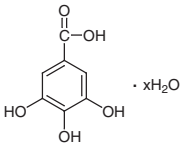
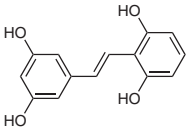
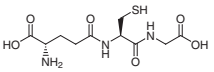
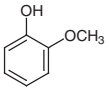
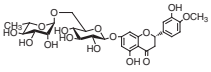
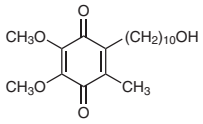
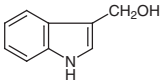
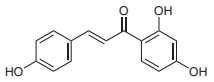
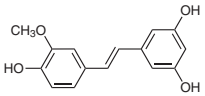
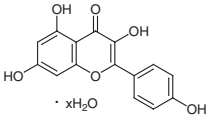
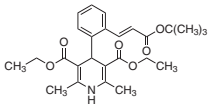
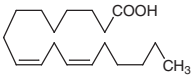
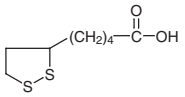
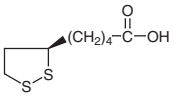
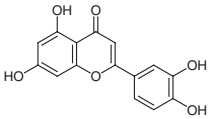
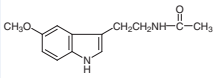
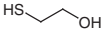
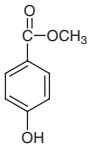
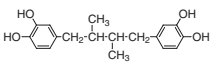
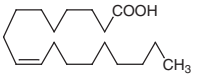
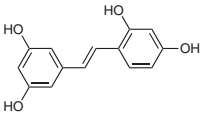
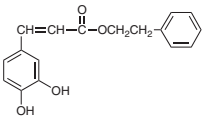
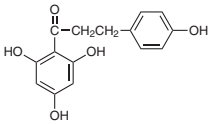
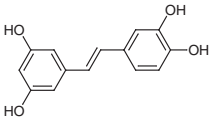
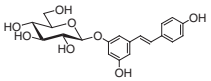
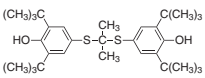
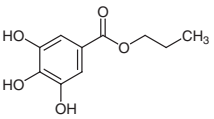
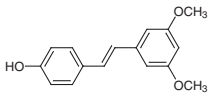
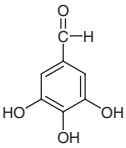
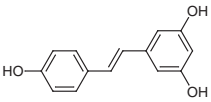
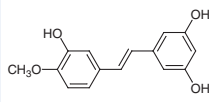
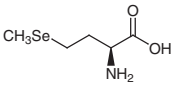
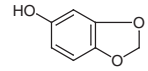
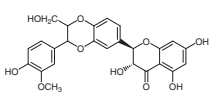
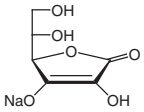
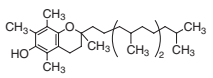
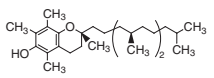
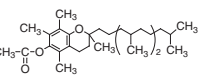


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

A0232 	H0267 	G0011 	G0371 	G0074 
M0121 	H0049 	I0848 	I0496 	I0822 
I0804 	K0018 	L0276 	L0124 	L0058 
L0207 	T2682 	M1105 	M0058 	H0216 
D0800 	O0180 	O0373 	P2088 	P1966 
P1928 	P1878 	P2002 	G0018 	P1924 
T2650 	R0071 	R0089 	S0442 	S0418 
S0508 	A0539 	T0251 	T2309 	T0252 

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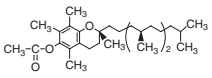	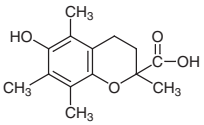

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1) *Oxidative Stress and Digestive Diseases*, ed. by T. Yoshikawa, Karger, Basel, **2001**.
2) *Oxidative / Nitrosative Stress and Disease*, ed. by D. L. Laskin, Wiley, **2010**.
3) *Oxidative Stress - Molecular Mechanisms and Biological Effects*, ed. by V. Lushchak, H. M. Semchyshyn, InTech, Rijeka, **2012**.

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Inhibitors

Proteolysis and dephosphorylation are major problems during protein extraction as they result in decreased yields. The addition of inhibitors helps prevent proteolysis and dephosphorylation and improves recovery of the desired protein. Inhibitors are also used during immunoprecipitation to prevent decomposition of antigens or antibodies by proteolytic impurities. The inhibitors frequently used in biochemical research are described in this section.

Protease Inhibitors

Product No.	Product Name	Unit Size	
A2215	AEBSF	100mg	1g
B3379	Benzamidine Hydrochloride		5g
D3789	EDTA 2Na Dihydrate	5g	25g
T2599	EDTA 3Na Hydrate	5g	25g
E0805	EGTA	5g	25g
I0741	2-Iodoacetamide		5g
P1826	1,10-Phenanthroline Monohydrate		5g
B3473	PMSF	5g	25g

Alkaline Phosphatase Inhibitors

Product No.	Product Name	Unit Size	
D3964	Disodium β-Glycerophosphate Pentahydrate	1g	5g
L0231	Levamisole Hydrochloride	1g	5g

References

1) K. Weber, J. R. Pringle, M. Osborn, *Methods Enzymol*. **1972**, *26*, 3.
2) J. Sambrook, D. W. Russell, in *Molecular Cloning: A Laboratory Manual*, 3rd ed., Cold Spring Harbor Labolatory Press, New York, **2001**.

Bioconjugation

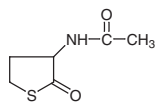
Bioconjugation is the formation of complexes by chemically bonding functional molecules to biomolecules such as DNA, RNA, proteins, lipids and sugars under mild conditions. The bioconjugated complexes are used to develop new methods, for example in drug discovery, ligand binding assays, disease diagnosis, and high-throughput screening.

There have been many recent reports of the chemical modification of biomolecules with non-natural bioorthogonal functional groups such as azide.

Functional Group Forming Reagents

Product No.	Product Name	Unit Size		
A2144	3-Acetamidotetrahydro-2-thiophenone		5g	25g
A0296	2-Aminoethanethiol Hydrochloride	25g	100g	500g
C0875	Cystamine Dihydrochloride	25g	100g	500g
D0944	5,5'-Dithiobis(2-nitrobenzoic Acid)	1g	5g	25g
D1071	DL-Dithiothreitol	1g	5g	25g
M0058	2-Mercaptoethanol		25g	500g
S0107	Succinic Anhydride		25g	500g
S0431	*N*-Succinimidyl *S*-Acetylthioglycolate		1g	5g
S0859	*N*-Succinimidyl 3-(Acetylthio)propionate			100mg
T1656	Tris(2-carboxyethyl)phosphine Hydrochloride	1g	5g	25g

A2144



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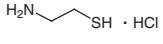

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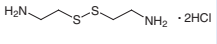

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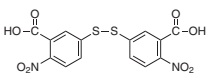

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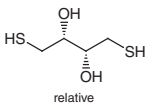
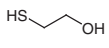


M0058



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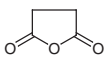

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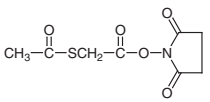

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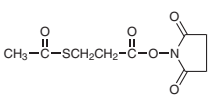

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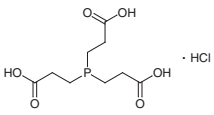

Functional Group Blocking Reagents

Product No.	Product Name	Unit Size		
M0365	Citraconic Anhydride		25g	500g
D1114	2,2'-Dipyridyl Disulfide	5g	25g	250g
D2477	4,4'-Dipyridyl Disulfide		5g	25g
E0136	*N*-Ethylmaleimide	1g	5g	25g
I0741	2-Iodoacetamide			5g
M0005	Maleic Anhydride		25g	500g
M1382	*S*-Methyl Methanethiosulfonate		5g	25g

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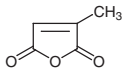
M0365



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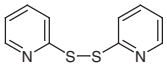

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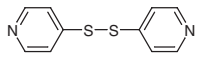

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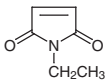

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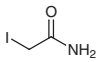

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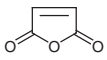

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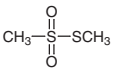
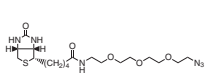


Biotins & Related Reagents

Product No.	Product Name	Unit Size		
A2659	AOL-Biotin Conjugate			1mL
A2523	*N*-[2-[2-[2-(2-Azidoethoxy)ethoxy]ethoxy]ethyl]biotinamide			100mg
A2524	*N*-(3-Azidopropyl)biotinamide			100mg
B0463	Biotin	100mg	1g	5g
B2433	6-Biotinamidohexanoic Acid			100mg
B2431	Biotin Hydrazide		25mg	100mg
B4009	(+)-Biotin 4-Nitrophenyl Ester			200mg
B3174	*N*-Biotinyl-*N*'-(3-maleimidopropionyl)-3,6-dioxaoctane-1,8-diamine			50mg
G0297	*N*-GlcNAc-Biotin			50mg
S0951	Streptavidin from *Streptomyces avidinii*			1vial
S0490	*N*-Succinimidyl 6-Biotinamidohexanoate		20mg	100mg
S0491	*N*-Succinimidyl D-Biotinate			100mg

A2523



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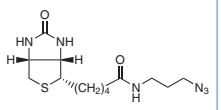

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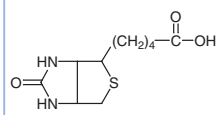

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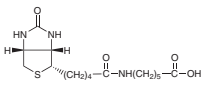

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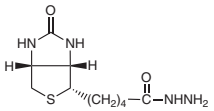

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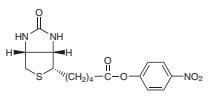

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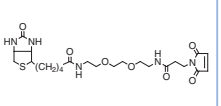

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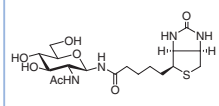

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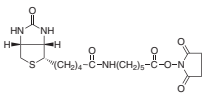

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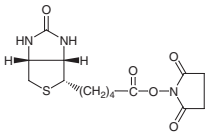
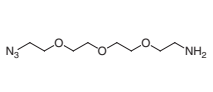


PEGylation Reagents & PEG Spacers

Product No.	Product Name	Unit Size	
A2363	Amino-PEG$_3$-Azide	1g	5g
A2293	Azido-PEG$_3$-carboxylate		1g

Product No.	Product Name			Unit Size
A2388	Azido-PEG_4-NHS Ester			25mg
B3174	*N*-Biotinyl-*N*'-(3-maleimidopropionyl)-3,6-dioxaoctane-1,8-diamine			50mg
B1431	1,2-Bis(2-aminoethoxy)ethane	25g	100g	500g
B3728	Bis(NHS)PEG_5			25mg
D3664	1,11-Diamino-3,6,9-trioxaundecane			1g
D1571	Diethylene Glycol Bis(3-aminopropyl) Ether		25mL	500mL
D3831	Diethylene Glycol 2-Bromoethyl Methyl Ether		5g	25g
F0719	Fmoc-NH-PEG_2-CH_2COOH			1g
M2186	Methyl-PEG_4-NHS Ester			25mg
M2187	Methyl-PEG_8-NHS Ester			25mg
M2188	Methyl-PEG_{12}-NHS Ester			25mg
A2728	mPEG_4-Azide		25mg	100mg
A2727	mPEG_8-Azide		25mg	100mg
A2526	NH_2-PEG_6-COOH			100mg
A2294	PEG_4-Azide			Price on request
A2500	PEG_5-Azide			100mg
M2501	3,6,9,12-Tetraoxatridecanamine			100mg
T2634	Triethylene Glycol 2-Bromoethyl Methyl Ether		5g	25g

A2363



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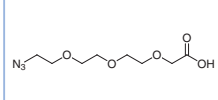

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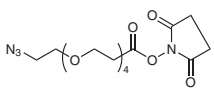

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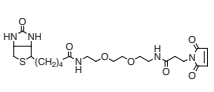

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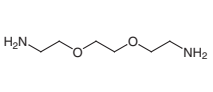

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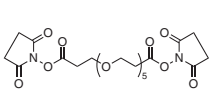

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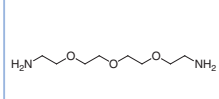

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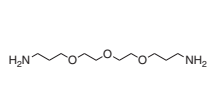

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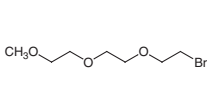

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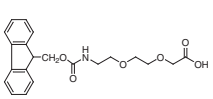

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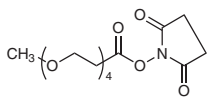

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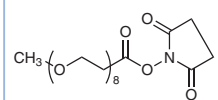

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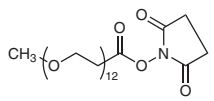

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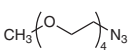

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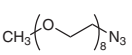

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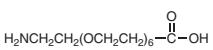

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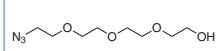

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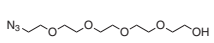

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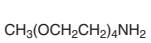

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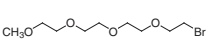

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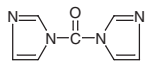
Zero-length Crosslinkers

Product No.	Product Name	Unit Size		
C0119	1,1'-Carbonyldiimidazole		25g	250g
C0793	1-Cyclohexyl-3-(2-morpholinoethyl)carbodiimide Metho-*p*-toluenesulfonate		5g	25g
D0254	*N*,*N*'-Diisopropylcarbodiimide		25g	250g
D4029	1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide		5g	25g
D1601	1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide Hydrochloride	5g	25g	250g
H1304	*N*-Hydroxysulfosuccinimide Sodium Salt		200mg	1g
S0396	Sodium Cyanoborohydride	5g	25g	250g

C0119



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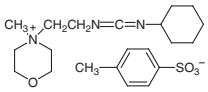

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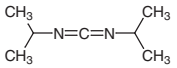

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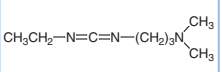

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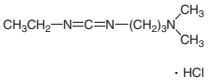

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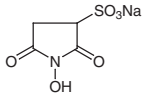

S0396



Heterobifunctional Crosslinkers

Product No.	Product Name			Unit Size
A0648	2-Aminoethanethiol	25g	100g	500g
A2436	*N*-(2-Aminoethyl)maleimide Hydrochloride		200mg	1g
A2363	Amino-PEG_3-Azide		1g	5g
A2293	Azido-PEG_3-carboxylate			1g
A2388	Azido-PEG_4-NHS Ester			25mg
A2738	3-Azidopropylamine			100mg
A2674	4-Azido-2,3,5,6-tetrafluorobenzoic Acid			1g
A2729	5-Azidovaleric Acid			200mg
B4062	BCN-amine		25mg	100mg
A2607	DIBAC-amine			25mg
F0719	Fmoc-NH-PEG_2-CH_2COOH			1g
H0882	5-Hexynoic Acid		5g	25g
L0058	DL-*α*-Lipoic Acid		5g	25g
L0207	(*R*)-*α*-Lipoic Acid	5g	25g	100g
M2337	4-Maleimidobutyric Acid		1g	5g
M2338	6-Maleimidohexanoic Acid			1g
M1962	3-Maleimidopropionic Acid	200mg	1g	5g
M2266	6-Mercapto-1-hexanol		5g	25g
A2526	NH_2-PEG_6-COOH			100mg
A2294	PEG_4-Azide			Price on request
A2500	PEG_5-Azide			100mg
S0859	*N*-Succinimidyl 3-(Acetylthio)propionate			100mg

Product No.	Product Name	Unit Size		
S0814	*N*-Succinimidyl Acrylate		5g	25g
S0860	*N*-Succinimidyl 5-Azido-2-nitrobenzoate			10mg
S0952	*N*-Succinimidyl 4-Azido-2,3,5,6-tetrafluorobenzoate		200mg	1g
S0863	*N*-Succinimidyl 4-Benzoylbenzoate		200mg	1g
S0852	*N*-Succinimidyl Bromoacetate			100mg
S0893	*N*-Succinimidyl 4-Formylbenzoate			100mg
S0844	*N*-Succinimidyl Iodoacetate			100mg
S0398	*N*-Succinimidyl 3-Maleimidobenzoate		100mg	1g
S0399	*N*-Succinimidyl 4-Maleimidobutyrate		100mg	1g
S0428	*N*-Succinimidyl 6-Maleimidohexanoate		100mg	1g
S0853	*N*-Succinimidyl 4-(*N*-Maleimidomethyl)cyclohexanecarboxylate		100mg	1g
S0881	*N*-Succinimidyl 6-[[4-(*N*-Maleimidomethyl)cyclohexyl]carboxamido]hexanoate			25mg
S0861	*N*-Succinimidyl 4-(4-Maleimidophenyl)butyrate			10mg
S0427	*N*-Succinimidyl 3-Maleimidopropionate	100mg	1g	5g
S0882	*N*-Succinimidyl 11-Maleimidoundecanoate		20mg	100mg
S0819	*N*-Succinimidyl 3-(2-Pyridyldithio)propionate			100mg
S0883	3-Sulfo-*N*-succinimidyl 4-(*N*-Maleimidomethyl)cyclohexane-1-carboxylate Sodium Salt		20mg	100mg
M0052	Thioglycolic Acid		25g	500g
T2820	4-[3-(Trifluoromethyl)-3*H*-diazirin-3-yl]benzoic Acid		200mg	1g
T2818	4-[3-(Trifluoromethyl)-3*H*-diazirin-3-yl]benzyl Alcohol		200mg	1g
T2819	4-[3-(Trifluoromethyl)-3*H*-diazirin-3-yl]benzyl Bromide		200mg	1g
U0054	10-Undecynoic Acid		1g	5g

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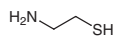

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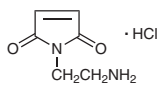

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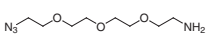

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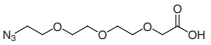

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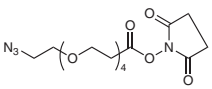

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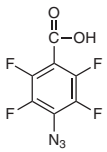

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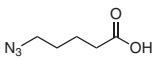

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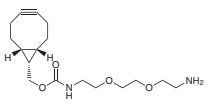

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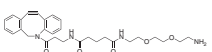

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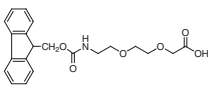

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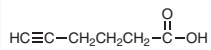

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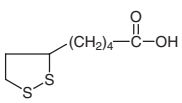

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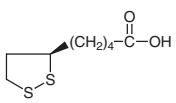

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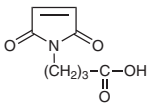

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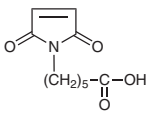

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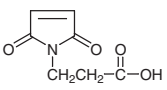

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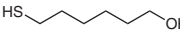

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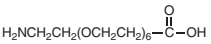

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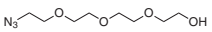

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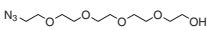

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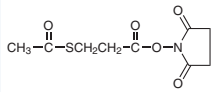

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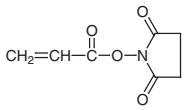

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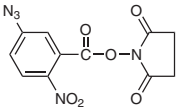

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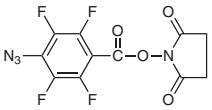
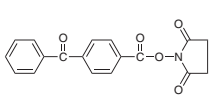
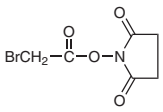
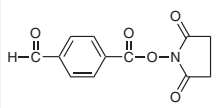
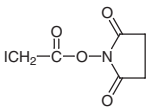
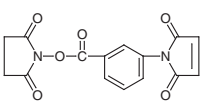
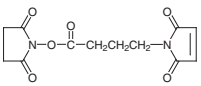
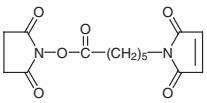
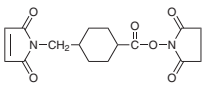
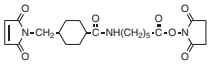
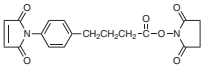
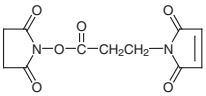
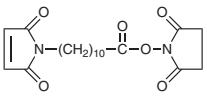
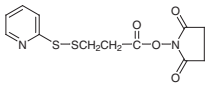
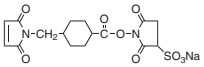
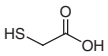
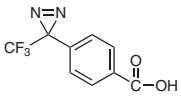
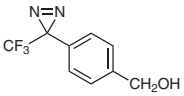
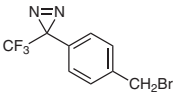
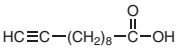


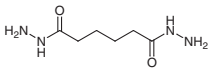
 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

S0863 	S0852 	S0893 	S0844 	S0398 
S0399 	S0428 	S0853 	S0881 	S0861 
S0427 	S0882 	S0819 	S0883 	M0052 
T2820 	T2818 	T2819 	U0054 	

Homobifunctional Linkers

Product No.	Product Name	Unit Size		
A0170	Adipic Dihydrazide		25g	250g
B1431	1,2-Bis(2-aminoethoxy)ethane	25g	100g	500g
B3790	Bis[2-(4-azidosalicylamido)ethyl] Disulfide			10mg
D0536	Bis(4-fluoro-3-nitrophenyl) Sulfone			10g
B3805	1,4-Bis(maleimido)butane		100mg	1g
E0482	1,2-Bis(maleimido)ethane			100mg
B1787	1,6-Bis(maleimido)hexane			100mg
B3728	Bis(NHS)PEG$_5$			25mg
B0964	1,4-Butanediol Diglycidyl Ether		25mL	250mL
D3664	1,11-Diamino-3,6,9-trioxaundecane			1g
D1571	Diethylene Glycol Bis(3-aminopropyl) Ether		25mL	500mL
D1649	1,5-Difluoro-2,4-dinitrobenzene		5g	25g
A0806	Dimethyl Adipimidate Dihydrochloride		5g	25g
P0892	Dimethyl Pimelimidate Dihydrochloride		5g	25g
S0246	Dimethyl Suberimidate Dihydrochloride		5g	25g
D1662	Di(*N*-succinimidyl) Carbonate		5g	25g
D2473	Di(*N*-succinimidyl) 3,3'-Dithiodipropionate		1g	5g
D3895	Di(*N*-succinimidyl) Suberate		1g	5g
D0947	3,3'-Dithiodipropionic Acid		25g	500g
E0342	Ethylene Glycol Diglycidyl Ether (so called)		25g	500g
G0067	Glutaraldehyde (24-26% in Water)		25mL	500mL
G0068	Glutaraldehyde (*ca.* 50% in Water, *ca.* 5.6mol/L)		25mL	500mL

A0170



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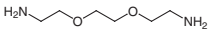

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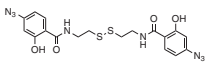

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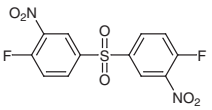

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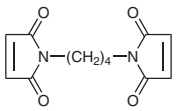

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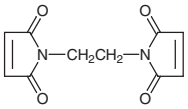

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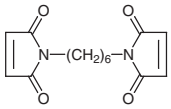

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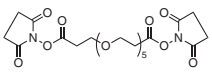

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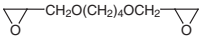

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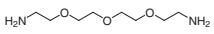

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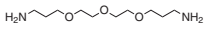

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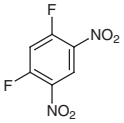

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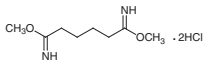

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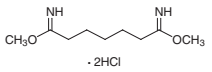

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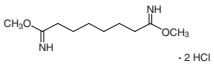

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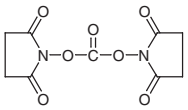

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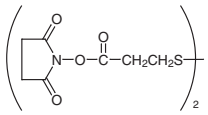

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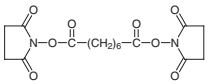

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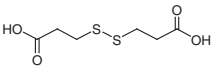

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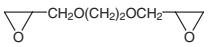
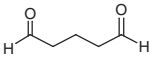


representative structure

G0067
G0068



Fluorescent Labeling Dyes (see p.243)

References

1) G. T. Hermanson, Bioconjugate Techniques, Third Edition, Academic Press, San Diego, USA, **2013**.
2) J. Kalia, R. T. Raines, *Curr. Org. Chem.* **2010**, *14*, 138.

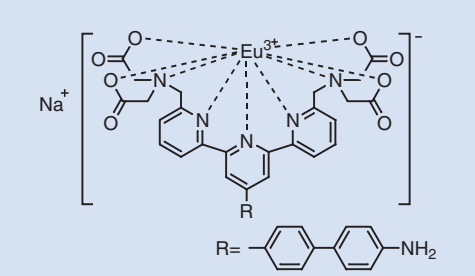
 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Fluorometry & Fluorescent Imaging

Fluorescent labeling and fluorescent staining are widely used in basic and applied research in the life sciences, including the quantitative determination of nucleic acids and proteins, electrophoresis assays, gene sequencing, flow cytometry and microscopic observation, as they allow highly-sensitive assays by fluorescence detection.

The use of fluorescent imaging has recently increased dramatically for elucidating various *in vivo* phenomena at the molecular level. Fluorescent imaging is also being applied to basic research on diseases because it allows real-time imaging without damaging cells and tissues.

Europium Fluorescent Labeling Reagent



A2083 ATBTA-Eu^{3+}

Product No.	Product Name	Unit Size
A2083	ATBTA-Eu^{3+} [=Sodium [4'-(4'-Amino-4-biphenylyl)-2,2':6',2''-terpyridine-6,6''-diylbis(methyliminodiacetato)]europate(III)]	100mg

ATBTA-Eu^{3+} is a europium chelate complex and can be used as a fluorescent labeling reagent. ATBTA-Eu^{3+} is easily labeled to protein etc. after conversion to DTBTA-Eu^{3+}.

Features

Long fluorescent life time (τ = 1.02ms)

For time-resolved fluorometry

Stable fluorescence in various aqueous buffers

Available in Tris, TE, PBS, etc.

For wide use

No cross talk of excitation light

- λex, max 335nm*
- λem, max 616nm*

Sharpened emission spectrum

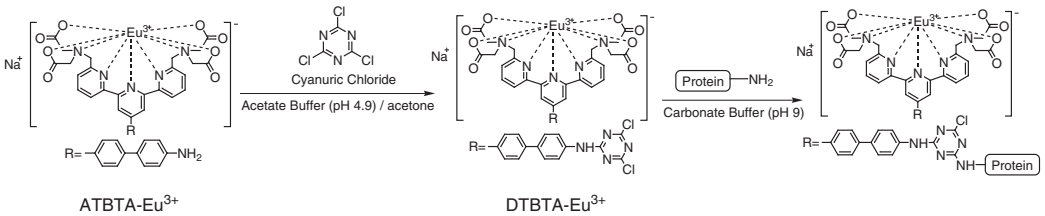
Large Stokes shift (the difference in wavelength between positions of the band maxima of the absorption and emission spectra)

* Data as DTBTA-Eu^{3+}

Historically a wide variety of organic fluorescent reagents have been used as tags or labels, such as fluorescein, rhodamine, and various cyanin dyes. Different from these organic reagents, certain lanthanide complexes, especially those of Eu^{3+} and Tb^{3+}, are also recognized as efficient fluorescent labels, owing to their distinct properties specific to lanthanide complexes; they are excited in the UV region (310-340nm) and emit fluorescence at ca. 615nm (Eu^{3+}) and *ca.* 545nm (Tb^{3+}), with the long lifetimes of several hundred microseconds to more than 1 milliseconds. By taking advantage of these properties, time-resolved fluorometric measurement can remove background fluorescence from the sample matrix

and often gives detectability better than one order of magnitude compared to those of conventional fluorometric assays.

The other reagent, ATBTA-Eu^{3+}, has an amino group instead of dichlorotriazinyl in DTBTA-Eu^{3+}, and is more stably stored, since it does not have the hydrolysable dichlorotriazinyl group. DTBTA-Eu^{3+} can be directly labeled to amino groups of biomolecules, whereas ATBTA-Eu^{3+} is used as a label after conversion to DTBTA-Eu^{3+} by reacting with trichlorotriazene. Scheme 1 summarizes these reactions and the labeling of DTBTA-Eu^{3+} to the primary amine groups of proteins and nucleic acids. Although ATBTA-Eu^{3+} is not so strongly fluorescent as DTBTA-Eu^{3+}, the fluorescence becomes strong after reaction with trichlorotriazene. The fluorescence spectrum of ATBTA-Eu^{3+} is basically the same with that of DTBTA-Eu^{3+}.



Scheme 1. Conversion of ATBTA-Eu^{3+} to DTBTA-Eu^{3+} and the labeling reaction to amino groups of proteins and nucleic acids

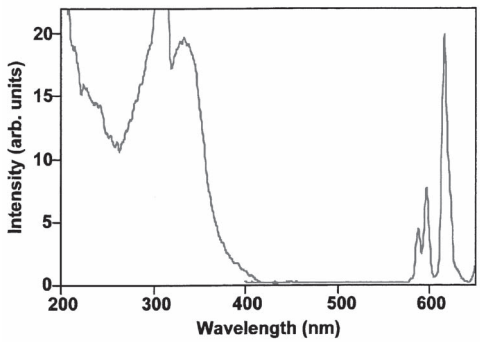


Figure 1. Exitation and emission spectra of DTBTA-Eu^{3+} in 0.05M borate buffer at pH9.0 ($1.5x10^{-6}$M)
The excitation spectrum is right and the emission spectrum is left.

The new lanthanide chelate reagent, DTBTA-Eu^{3+}, has a high stability constant, and therefore the problem of fluorescence intensity change in different buffers has been greatly reduced. DTBTA-Eu^{3+} has also several advantages such as the intensity stability in water for a long period, and the stability against photo-bleaching. The excitation and emission spectra are shown in Figure 1.

■Typical Procedure Preparation of DTBTA-Eu^{3+}

Dissolve 2mg of ATBTA-Eu^{3+} in 60μL of 0.1M acetate buffer (pH4.9). This solution is added 0.43mg of cyanuric chloride in 25μL of acetone, and stirred for 30 min. The reaction mixture is added dropwise to 1mL of acetone, and formed precipitate is centrifuged. After washing with 0.5mL of acetone twice, the yellow powder is dried in vacuum for 1 h. Dissolve the powder in 1mL of carbonate buffer gives (pH9) for labeling. This solution contains *ca.* 2mM of labeling reagent.

■Warning

This labeling reagent is deactivated by hydrolysis, especially in alkali solution. The reagent dissolved in water should be used immediately. For temporary storage, the reagent should be dissolved in buffer solution at acidic pH (pH～5) and kept below 0℃ .

In order to examine the application of the product as a hapten-label, we supply the antibody.
Please refer to “Anti-DTBTA-Eu^{3+} Polyclonal Antibody” (p.249) for detail.

 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Related products

Product No.	Product Name	Unit Size
A2239	Anti-DTBTA-Eu^{3+} Rabbit Polyclonal Antibody [2.5mg/mL in PBS(-)] (Preservative : 0.1% NaN_3)	0.5mL
A2181	Anti-DTBTA-Eu^{3+} Rabbit Antiserum (Preservative : 0.1% NaN_3)	0.5mL
C0460	Cyanuric Chloride	25g 500g

References

T. Nishioka, J. Yuan, Y. Yamamoto, K. Sumitomo, Z. Wang, K. Hashino, C. Hosoya, K. Ikawa, G. Wang, K. Matsumoto, *Inorg. Chem.* **2006**, *45*, 4088; Erratum in : *Inorg. Chem.* **2006**, *45*, 8460; H. Kimura, M. Mukaida, K. Kuwabara, T. Ito, K. Hashino, K. Uchida, K. Matsumoto, K. Yoshida, *Free Radic. Biol. Med.* **2006**, *41*, 973; K. Hashino, K. Ikawa, M. Ito, C. Hosoya, T. Nishioka, M. Makiuchi, K. Matsumoto, *Anal. Biochem.* **2007**, *364*, 89; M.-J. Xie, K. Fukui, M. Horie, Y. Sakihama, K. Hashino, H. Kimura, K. Matsumoto, *Anal. Biochem.* **2008**, *374*, 278.

Fluorescent Labeling Dyes

Product No.	Product Name	Unit Size
A0306	5-Aminofluorescein (isomer I)	1g 5g
A0864	6-Aminofluorescein (isomer II)	1g 5g
B1149	*N*-[4-(2-Benzimidazolyl)phenyl]maleimide	50mg 100mg
B4220	Bromobimane	20mg 100mg
C2477	5-Carboxyfluorescein Hydrate	100mg
C2478	6-Carboxyfluorescein Hydrate	100mg
C2479	5-Carboxyfluorescein *N*-Succinimidyl Ester	20mg 100mg
C1196	4-Carboxymethyl-6,7-methylenedioxycoumarin	1g
A5596	DAABD-Cl [=4-[2-(Dimethylamino)ethylaminosulfonyl]-7-chloro-2,1,3-benzoxadiazole]	100mg
D0656	Dansyl Chloride	1g 5g 25g
A5595	DBD-F [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-fluoro-2,1,3-benzoxadiazole]	100mg
D4238	7-(Diethylamino)coumarin-3-carboxylic Acid	100mg
F0026	5-FITC (isomer I)	100mg 1g
F0783	6-FITC (isomer II)	100mg
F0784	Fluorescein Isothiocyanate (mixture of 5- and 6- isomers)	100mg 1g
F0810	Fluorescein-5-maleimide	25mg
H1352	7-Hydroxycoumarin-3-carboxylic Acid	200mg 1g
H1398	7-Hydroxy-4-methylcoumarin-3-acetic Acid	100mg
M2233	7-Methoxycoumarin-3-carboxylic Acid	100mg 1g
M0881	6,7-Methylenedioxy-4-methyl-3-maleimidocoumarin	100mg
A5591	NAM [=*N*-(9-Acridinyl)maleimide]	50mg 100mg
P1214	*N*-(1-Pyrenyl)maleimide	250mg
S0891	Sodium 5-(2-Aminoethylamino)-1-naphthalenesulfonate Hydrate	100mg
S0503	Succinimidyl 6-[[7-(*N*,*N*-Dimethylaminosulfonyl)-2,1,3-benzoxadiazol-4-yl]amino]hexanoate	100mg
S0866	*N*-Succinimidyl 7-Hydroxycoumarin-3-carboxylate	200mg 1g
S0867	*N*-Succinimidyl 7-Methoxycoumarin-3-carboxylate	100mg 1g

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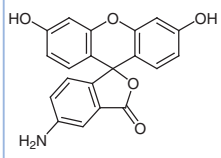

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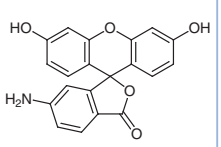

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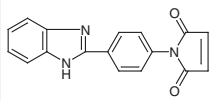

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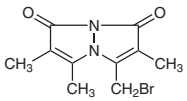

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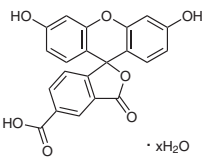

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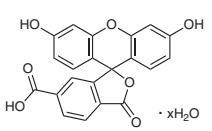

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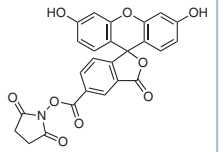

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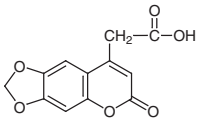

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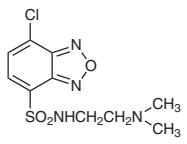

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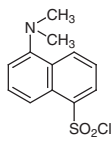

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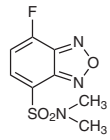

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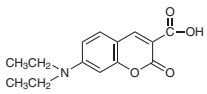

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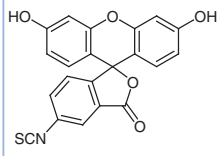

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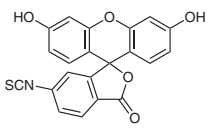

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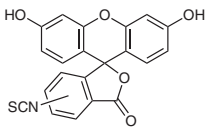

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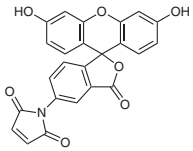

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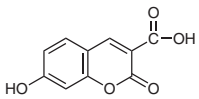

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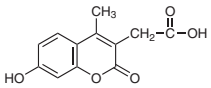

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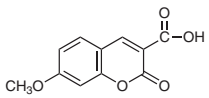

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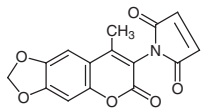

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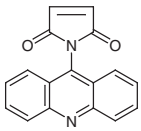

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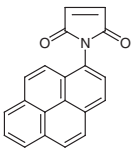

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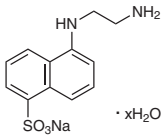

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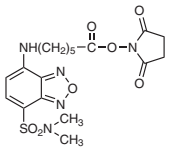

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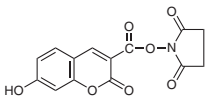

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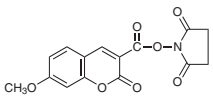
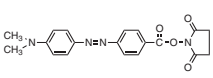


Donors & Acceptors for Fluorescent Resonance Energy Transfer (FRET)

Product No.	Product Name	Unit Size	
S0857	DABCYL *N*-Succinimidyl Ester	200mg	1g
D4238	7-(Diethylamino)coumarin-3-carboxylic Acid		100mg
S0891	1,5-EDANS Hydrate		100mg
H1352	7-Hydroxycoumarin-3-carboxylic Acid	200mg	1g
M2233	7-Methoxycoumarin-3-carboxylic Acid	100mg	1g
S0866	*N*-Succinimidyl 7-Hydroxycoumarin-3-carboxylate	200mg	1g
S0867	*N*-Succinimidyl 7-Methoxycoumarin-3-carboxylate	100mg	1g

S0857



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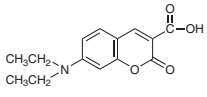

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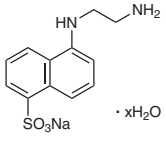

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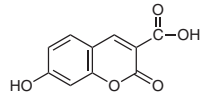

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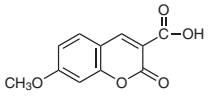

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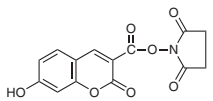

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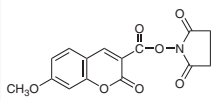

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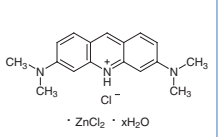
Fluorescent Stains

Product No.	Product Name	Unit Size		
A0132	Acridine Orange			25g
A0334	Auramine			25g
H1343	Bisbenzimide H 33258 Hydrate			25mg
C0004	Calcein		1g	5g
U0001	Calcein Blue			1g
A2412	DAPI・2HCl			5mg
D3251	Disodium 4,4'-Bis(2-sulfonatostyryl)biphenyl	25g	100g	500g
E0370	Ethidium Bromide		1g	5g
F0240	Fluorescein Diacetate			5g
R0040	Rhodamine B		25g	250g
T0558	Thioflavine T			25g
F0096	Uranine		25g	500g

A0132



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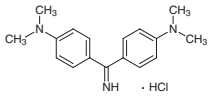

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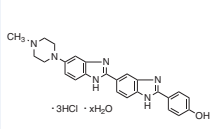

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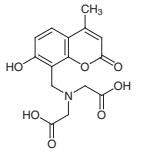

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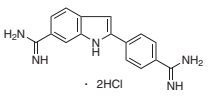

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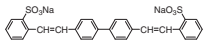

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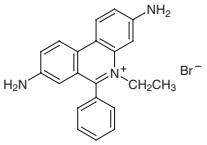

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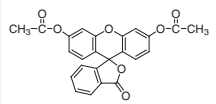

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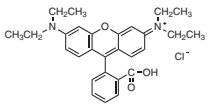

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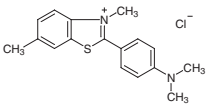

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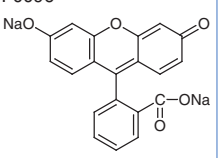
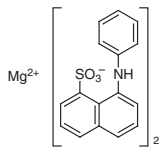


Fluorescent Probes

Product No.	Product Name	Unit Size	
A5353	ANS-Mg (=Magnesium 8-Anilino-1-naphthalenesulfonate)		1g
A5352	ANS-Na (=Sodium 8-Anilino-1-naphthalenesulfonate)		1g
A5351	ANS-NH_4 (=Ammonium 8-Anilino-1-naphthalenesulfonate)	1g	10g
C2859	5-Carboxyfluorescein Diacetate	50mg	200mg
D0371	2',7'-Dichlorofluorescein	1g	25g
D2404	Diphenyl-1-pyrenylphosphine	100mg	1g
F0918	Fluorescein Isothiocyanate Dextran (*Mw.=ca.* 10,000)		100mg

A5353



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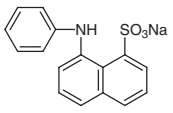

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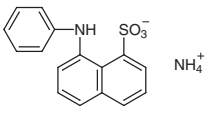

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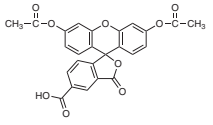

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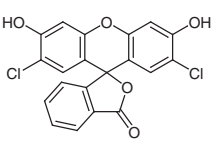

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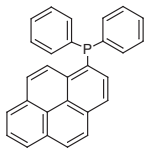

Fluorescence-labeled Antibodies

Product No.	Product Name	Unit Size
G0406	Goat Anti-Mouse IgG FITC Conjugate	0.1mg
G0452	Goat Anti-Rabbit IgG FITC Conjugate	0.1mg

References

1) *Fluorescence Spectroscopy in Biology*, ed. by M. Hof, R. Hutterer, V. Fidler, Springer, Berlin, Heidelberg, **2005**.
2) *Cell Imaging Techniques*, ed. by D. J. Taatjes, J. Roth, Humana Press, New York, **2013**.

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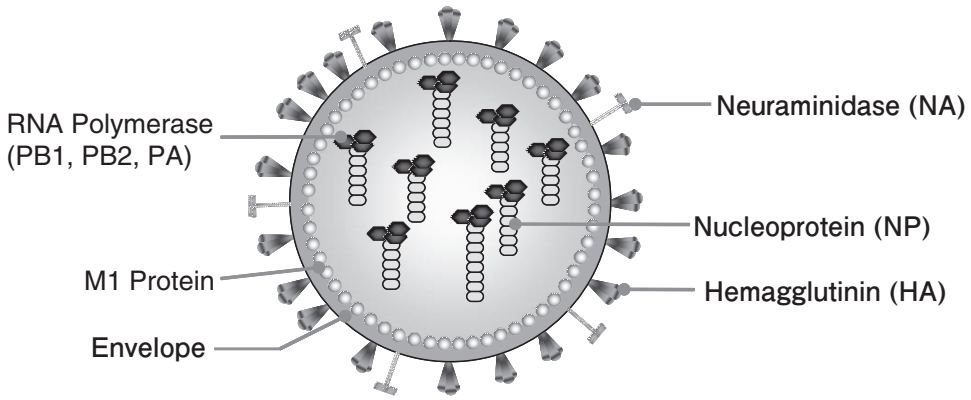
Antibodies

An antibody is a component of the immune system that binds to a corresponding antigen with high specificity, similar to the relationship of a key to a keyhole. An antibody can recognize a wide variety of biological and chemical substances as antigens. This recognition function of antibodies is useful for the analysis and enrichment of cells, diagnostics, and clinical treatments, and is thus an essential tool for the field of biosciences.

Anti-Glyco Antibodies

See p.103

Anti-Influenza virus Monoclonal Antibodies



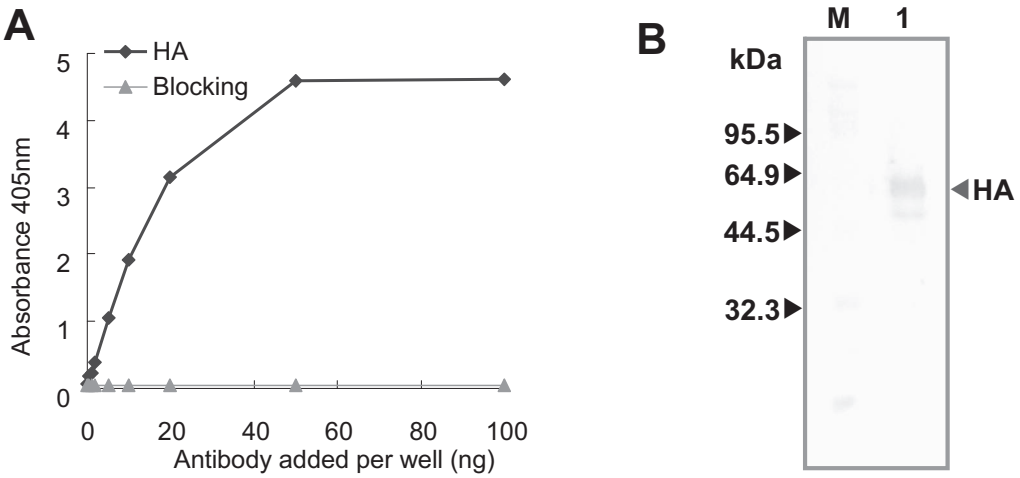
Product No.	Product Name	Unit Size
I0779	Anti-Influenza A Virus Hemagglutinin H3 Monoclonal Antibody (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) Immunogen : purified hemagglutinin H3 (Influenza A/sydney/5/97) Isotype : IgG_3 Host : Mouse Clone : 1G8 Product Form : Purified mouse monoclonal antibody/IgG_3 Preservative : 0.05 % NaN_3 Applications : ELISA, Western Blot. Not tested in other applications. Optimal dilutions are dependent on conditions and should be determined by the user.	0.2mL
A2380	Anti-Influenza A Virus Neuraminidase N2 Monoclonal Antibody (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) Immunogen : Influenza A/Sydney/5/97(strain H3N2) Isotype : IgG_1 Host : Mouse Clone : 1-4B Product Form : Purified mouse monoclonal antibody/IgG_1 Preservative : 0.05 % NaN_3 Applications : ELISA, Western Blot. Not tested in other applications. Optimal dilutions are dependent on conditions and should be determined by the user.	0.2mL

Product No.	Product Name	Unit Size
A2406	Anti-Influenza A Virus Nucleoprotein Monoclonal Antibody (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) Immunogen : Influenza A/Beijing/262/95 (strain H1N1) Isotype : IgG_{2a} Host : Mouse Clone : 17 Product Form : Purified mouse monoclonal antibody/IgG_{2a} Preservative : 0.05% NaN_3 Applications : This antibody reacts with nucleoprotein on ELISA (1:1000) and Western blotting.	0.2mL
A2407	Anti-Influenza A Virus Neuraminidase N1 Monoclonal Antibody (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) Immunogen : Influenza A/Beijing/262/95 (strain H1N1) Isotype : IgG_1 Host : Mouse Clone : 2-3B Product Form : Purified mouse monoclonal antibody/IgG_1 Preservative : 0.05% NaN_3 Applications : This antibody reacts with neuraminidase on western blotting (1:1000).	0.2mL

Influenza viruses are members of the *Orthomyxoviridae* family, and as such are enveloped viruses that contain segmented genomes composed of negative-sense, single-stranded RNA[1]. There are three genera of influenza viruses, types A, B and C. Type A influenza viruses are grouped into subtypes based on antigenic properties of the viral-encoded hemagglutinin (HA) and neuraminidase (NA) envelope glycoproteins.

Monoclonal antibodies are essential tools for many molecular immunology investigations. Especially, anti-influenza virus monoclonal antibodies are useful for diagnosis and investigations of virus structure. These monoclonal antibodies introduced here are suitable for use in ELISA and Western blot.

■Typical Procedure



A. ELISA assay. Each well was coated by 50ng Purified influenza hemagglutinin H3. 0-100ng anti-Influenza A virus Hemagglutinin H3 monoclonal antibody (TCI Product No. : I0779) was added to the well. After washing, bound antibody was detected using goat-anti-mouse IgG-HRP conjugate. The signal was developed with ABTS substrate (TCI Product No. : A2166).

B. Western Blot. Analysis was performed using anti-Influenza A virus Hemagglutinin H3 monoclonal antibody (I0779) at 1μg/ml. Goat-anti-mouse-HRP conjugate was used as the secondary antibody. The signal was visualized using DAB-nickel as the chromogen. Molecular weight marker (M). Purified Hemagglutinin (Lane 1).

Figure. Reactivity of the anti-influenza A hemagglutinin monoclonal antibody

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Related Product

Product No.	Product Name	Unit Size	
A2166	ABTS [=2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonic Acid Ammonium Salt)]	1g	5g

References

1) P. F. Wright, R. G. Webster, Orthomyxoviruses, in *Fields Virology*, 4th ed., Lippincott Williams & Wilkins, Philadelphia, **2001**, vol. 1.

Details of influenza A sydney/5/97

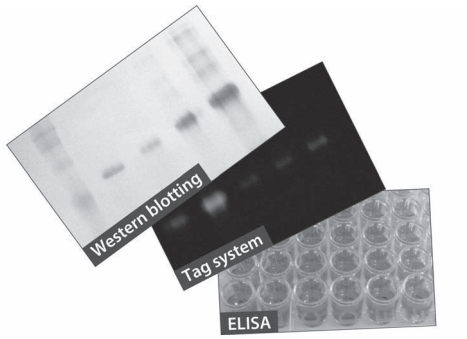
2) Phenotypic properties resulting from directed gene segment reassortment between wild-type A/Sydney/5/97 influenza virus and the live attenuated vaccine strain
C. L. Parks, T. Latham, A. Cahill, R. E. O'Neill, C. J. Passarotti, D. A. Buonagurio, T. M. Bechert, G. A. D'Arco, G. Neumann, J. DeStefano, H. E. Arendt, J. Obregon, L. Shutyak, S. Hamm, M. S. Sidhu, T. J. Zamb, S. A. Udem, *Virology* **2007**, *367*, 275.

3) Accumulation of amino acid substitutions promotes irreversible structural changes in the hemagglutinin of human influenza AH3 virus during evolution.
K. Nakajima, E. Nobusawa, A. Nagy, S. Nakajima, *J. Virol*. **2005**, *79*, 6472.

4) Influenza research database: http://www.fludb.org/

* This monoclonal antibody was developed by collaboration with Tokai University

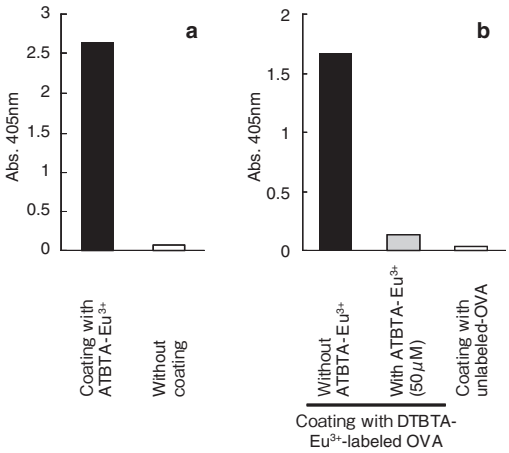
Anti-DTBTA-Eu^{3+} Polyclonal Antibody



Product No.	Product Name	Unit Size
A2239	Anti-DTBTA-Eu^{3+} Rabbit Polyclonal Antibody [2.5mg/mL in PBS(-)] (Preservative : 0.1% NaN_3) Immunogen : DTBTA-Eu^{3+} Labeled KLH Product Form : Protein A purified, 0.1% NaN_3 Suggested Dilution : 1:1000 for ELISA*	0.5mL
A2181	Anti-DTBTA-Eu^{3+} Rabbit Antiserum (Preservative : 0.1% NaN_3) Immunogen : DTBTA-Eu^{3+} Labeled KLH Product Form : Rabbit Serum, 0.1% NaN_3 Suggested Dilution : 1:1000 for ELISA*	0.5mL

* Since applications vary, each investigator must determine dilutions appropriate for individual use.

This rabbit antiserum was obtained by immunization of DTBTA-Eu^{3+}-Labeled KLH (keyhole limpet hemocyanin) as an immunogen and can be recognized with DTBTA-Eu^{3+} as a hapten molecule. DTBTA-Eu^{3+} is a fluorescent label for proteins and nucleic acids. With the combination of the antiserum, DTBTA-Eu^{3+} is applicable as a tag molecule. DTBTA-Eu^{3+}-labeled molecules can be immunologically detected with ELISA and Western-blotting via the Tag. In addition, the tagged molecule can be monitored and quantified by the fluorescence from DTBTA-Eu^{3+} (λ_{ex}, max 335nm, λ_{em}, max 616nm). As shown in Figure 1, the antiserum can also bind to ATBTA-Eu^{3+} (**a**), which is a precursor of DTBTA-Eu^{3+}. The binding of the antiserum to DTBTA-Eu^{3+}-labeled protein is inhibited by ATBTA-Eu^{3+} (**b**).



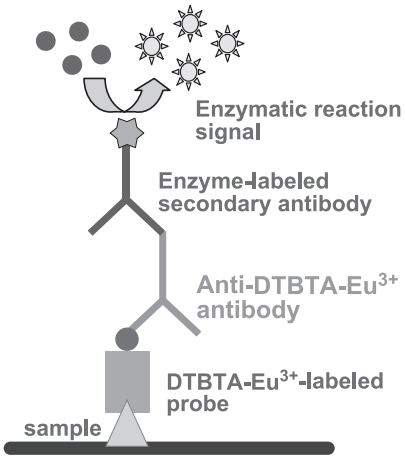
For ELISA, a microtiter plate was coated with DTBTA-Eu^{3+}-labeled OVA or ATBTA-Eu^{3+}, which is a precursor of DTBTA-Eu^{3+}.

a : ATBTA-Eu^{3+} was coated onto the wells and then reacted with anti DTBTA-Eu^{3+} serum. Anti-rabbit IgG-HRP conjugate was used for detecting the antiserum bound to ATBTA-Eu^{3+}.

b : DTBTA-Eu^{3+}-labeled OVA was coated onto the wells. Inhibition of Protein A-purified anti-DTBTA-Eu^{3+} antibody to DTBTA-Eu^{3+}-labeled OVA was observed in the presence of ATBTA-Eu^{3+} (50μM). Anti-rabbit IgG-HRP conjugate was used for detecting the bound IgG.

Absorbance at 405nm was determined for HRP with ABTS as a substrate.

Figure 1. Reactivity of anti DTBTA-Eu^{3+} antiserum and Protein A-purified antibody to antigen



[Application]

- With the combination of the antiserum, DTBTA-Eu^{3+} is applicable as a tag molecule.
- DTBTA-Eu^{3+}-labeled molecules can be immunologically detected with ELISA and Western-blotting via the Tag.

●About DTBTA-Eu^{3+}

The DTBTA-Eu^{3+} is a europium fluorescent labeling reagent, whereas ATBTA-Eu^{3+} (TCI code: A2083) is used as a label after conversion to DTBTA-Eu^{3+} by reacting with trichlorotriazene. DTBTA-Eu^{3+} can be labeled onto proteins and nucleic acids. Different from other lanthanide chelate reagents, the DTBTA-Eu^{3+} complex has a high stability constant, and therefore, the problem of fluorescence intensity change in various buffers has been greatly reduced. DTBTA-Eu^{3+} also has several advantages such as intensity stability in water for a long period, and the stability against photo-bleaching.

If further detailed information about DTBTA-Eu^{3+} is required, please refer to “Europium Fluorescent Labeling Reagent” (p.241).

Related products

Product No.	Product Name	Unit Size
A2083	ATBTA-Eu^{3+} [=Sodium [4'-(4'-Amino-4-biphenylyl)-2,2':6',2"-terpyridine-6,6"-diylbis(methyliminodiacetato)]europate(III)]	100mg
C0460	Cyanuric Chloride	25g 500g
G0389	Goat Anti-Rabbit IgG Biotin Conjugate (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) Product Form : Purified goat polyclonal antibody/IgG, biotin conjugated Specificity : Rabbit IgG	0.1mg
G0418	Goat Anti-Rabbit IgG HRP Conjugate Product Form : Purified goat polyclonal antibody/IgG, Horseradish Peroxidase (HRP) conjugated Specificity : Rabbit IgG	0.1mg

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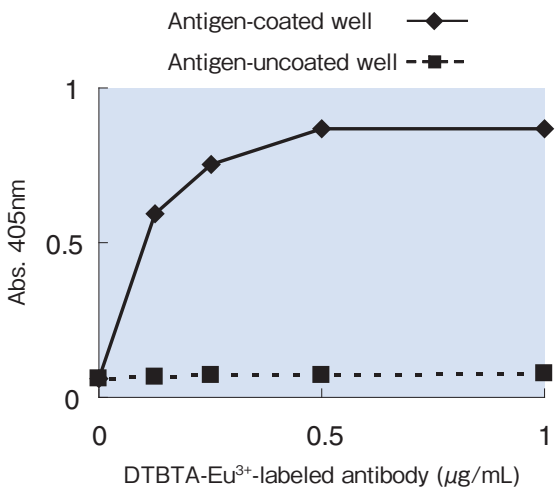
■Typical Procedure　ELISA using DTBTA-Eu^{3+}-labeled antibody

We demonstrate the immunological technique to detect an antigen with an antibody labeled with a hapten tag.

The antibody that recognizes a certain protein, was labeled with DTBTA-Eu^{3+} and a secondary-antibody (anti-DTBTA-Eu^{3+} antibody) binds to the tag molecule (DTBTA-Eu^{3+}).

Reagents
- Antigen protein(10μg/mL)
- DTBTA-Eu^{3+}-labeled antigen-specific antibody (1mg/mL) : Antigen specific primary antibody, which has been labeled with DTBTA-Eu^{3+}
- Purified anti-DTBTA-Eu^{3+} antibody : purified anti-DTBTA-Eu^{3+} rabbit antiserum with Protein A column
- Alkaline phosphatase-conjugated anti rabbit IgG :commercially available
- 10mM diethanolamine buffer (pH9.5) containing 0.5mM $MgCl_2$
- Chromogenic substrate : 1mg/mL pNPP in the diethanolamine buffer
- Stop solution : 0.1M EDTA, pH7.5
- TBS : 25mM Tris-HCl (pH7.2) containing 0.15M NaCl
- TBST : TBS containing 0.05% Tween-20
- Blocking solution : 4% skim milk in TBST
- Antibody diluting solution : 1% skim milk in TBST

Procedure
1. Place antigen protein into a 96-well plate (50μL/well) and incubate for 2 hours at room temperature
2. Remove the antigen solution, add blocking solution (150μL/well) to the wells and incubate for 2 hours at room temperature
3. Wash the wells with 200μL TBST, twice
4. Add purified DTBTA-Eu^{3+}-labeled antigen-specific antibody, which has been diluted at 1, 0.5, 0.25, and 0.125μg/mL with antibody diluting solution, to the well (100μL/well) and incubate for 1 hour at room temperature
5. Remove the antibody solution and wash the well with TBST, 3-times
6. Add purified anti-DTBTA-Eu^{3+} antibody (diluted at 1/1000, 100μL/well) to the wells and incubate for 1 hour at room temperature
7. Remove the antibody solution and wash the well with TBST, 3-times
8. Add alkaline phosphatase-conjugated anti rabbit IgG (100μL/well) to the wells and incubate for 1 hour at room temperature
9. Remove the antibody solution and wash the well with TBST, 3-times and further wash with 10mM diethanolamine buffer (pH9.5) containing 0.5mM $MgCl_2$
10. Add the chromogenic substrate (100μL/well) to the wells and add stop solution (100μL/well) after the incubation for 5-20 minutes at room temperature
11. Determine absorbance at 405nm



The increase of absorbance observed depending on the antibody concentration. On the other hand, antigen-uncoated wells gave low background signal. These observations have shown that the anti-DTBTA-Eu^{3+} antibody recognizes DTBTA-Eu^{3+} with higher specificity.

*This data is an application example of the products. Product performances are not guaranteed by this data.

References

1) New luminescent europium(III) chelates for DNA labeling
T. Nishioka, J. Yuan, Y. Yamamoto, K. Sumitomo, Z. Wang, K. Hashino, C. Hosoya, K. Ikawa, G. Wang, K. Matsumoto, *Inorg. Chem.* **2006**, *45*, 4088; Erratum in : *Inorg. Chem.* **2006**, *45*, 8460.

Anti-HRP Antibody

Product No.	Product Name	Unit Size
A2250	Anti-HRP Rabbit Polyclonal Antibody Product Form : Purified rabbit IgG Immunogen : Horseradish Peroxidase	0.2mL

Secondary Antibodies and Related Products

Product No.	Product Name	Unit Size
G0386	Goat Anti-Mouse IgG (Preservative : 0.07% NaN_3) (1mg/vial) Product Form : Purified goat polyclonal antibody/IgG Specificity : Mouse IgG	1mg
G0388	Goat Anti-Rabbit IgG (Preservative : 0.07% NaN_3) (1mg/vial) Product Form : Purified goat polyclonal antibody/IgG Specificity : Rabbit IgG	1mg
G0408	Goat Anti-Mouse IgM Product Form : Purified goat polyclonal antibody/IgG Specificity : Mouse IgM	1mg

HRP Conjugated Secondary Antibodies

Product No.	Product Name	Unit Size
G0407	Goat Anti-Mouse IgG HRP Conjugate Product Form : Purified goat polyclonal antibody/IgG, Horseradish Peroxidase (HRP) conjugated Specificity : Mouse IgG	0.1mg
G0417	Goat Anti-Mouse IgM HRP Conjugate Product Form : Purified goat polyclonal antibody/IgG, Horseradish Peroxidase (HRP) conjugated Specificity : Mouse IgM	0.1mg
G0418	Goat Anti-Rabbit IgG HRP Conjugate Product Form : Purified goat polyclonal antibody/IgG, Horseradish Peroxidase (HRP) conjugated Specificity : Rabbit IgG	0.1mg

FITC labeled Secondary Antibodies

Product No.	Product Name	Unit Size
G0406	Goat Anti-Mouse IgG FITC Conjugate Product Form : Purified goat polyclonal antibody/IgG, Fluorescein 5-Isothiocyanate (FITC) conjugated Specificity : Mouse IgG	0.1mg
G0452	Goat Anti-Rabbit IgG FITC Conjugate Product Form : Purified goat polyclonal antibody/IgG, Fluorescein 5-Isothiocyanate (FITC) conjugated Specificity : Rabbit IgG	0.1mg

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Biotin Conjugated Secondary Antibodies

Product No.	Product Name	Unit Size
G0387	Goat Anti-Mouse IgG Biotin Conjugate (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) (0.1mg/vial) Product Form : Purified goat polyclonal antibody/IgG, biotin conjugated Specificity : Mouse IgG	0.1mg
G0389	Goat Anti-Rabbit IgG Biotin Conjugate (Preservative : 0.05% NaN_3, Stabilizer : 1% BSA) (0.1mg/vial) Product Form : Purified goat polyclonal antibody/IgG, biotin conjugated Specificity : Rabbit IgG	0.1mg
G0432	Goat Anti-Mouse IgM Biotin Conjugate Product Form : Purified goat polyclonal antibody/IgG, biotin conjugated Specificity : Mouse IgM	0.1mg

Related Products

Product No.	Product Name	Unit Size
S0951	Streptavidin from *Streptomyces avidinii* Product Form : Purified streptavidin from *Streptomyces avidinii.* Lyophilized in 50mM sodium chloride.	1mg
S0966	Streptavidin FITC conjugate Product Form : Purified streptavidin, Fluorescein 5-Isothiocyanate (FITC) conjugated.	0.1mg

Staining

In the area of medical science and biology, several common visualization methods using dyes and antibodies are frequently employed to observe living tissue, cell structure, and cell function. These methods are called staining and are utilized as one of the most indispensable techniques in this area.

In general, the three typical staining methods include: 1) Dye staining, 2) Enzyme staining, and 3) Immunostaining. Dye staining relies on the affinity of a certain dye to specific biomolecular substrates such as proteins, nucleic acids, lipids and saccharides that compose the target samples. Enzyme staining or activity staining is based on enzymatic reaction while immunostaining is based on antigen-antibody interactions.

The page below shows the dyes and treating agents such as fixing agents for staining.

Stains & Dyes

Product No.	Product Name	Unit Size		
A2097	Acid Black 1			5g
A0586	Acid Black 1	25g	100g	500g
A0596	Acid Blue 119		1g	5g
A0595	Acid Fuchsine			25g
N0306	Acid Green 1		25g	500g
L0054	Acid Green 5			25g
G0158	Acid Orange 7		25g	500g
P0590	Acid Red 26			25g
E0204	Acid Red 91			25g
R0041	Acid Red 94			25g
M0490	Acid Yellow 36		25g	500g
A0132	Acridine Orange			25g
D0242	Alizarin			25g
A0440	Alizarin Complexone	100mg	1g	5g
A0583	Amaranth			25g
A0597	Aniline Blue (spirit soluble)			25g
A0334	Auramine			25g
A0603	Azocarmine G			25g
A0585	Azophloxine		25g	500g
A0574	Azure II		1g	25g
A5106	Basic Green 1			1g
B0789	Basic Green 1			25g
T0558	Basic Yellow 1			25g
H1343	Bisbenzimide H 33258 Hydrate			25mg
B0780	Bismarck Brown			25g
C0700	Brilliant Blue R			25g
C0543	Carmine		5g	25g
C0570	4-Chloro-1-naphthol			10g
C2291	4-Chloro-1-naphthol		1g	5g
C0550	Congo Red			25g
B3193	Coomassie Brilliant Blue G-250			5g
B3194	Coomassie Brilliant Blue R-250			5g
C2460	Crystal Violet Hydrate			5g
C0428	Crystal Violet Hydrate	25g	100g	500g
C0436	Cyanine		1g	5g
C0524	Cytidine 5'-Monophosphate Disodium Salt Hydrate		1g	5g
D3756	DAB		1g	5g
D3757	DAB・4HCl Hydrate		1g	5g
D0078	DAB・4HCl Hydrate		5g	25g
D0092	DAF	1g	5g	25g
A2412	DAPI・2HCl			5mg
D0949	Dithizone			25g
D0600	L-DOPA		5g	25g
T0037	Eosine			25g
E0214	Eriochrome Black T			25g
E0201	Eriochrome Cyanine R			25g
T0557	Erythrosine B			25g
E0370	Ethidium Bromide		1g	5g

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Product No.	Product Name			Unit Size
A5101	Ethyl Violet			1g
E0197	Evans Blue			25g
F0734	Fast Black K Salt			5g
F0718	Fast Green FCF			5g
O0096	Fat Red 7B		5g	25g
F0026	5-FITC (isomer I)		100mg	1g
F0783	6-FITC (isomer II)			100mg
F0240	Fluorescein Diacetate			5g
F0784	Fluorescein Isothiocyanate (mixture of 5- and 6- isomers)		100mg	1g
F0097	Fuchsine, Basic			25g
H0006	Hematoxylin Hydrate		5g	25g
H0093	Hexamethylenetetramine		25g	500g
I0214	Indigo Carmine			25g
I0212	Indigo (synthetic)			25g
I0067	INT		1g	5g
I0604	Iodine		25g	500g
J0002	Janus Green B		5g	25g
N0184	Kernechtrot		1g	10g
A5100	Malachite Green, Oxalate			1g
M0497	Malachite Green, Oxalate			25g
M0501	Methylene Blue Hydrate			25g
A5105	Methylene Blue			1g
M0498	Methyl Green			25g
G0177	Methyl Violet		25g	100g
A0579	Mordant Orange 1			25g
D0801	MTT		1g	5g
N0864	1-Naphthol		1g	5g
N0308	α-Naphthol Orange			25g
N0315	Neutral Red			25g
N0873	New Fuchsin			5g
N0318	New Methylene Blue		5g	25g
N0782	Nigrosine (Water soluble)			25g
N0317	Nile Blue A		5g	25g
N0659	Nile Red	500mg	1g	5g
D0844	Nitro Blue Tetrazolium		100mg	1g
O0101	Oil Red XO			25g
O0093	Orange G			25g
O0061	Orcein (Synthetic)		1g	25g
P0021	Pararosaniline		25g	500g
P0599	Pararosaniline Hydrochloride	25g	100g	500g
P0083	Phenazine Methyl Sulfate		1g	5g
T0050	Phloxine B			25g
P0156	Pinacyanol Chloride		100mg	1g
P0436	Pinacyanol Iodide		1g	5g
A2256	Ponceau S		1g	5g
P1721	Potassium Iodide			300g
Q0056	Quinacrine Dihydrochloride Hydrate			25g
A5102	Rhodamine B			1g
R0040	Rhodamine B		25g	250g
S0145	Safranine O		25g	500g
O0097	Solvent Black 5			25g
P0585	Sudan I			25g
S0142	Sudan III			25g
O0100	Sudan IV		25g	500g
S0113	Sudan Black B			25g
D0943	Tetrazolium Blue			1g
B3581	Tetrazolium Blue		1g	5g
T0214	Thionine Chloride			5g
T0571	Toluidine Blue			25g
T0556	Trypan Blue			25g
V0109	Variamine Blue B Diazonium Salt		5g	25g
V0035	Victoria Blue			25g

Treating Agents

Product No.	Product Name	Unit Size	
A0137	Acrolein Monomer (stabilized with HQ)	25mL	500mL
B0706	*tert*-Butyl Alcohol	25mL	500mL
D0798	DMSO	25g	500g
G0067	Glutaraldehyde (24-26% in Water)	25mL	500mL
A0264	Isoamyl Acetate		100mL
A0033	Isoamyl Acetate	25mL	500mL
O0308	Osmium Tetroxide (4% in Water)		10mL
P0018	Paraformaldehyde	25g	500g
P1742	Potassium Permanganate		300g
E0016	Propylene Oxide	25mL	500mL

When you stain for the first time, please perform preliminary staining, and use it after checking the optimal concentration etc.

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Substrates for Enzymatic Detection

●Peroxidase Substrates

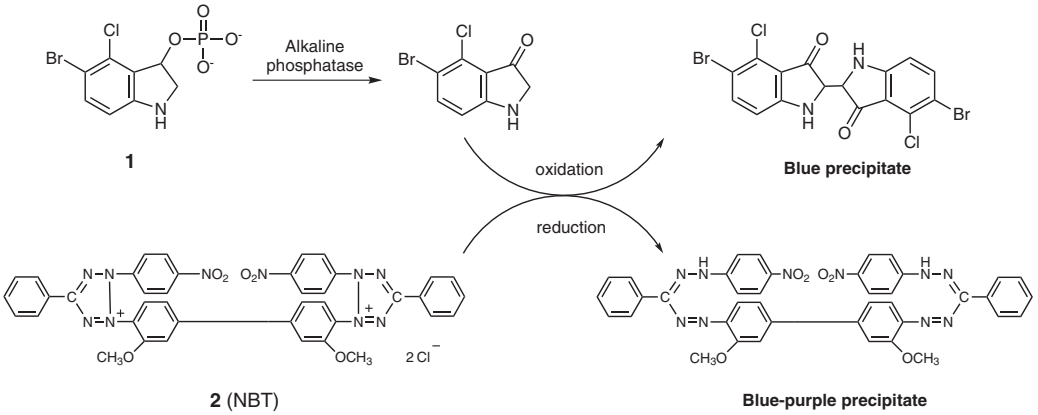
Peroxidase is an enzyme that oxidizes various compounds in the presence of hydrogen peroxide. The enzyme is used for quantifying and the qualifying of many compounds including biogenic substances. Moreover, peroxidase is applied, due to its stability, to perodixase-labeled antibodys etc. and they are used in the fields of biochemistry, immunology, and molecular biology. On the other hand, the enzyme that generates hydrogen peroxide exists widely in organisms. Some of substances in biological samples can be assayed by measuring the hydrogen peroxide generated with such an enzyme reaction.

Colorimetry is used for quantifying and qualifying peroxidase activity. A variety of chromogenic substrates is used for the purpose. The generally-used colorimetric substrates and their usage are summarized in the table as follows.

Product No.	Product Name	Unit Size	
Generating soluble dye (for ELISA, determining hydrogen peroxide, etc.)			
A2166	ABTS	1g	5g
A2254	4-Aminoantipyrine (4-AA)	1g	5g
A0257	4-Aminoantipyrine Hydrochloride (4-AA・HCl)	5g	25g
A2291	5-Aminosalicylic Acid (5-ASA)	5g	25g
D3865	2,4-Dichlorophenol (2,4-DCP)	1g	5g
D3868	*N*,*N*-Diethyl-*m*-toluidine (DMT)	1g	5g
D3866	*N*,*N*-Dimethylaniline (DMA)	1g	5g
S0827	*N*-(2-Hydroxy-3-sulfopropyl)-3,5-dimethoxyaniline Sodium Salt (HDAOS)	200mg	1g
M2155	3-Methyl-2-benzothiazolinonehydrazone Hydrochloride (MBTH Hydrochloride) Hydrate	1g	5g
P1805	1,2-Phenylenediamine (OPD)	1g	5g
P1144	1,2-Phenylenediamine Dihydrochloride (OPD・2HCl)	1g	5g
D1928	Sodium 3,5-Dichloro-2-hydroxybenzenesulfonate		25g
S0817	Sodium 3-(*N*-Ethylanilino)propanesulfonate (ALPS)	200mg	1g
S0826	Sodium 3-(*N*-Ethyl-3-methoxyanilino)-2-hydroxy-1-propanesulfonate (ADOS)	200mg	1g
S0805	Sodium 3-[Ethyl(*m*-tolyl)amino]-2-hydroxy-1-propanesulfonate (TOOS) Hydrate	1g	5g
T2573	3,3',5,5'-Tetramethylbenzidine (TMB)	1g	5g
T1764	2,4,6-Tribromo-3-hydroxybenzoic Acid (TBHBA)		5g
Generating insoluble dye (for immunohistochemistry, hybridization, Western-blotting, etc.)			
A2167	3-Amino-9-ethylcarbazole (AEC)	1g	5g
C2291	4-Chloro-1-naphthol (4-CN)	1g	5g
D3756	3,3'-Diaminobenzidine (DAB)	1g	5g
D3757	3,3'-Diaminobenzidine Tetrahydrochloride (DAB・4HCl) Hydrate	1g	5g
D3864	*o*-Dianisidine (Fast Blue B)	1g	5g
D3893	*o*-Dianisidine Dihydrochloride (Fast Blue B・2HCl)	1g	5g
D3931	*N*,*N*-Dimethyl-*p*-phenylenediammonium Dichloride	1g	5g
N0864	1-Naphthol	1g	5g

Alkali Phosphatase Substrates

Alkaline phosphatase is an enzyme that hydrolyzes phosphorylated substances under alkaline conditions. As the enzyme activity in serum originates in the liver, small intestines, and the osseous tissue, the activity is made to one of the disease markers of these tissues in the field of diagnosis. On the other hand, alkaline phosphatase is widely applied as a research reagent in the field of biochemistry and molecular biology and used to detect the antigen-antibody reaction as a labeling enzyme for antibodies. 5-Bromo-4-chloro-3-indolyl phosphate (**1**) and NBT (**2**) are substrates that are frequently employed for detecting the labeled enzyme on the blotting-experiment etc. Phosphoester bond of **1** is hydrolyzed by the enzyme and converted to a blue compound. NBT is reduced, by the linkage of the reaction described above, and converted to a blue purple compound which forms an insoluble precipitate. The precipitate gives a clear signal for an assay.



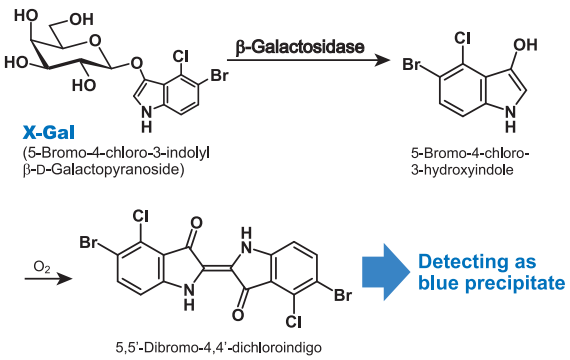
Chromogenic reaction of **1** / **2** by alkaline phosphatase.

Product No.	Product Name	Unit Size		
B3581	Blue Tetrazolium		1g	5g
B1846	5-Bromo-4-chloro-3-indolyl Phosphate Disodium Salt			Price on request
B1239	5-Bromo-4-chloro-3-indolyl Phosphate *p*-Toluidine Salt		100mg	1g
P1952	2-Carboxyphenyl Phosphate			1g
P0263	Disodium 1-Naphthyl Phosphate Hydrate		1g	5g
D4005	Disodium 4-Nitrophenyl Phosphate Hexahydrate		1g	5g
F0734	Fast Black K Salt			5g
B0785	Fast Blue RR Salt		5g	25g
F0751	Fast Red B Salt 1,5-Naphthalenedisulfonate			1g
I0781	2-(4-Iodophenyl)-3-(4-nitrophenyl)-5-phenyltetrazolium Chloride (INT)		100mg	1g
N0452	Monosodium 1-Naphthyl Phosphate Monohydrate	1g	5g	25g
C2250	Naphthol AS-TR Phosphate			200mg
D0844	Nitro Blue Tetrazolium (NBT)		100mg	1g
N0422	4-Nitrophenyl Phosphate Di(tris) Salt Hydrate		5g	25g
T0250	Tetranitro Blue Tetrazolium (TNBT)		100mg	1g
V0109	Variamine Blue B Diazonium Salt		5g	25g

β-Galactosidase Substrates

β-Galactosidase is an enzyme that hydrolyzes lactose to glucose and also acts broadly on allyl and alkyl β-D-galactosides. 5-Bromo-4-chloro-3-indolyl-β-D-galactopyranoside (X-Gal), which is a substrate of β-galactosidase, is hydrolyzed to galactose and 5-bromo-4-chloro-3-hydroxyindole by the action of the enzyme. 5-Bromo-4-chloro-3-hydroxyindole generated by the reaction is oxidized and converts to 5,5'-dibromo-4,4'-dichloroindigo, which forms a blue insoluble precipitate. The chromogenic signal of the precipitate offers the detection of the enzymatic activity with high sensitivity. Thus, X-Gal is widely used for assays, for example, color selection (Blue-white selection) of genetically-modified organisms with an introduced *lacZ* gene, in molecular biology, biochemistry, and histochemistry.

Availability or specification of the listed products are subject to change without prior notice.



X-Gal hydrolysis with β-galactosidase.

Product No.	Product Name	Unit Size		
Generating insoluble dye (Blue/white-selection, immunohistochemistry, etc.)				
B3201	5-Bromo-4-chloro-3-indolyl β-D-Galactopyranoside (X-Gal)		200mg	1g
B3469	5-Bromo-6-chloro-3-indolyl β-D-Galactopyranoside (Magenta-Gal) (contains *ca.* 10% Ethyl Acetate)		20mg	100mg
B3470	5-Bromo-3-indolyl β-D-Galactopyranoside (Bluo-Gal)		20mg	100mg
C2371	6-Chloro-3-indolyl β-D-Galactopyranoside (Salmon-Gal)		20mg	100mg
Generating soluble dye				
N0418	2-Nitrophenyl β-D-Galactopyranoside (ONPG)	1g	5g	25g
N0616	4-Nitrophenyl β-D-Galactopyranoside (PNPG)		1g	5g

■Typical Procedure Blue-white selection of *E. coli* expressing *lacZ* gene

- 100mM IPTG solution: IPTG (0.238g) is dissolved in 1mL of sterile water and the solution is sterilized with filtration and stored at −20℃ before use.
- 20mg/mL X-Gal solution: X-Gal (40mg) is dissolved into 1mL of *N*,*N*-dimethylformamide. The solution is stored under dark at −20℃ before use.
- 100mM IPTG solution (40μL) and 20mg/mL X-Gal solution (40μL) is dropped onto LB-agar medium (10cm) and is spread on the medium with glass beads or with a spreader.
- Appropriate amount of the gene-introduced *E. coli* cells is inoculated on the agar-medium with glass beads or with a spreader.
- The cells are cultivated at 37℃ over night, and the colonies grown on the agar-medium are counted.*

*When *lacZ*-expression plasmid vectors for gene cloning are used, some genes would be inserted into the vectors from white colonies.

●β-Glucuronidase Substrates

β-Glucuronidase (GUS) is an enzyme that hydrolyzes the β-glucuronide bond. In plants, due to the absence of *E. coli* GUS activity, it is possible to detect the activity at the tissue level. Thus, the GUS gene is widely used as a reporter for gene transfer into the plant. 5-Bromo-4-chloro-3-indolyl-β-D-glucuronide (X-Gluc), which is a substrate of β-glucuronidase, is hydrolyzed to glucuronic acid and 5-bromo-4-chloro-3-hydroxyindole by the action of the enzyme. 5-Bromo-4-chloro-3-hydoxyindole generated by the reaction is oxidized and converts to 5,5'-dibromo-4,4'-dichloroindigo, which forms a blue insoluble precipitate.

Product No.	Product Name	Unit Size	
B3620	5-Bromo-4-chloro-3-indolyl β-D-Glucuronide Cyclohexylammonium Salt (X-Gluc CHA Salt)	10mg	100mg
B3621	5-Bromo-4-chloro-3-indolyl β-D-Glucuronide Sodium Salt (X-Gluc Sodium Salt)	10mg	100mg
B4128	5-Bromo-6-chloro-3-indolyl β-D-Glucuronide Cyclohexylammonium Salt (Magenta-Gluc CHA Salt)	10mg	100mg
N0882*	Naphthol AS-BI β-D-Glucuronide	25mg	100mg
P2052	Pararosaniline Hydrochloride (Parafuchsin)	5g	25g

* N0882 is used together with P2052

●Luciferase Substrate

Luciferase is an enzyme that catalyzes luminescent reactions in bioluminescent organisms. Luciferase from the beetle catalyzes the two steps of luciferin oxidation in the presence of ATP, Mg^{2+}, and oxygen molecules.

The beetle's bioluminescence system, for example, the firefly system, is applied to the analysis of biological materials at the forefront of life sciences. For instance, the transcription activity of a special gene in cells is frequently assayed as an index for analysis and evaluation of the toxicity or medicinal effect of chemicals.

As the method of measuring gene transcription, i.e., gene expression assay (reporter assay) system, luciferase is an important tool in today's life sciences.

Product No.	Product Name	Unit Size	
A5030	D-(-)-Luciferin	10mg	50mg

Reference

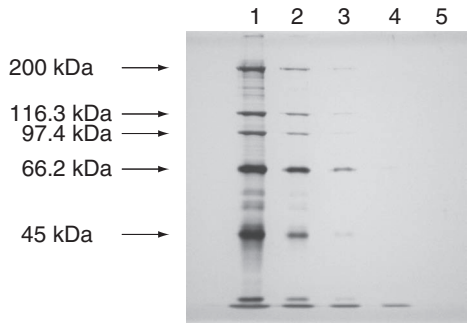
1) J. Sambrook, D. W. Russell, in *Molecular Cloning, A Laboratory Manual*, 3rd ed., Cold Spring Harbor Laboratory Press, New York, **2001**.

Availability or specification of the listed products are subject to change without prior notice.

Reagents for Electrophoresis

Electrophoresis is a technique which separates charged biomolecules based on the rate at which they migrate in an applied electrical field. In many cases, electrophoreses of proteins are performed using polyacrylamide gel electrophoresis (PAGE).[1] For molecular weight estimation and purity determination of proteins, sodium dodecyl sulfate (SDS)-PAGE is frequently employed. SDS is a strong denaturant of proteins and is added to samples, gels, and buffer solutions for electrodes when proteins are separated with electrophoresis. As SDS not only denatures protein but also binds to the protein, when SDS is used in conjunction with a reducing reagent such as 2-mercaptoethanol to cleave disulfide bonds in the protein, and the protein is completely denatured, the amount of SDS bound is almost always proportional to the molecular weight of the protein. Resultantly, the protein is negatively charged. Therefore, the denatured protein can be separated by molecular weight independently of its structure and biological properties.

Laemmli's method is the most widely used system of SDS-PAGE.[2] In this method, the separation and the stacking gel contain Tris-HCl and the upper and lower buffer reservoirs contain Tris-glycine. All components of the system contain SDS. The advantage of Laemmli's method is that it gives sharper bands in the final plate.[1]



[Example of electrophoresis]
Concentration of gel for separation: 7.5%
Staining: Ag-staining
Sample proteins: commercially available molecular weight marker

Lane 1 : 250 ng
Lane 2 : 62.5 ng
Lane 3 : 16 ng
Lane 4 : 4 ng
Lane 5 : 0 ng

●Reagents for gel preparation, buffer preparation, etc.

Reagents used for Laemmli's method are listed.

Product No.	Product Name	Unit Size	
A1132	Acrylamide Monomer	25g	500g
A2098	Ammonium Peroxodisulfate	5g	25g
B3195	Bromophenol Blue Sodium Salt (BPB)		1g
D3647	DL-Dithiothreitol (DL-DTT)	1g	5g
G0316	Glycerol		1g
G0317	Glycine (H-Gly-OH)	25g	500g
M1948	2-Mercaptoethanol	5g	25g
M0506	*N*,*N*'-Methylenebisacrylamide		25g
S0588	Sodium Dodecyl Sulfate (SDS)	25g	500g
T2515	*N*,*N*,*N*',*N*'-Tetramethylethylenediamine (TEMED)	5g	25g
T2516	Tris-Base (Tris-Base)	25g	500g

●Reagents for protein staining and others

After PAGE, the separated proteins are visualized with staining. Additionally, the separated proteins can be transferred to a PVDF membrane, etc. to be detected immunologically. Reagents for protein staining and others are listed.

Product No.	Product Name	Unit Size	
A2097	Acid Black 1 (Amido Black 10B)		5g
A2256	Acid Red 112 (Ponceau S)	1g	5g
A2255	6-Aminohexanoic Acid	5g	25g
B3193	Coomassie Brilliant Blue G-250		5g
B3194	Coomassie Brilliant Blue R-250		5g
F0718	Fast Green FCF		5g
D1820	Sodium Deoxycholate		25g

■Typical Procedure CBB R-250 staining of separated proteins on SDS-PAGE

Coomassie Brilliant Blue R-250 (CBB R-250) is frequently used for protein staining after PAGE.

Solutions
CBB R-250 staining solution : 0.25% CBB R-250, 50% methanol, 10% acetic acid
Destaining solution : 50% methanol, 10% acetic acid

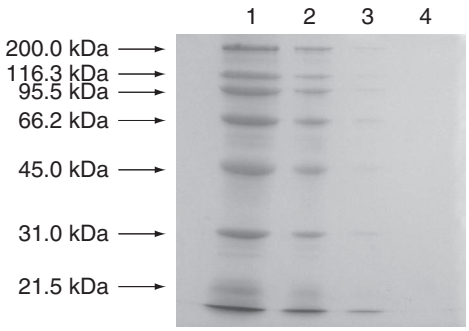
Procedure
1. Soak gel after electrophoresis in CBB R-250 staining solution with gentle agitation for 1 h.
2. Transfer the gel after step 1 into the destaining solution and gently agitate for 10 min.
3. Destain the gel until it gives an appropriate stained image by changing the destaining solution several times.
4. After destaining, transfer the gel into pure water and gently agitate for 1 h.

■Typical Procedure Fast Green FCF staining of separated proteins on SDS-PAGE[3)]

Fast Green FCF is used for staining and determination of protein after PAGE, SDS-PAGE etc. Stained protein is detected by absorbance at 625nm and quantified.

Solutions
Fast Green FCF staining solution : 0.1% Fast Green FCF, 30% ethanol, 10% acetic acid
Destaining solution : 30% ethanol, 10% acetic acid

Procedure
1. Soak gel after electrophoresis in Fast Green FCF staining solution with gentle agitation for 1 h.
2. Transfer the gel after step 1 into the destaining solution and gently agitate for 10 min.
3. Destain the gel until it gives an appropriate staining image by changing the destaining solution several times at 10-minute intervals.
4. After destaining, transfer the gel into pure water and gently agitate for 1 h.



[Example of staining]
Concentration of gel for separation: 10%
Staining: Ag-staining
Sample proteins: commercially available molecular weight markers

Lane 1 : 4 μg
Lane 2 : 0.8 μg
Lane 3 : 0.16 μg
Lane 4 : 0 μg

■Typical Procedure Reversible protein staining with Acid Red 112 (Ponceau-S)[4)]

Acid Red 112 gives a pinkish staining image. Because the staining with the dye is reversible and the dye can be removed from stained protein, immunoassay and other analyses can be carried out after destaining.

Solution
Acid Red 112 staining solution: 0.1% Acid Red 112, 5% acetic acid

Procedure
1. Soak the protein-blotted membrane into Acid Red 112 staining solution and gently agitate for 2 min.
2. Transfer the membrane into pure water and destain until it gives an appropriate staining image.
3. When required to completely remove the dye from the stained protein, gently agitate the membrane in 0.1mol/L NaOH.

Availability or specification of the listed products are subject to change without prior notice.



[Example of staining]
Bovine serum albumin, with the amount shown in the figure, is spotted on a nitrocellulose membrane and stained with Acid Red 112.

References

1) J. Sambrook, D. W. Russell, in *Molecular Cloning, A Laboratory Manual*, 3rd ed., Cold Spring Harbor Laboratory Press, New York, **2001**.
2) U. K. Laemmli, *Nature* **1970**, *227*, 680.
3) M. J. Bertolini, D. L. Tankersley, D. D. Schroeder, *Anal. Biochem*. **1976**, *71*, 6.
4) R. Simpson, in *Proteins and Proteomics*, Cold Spring Harbor Laboratory Press, New York, **2003**.

Surfactants

Surfactants are amphiphilic compounds containing both hydrophobic and hydrophilic groups and thereby are soluble in both organic solvents and water. Owing to the characteristic behavior of surfactants to orient at surfaces and form micelles by reducing the surface tension, they play an important role in many practical applications including the solubilization of membrane proteins, the decrease of the nonspecific adsorption of the material to the container surface etc. in the area of biochemistry. Surfactants are classified as ionic or nonionic depending on the formal charge on their hydrophilic head. Ionic surfactants can further be cationic, anionic or zwitter-ionic on the basis of the type of the charge present. The selection of surfactants in different fields is decided according to their particular usage.

The commonly used surfactants suitable in the field of biochemical research are listed below.

Anionic Surfactants

Product No.	Product Name	Unit Size	
L0254	Lithium Dodecyl Sulfate (LDS)	5g	25g
S0596	Sodium Cholate from Bovine Bile	5g	25g
D1820	Sodium Deoxycholate		25g
S0588	Sodium Dodecyl Sulfate (SDS)	25g	500g
S0597	Sodium *N*-Lauroylsarcosinate Hydrate	5g	25g

Amphoteric Surfactants

Product No.	Product Name	Unit Size	
D4246	Caprylyl Sulfobetaine	5g	25g
D3860	Lauryl Sulfobetaine	5g	25g
T2653	Myristyl Sulfobetaine	5g	25g
D4247	*n*-Octyl Sulfobetaine		5g
H1283	Palmityl Sulfobetaine	5g	25g

Nonionic Surfactants

Product No.	Product Name	Unit Size	
O0355	*n*-Octyl β-D-Glucopyranoside		1g
P1775	Polyethylene Glycol Mono-4-octylphenyl Ether n≈10	5g	25g
P1776	Polyethylene Glycol Monocetyl Ether n≈23	5g	25g
P1777	Polyethylene Glycol Monododecyl Ether n≈25	5g	25g
T2530	Tween 20 (=Polyoxyethylene Sorbitan Monolaurate)	5g	25g
T2531	Tween 40 (=Polyoxyethylene Sorbitan Monopalmitate)	5g	25g
T2532	Tween 60 (=Polyoxyethylene Sorbitan Monostearate)	5g	25g
T2533	Tween 80 (=Polyoxyethylene Sorbitan Monooleate)	5g	25g
T2534	Tween 85 (=Polyoxyethylene Sorbitan Trioleate)	5g	25g

TCI supplies general grade surfactants. Please refer to our web site.

Availability or specification of the listed products are subject to change without prior notice.

Protein Denaturation Reagents

Proteins fold into higher-order structures due to interactions such as hydrogen bonding, ionic interactions, and Van der Waals forces. Heat, acids and alkalis can change protein conformation and denature proteins. Protein extraction and analysis require protein denaturation, necessitating the use of urea and guanidine, which are chaotropic agents that disrupt the hydrogen bonding network.

Product No.	Product Name	Unit Size	
G0197	Guanidine Hydrochloride	25g	500g
G0360	Guanidine Thiocyanate	5g	25g
T2835	Thiourea	5g	25g
U0077	Urea	5g	25g

Non-detergent Sulfobetaines (NDSB)

Non-detergent sulfobetaines (NDSB) are amphiphilic small compounds containing both a cationic and anionic component which do not form micelles because of their small hydrophobic moiety. NDSBs solubilize proteins under mild conditions and can prevent protein denaturation by heat or acid, inhibit protein aggregation, acceleration protein refolding, and aid membrane protein extraction.

Product No.	Product Name		Unit Size
B4030	4-*tert*-Butyl-1-(3-sulfopropyl)pyridinium Hydroxide Inner Salt Hydrate		1g
H1399	(2-Hydroxyethyl)dimethyl(3-sulfopropyl)ammonium Hydroxide Inner Salt	1g	5g
S0813	1-(3-Sulfopropyl)pyridinium Hydroxide Inner Salt	5g	25g

References

1) L. Vuillard, C. Braun-Breton, T. Rabilloud, *Biochem. J.* **1995**, *305*, 337.
2) M. E. Goldberg, *et al.*, *Biophys. Chem.* **2002**, *100*, 469.

Availability or specification of the listed products are subject to change without prior notice.

Preservatives

Research in the life sciences requires the analysis of biological samples. Microorganisms can easily grow in these samples, and also in the buffers and reagents used for biological analysis. Therefore, preservatives are frequently added to samples and buffers to prevent the growth of microorganisms.

Product No.	Product Name	Unit Size	
A2572	Amprolium Hydrochloride	5g	25g
B3767	1,2-Benzisothiazol-3(2*H*)-one		5g
S0855	Benzoic Acid Sodium Salt	5g	25g
B3768	Benzylparaben	5g	25g
B3769	5-Bromo-5-nitro-1,3-dioxane		5g
B3770	1,3-Butylene Glycol	5g	25g
B3771	Butylparaben	5g	25g
C2536	2-Chloroacetamide	5g	25g
D4081	Dimetridazole	5g	25g
E0884	Ethylparaben	5g	25g
I0666	IPBC		25g
I0816	Isobutylparaben	5g	25g
I0817	Isopropylparaben	5g	25g
M2206	Methylparaben	5g	25g
O0378	2-*n*-Octyl-4-isothiazolin-3-one		1g
P1953	2-Phenoxyethanol	5g	25g
P1955	Propylparaben	5g	25g
H1342	Salicylic Acid	5g	25g
S0856	Sorbic Acid	5g	25g
P1954	Sorbic Acid Potassium Salt	5g	25g

Buffers

●Good's Buffers

In the field of biochemical research, buffering agents perform a very important function. The Tris buffers widely used today have a primary amino group and they are known to frequently cause inhibition problems in biological systems. Furthermore sufficient buffering power cannot be obtained under pH7.5.

Good and co-workers have developed buffers to overcome the above-noted defects and their superiority has been indicated by the Hill reactions. These buffers are referred to as Good's Buffers being named after the inventor.

【Characteristics】

1) Acid dissociation constant p*Ka* is between 6～8.
2) High water solubility.
3) Low penetration through biomembranes.
4) Low base effect toward biological systems.
5) p*Ka* is less affected by concentration, temperature and ion composition.
6) Low complexation ability with metal ions.
7) Chemically stable.
8) Low in absorption of visible and ultra-violet rays.

Composition and pH range

Composition	pH 5 6 7 8 9 10 11	Items	Unit Size
MES-NaOH-NaCl	5.2 – 7.1	M0606 MES	25g 250g
MES-NaOH	5.6 – 6.8	M0606 MES	25g 250g
ADA-NaOH-NaCl	5.6 – 7.5	A0699 ADA	25g 500g
Bis-Tris-HCl	5.7 – 7.3	B1493 Bis-Tris	25g 250g
ACES-NaOH-NaCl	5.9 – 7.8	A0700 ACES	25g
PIPES-NaOH	6.1 – 7.5	P1233 PIPES	25g 500g
BES-NaOH-NaCl	6.2 – 8.1	B0909 BES	25g 500g
MOPS-NaOH-NaCl	6.2 – 8.1	M0707 MOPS	25g 250g
MOPSO-NaOH	6.5 – 7.4	H0671 MOPSO	25g
TES-NaOH-NaCl	6.6 – 8.5	T0683 TES	25g 250g
MOPS-KOH	6.6 – 7.8	M0707 MOPS	25g 250g
HEPES-NaOH-NaCl	6.6 – 8.5	H0396 HEPES	25g 500g
HEPES-NaOH	6.8 – 8.2	H0396 HEPES	25g 500g
DIPSO-NaOH	7.1 – 8.1	B1494 DIPSO	25g
TAPSO-NaOH	7.2 – 8.2	T1364 TAPSO	25g
Tricine-NaOH-NaCl	7.2 – 9.1	T0682 Tricine	25g 250g
POPSO-NaOH	7.3 – 8.3	P1131 POPSO	25g
HEPPSO-NaOH	7.4 – 8.4	H0772 HEPPSO	25g
Bicine-NaOH-NaCl	7.4 – 9.3	B0484 Bicine	25g 100g 500g
TAPS-NaOH-NaCl	7.5 – 9.4	T0974 TAPS	25g
HEPPS-NaOH	7.5 – 8.7	H0576 HEPPS	25g
Tricine-NaOH	7.6 – 8.6	T0682 Tricine	25g 250g
Bicine-NaOH	7.7 – 8.9	B0484 Bicine	25g 500g
CHES-NaOH	8.6 – 10.0	C0920 CHES	25g
CAPS-NaOH	9.7 – 11.1	C0921 CAPS	25g 250g

Availability or specification of the listed products are subject to change without prior notice.

●pH Standard Solutions

Product No.	Product Name	Unit Size
S0352	pH Standard Solution Oxalate Buffer (pH 1.68)	250mL
S0353	pH Standard Solution Phthalate Buffer (pH 4.01)	250mL
S0354	pH Standard Solution Phosphate Buffer (pH 6.86)	250mL
S0355	pH Standard Solution Phosphate Buffer (pH 7.41)	250mL
S0356	pH Standard Solution Tetraborate Buffer (pH 9.18)	250mL
S0357	pH Standard Solution Carbonate Buffer (pH 10.01)	250mL

●Instant Buffers

Instant buffers are in granulated form. Dissolve immediately in purified water to give the desired buffer solution.

Soerensen Buffers

Product No.	Product Name	Unit Size
I0241	Instant Buffer S64 pH 6.4 (acc. to Soerensen)	50packs
I0243	Instant Buffer S70 pH 7.0 (acc. to Soerensen)	50packs

Kolthoff Buffers

Product No.	Product Name	Unit Size
I0234	Instant Buffer K40 pH 4.0 (acc. to Kolthoff)	50packs

■Preparation

Dissolve 1 pack of the product in purified water and adjust to 100mL. (Accuracy : pH ±0.05, 18℃)

●Other

Product No.	Product Name	Unit Size
B2904	Buffer Solution pH8.7 (6mol/L Guanidine Hydrochloride)	100mL

●Related Reagents for Buffer

Product No.	Product Name	Unit Size		
B0002	Barbital Sodium [for Michaelis' Buffer]		25g	500g
B1057	BIS-TRIS propane			25g
G0124	Glycylglycine		25g	500g
I0288	Imidazole	25g	100g	500g
L0165	L-Lactic Acid		25g	500g
M0713	*N*-Methyl-D-glucamine Hydrochloride		5g	25g
P0875	PIPES 1Na			25g
P0874	PIPES 2Na			25g
P0309	Potassium Hydrogen Phthalate		25g	500g
T0025	L-(+)-Tartaric Acid		25g	500g
T0962	TES Sodium Salt Hydrate			25g
T2516	Tris-Base		25g	500g
T0740	Tris Hydrochloride		25g	500g

References

1) N. E. Good, G. D. Winget, W. Winter, T. N. Connolly, S. Izawa, R. M. M. Singh, *Biochemistry* **1966**, *5*, 467.
2) W. J. Ferguson, K. I. Braunschweiger, W. R. Braunschweiger, J. R. Smith, J. J. McCormick, C. C. Wasmann, N. P. Jarvis, D. H. Bell, N. E. Good, *Anal. Biochem.* **1980**, *104*, 300.

Plant Hormones

A typical example of plant growth regulator is a plant hormone. Plant hormones are the collective term for compounds produced in minute amounts by plants to regulate their own physiological functions. To date, seven natural plant hormones have been discovered: auxins, cytokinins, ethylene, jasmonates, abscisic acid, gibberillins and brassinosteroids (Figure 1). Unnatural plant hormones or plant growth inhibitors are also included in this section.

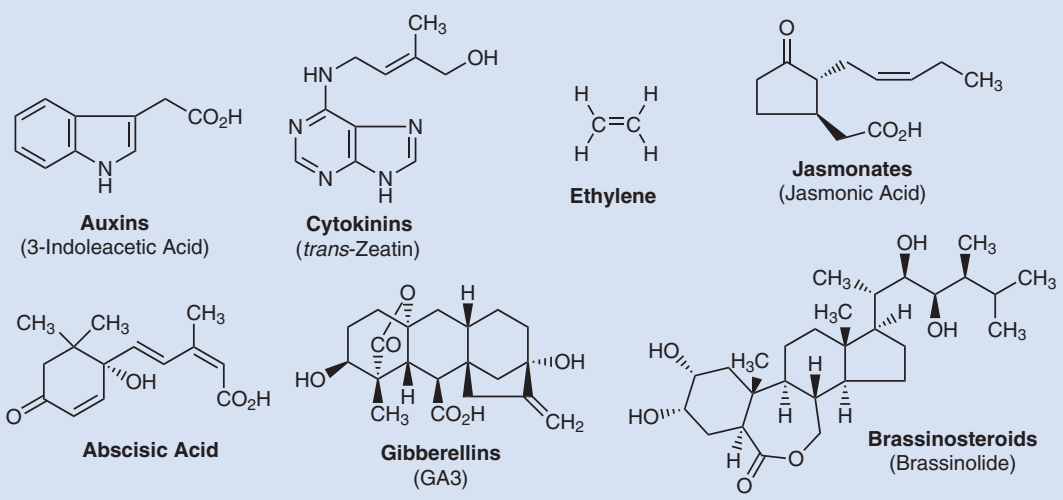


Figure 1. Natural Plant Hormones

Auxins

Historically, auxins were first discovered as substances which showed phototropism. To date, it has been revealed that they play numerous roles such as initial development, budding, root growth development, growth of flower parts and cell division. Natural auxins are 3-indoleacetic acid, 3-indolebutyric acid and phenylacetic acid. Some unnatural synthetic compounds also exhibit the same activities.

Product No.	Product Name	Unit Size	
B2746	4-BPA	5g	25g
C0250	4-CPA	25g	500g
D0396	2,4-D	25g	500g
D1942	Dichlorprop		25g
I0022	IAA	5g	25g
E0878	IAA Ethyl Ester	5g	25g
M2605	IAA Methyl Ester	5g	25g
I0026	IBA	5g	25g
I0024	3-Indoleacetonitrile	1g	25g
I0032	IPA	5g	25g
I0023	K-IAA	1g	25g
N0006	K-NAA		25g
N0005	NAA	25g	500g
D1319	Na-2,4-D Monohydrate	25g	500g
N0007	Na-NAA	25g	500g
N0624	1-Naphthaleneacetamide	25g	500g
N0045	NOA	25g	500g
C0940	PCIB	25g	500g
T0451	TIBA	5g	25g
T1509	2,4,5-T Potassium Salt	25g	500g

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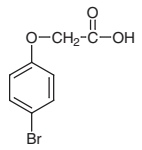
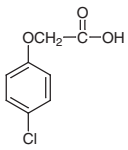
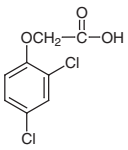
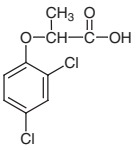
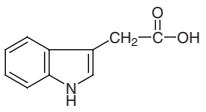
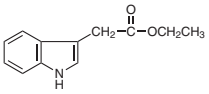
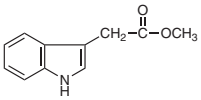
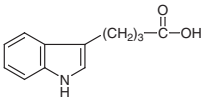
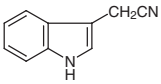
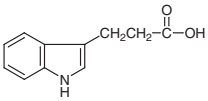
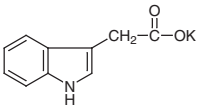
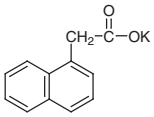
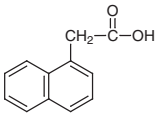
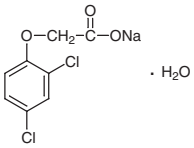
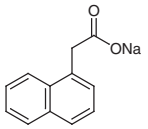
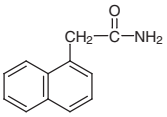
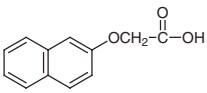
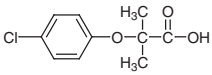
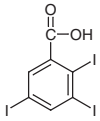
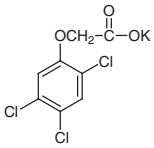
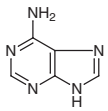
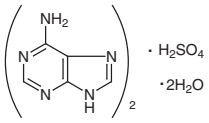
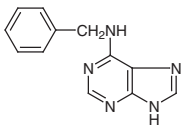
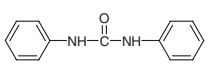
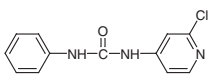
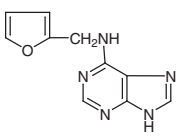
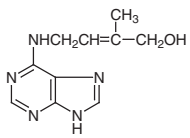
B2746 	C0250 	D0396 	D1942 	I0022 
E0878 	M2605 	I0026 	I0024 	I0032 
I0023 	N0006 	N0005 	D1319 	N0007 
N0624 	N0045 	C0940 	T0451 	T1509 

●Cytokinins

Cytokinins are regarded as substances which stimulate cell division, shoot initiation and bud formation, when addition auxins are added. Typical structure features are adenine with an isopentenyl unit at N^6 position, or with an isopentenyl unit with the methyl terminus being hydroxylated.

Product No.	Product Name	Unit Size	
A0149	Adenine	25g	250g
A0151	Adenine Sulfate Dihydrate		25g
B1088	N^6-Benzyladenine	5g	25g
C0031	Carbanilide	25g	500g
C0926	Forchlorfenuron	5g	25g
K0009	Kinetin	1g	5g
Z0012	*trans*-Zeatin		100mg

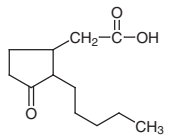
A0149 	A0151 	B1088 	C0031 	C0926 
K0009 	Z0012 			

Jasmonates

Jasmomates have a distinct fragrance and are biosynthesized from linolenic acid, an unsaturated fatty acid. They inhibit growth in adverse conditions, and stimulate tuber formation. They promote senescence of leaves, suppression of fruit growth, and the induction of tuber formation in potatoes.

Product No.	Product Name	Unit Size	
D3225	Dihydrojasmonic Acid	1g	5g
J0004	Jasmonic Acid (mixture of isomers)	1g	5g
J0005	(±)-Jasmonic Acid-9,10-d_2 *ca.* 80atom%D (contains *ca.* 5% (±)-7-*epi*-Jasmonic Acid-9,10-d_2) (200μg/mL in Acetonitrile) [Internal standard for qualitative analysis of endogenous Jasmonic Acid]		1mL
D1431	Methyl Dihydrojasmonate (*cis*- and *trans*- mixture)	10mL	25mL
M1068	Methyl Jasmonate (mixture of isomers)	5g	25g
M1700	Methyl (±)-Jasmonate-9,10-d_2 *ca.* 97atom%D (containing *ca.* 5% of Methyl (±)-7-*epi*-Jasmonate-9,10-d_2) (200μg/mL in Acetonitrile) [Internal standard for qualitative analysis of endogenous Methyl Jasmonate]		1mL

D3225



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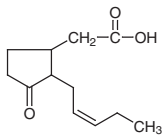

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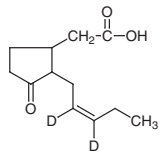

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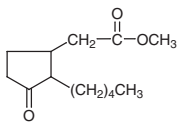

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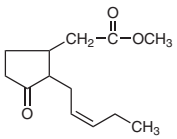

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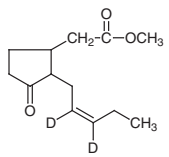
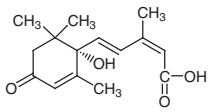


Abscisic Acids

Abscisic acid is occasionally classified as a sesquiterpene, however, it is biosynthesized from a carotenoid (C_{40}) precursor. It stimulates the closure of stomata in the absence of water and induces seeds to synthesize storage proteins. It is also released when a plant experiences stress, as in lack of nutrition, pests, root distress, or disease.

Product No.	Product Name	Unit Size	
A1698	(*S*)-(+)-Abscisic Acid		100mg
A0792	Abscisic Acid (Synthetic)	100mg	500mg

A1698



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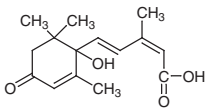


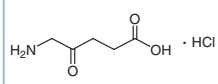
Others

Product No.	Product Name	Unit Size	
A0325	5-Aminolevulinic Acid Hydrochloride	100mg	1g
B2635	Benzoic Acid	25g	500g
B2829	Brassinazole	10mg	100mg
D0108	Cadaverine	5mL	25mL

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size	
C0172	Chlorocholine Chloride	25g	500g
C0329	Choline Chloride	25g	500g
C0380	Colchicine (contains 5% Ethyl Acetate at maximum)	500mg	5g
D4015	Daminozide	5g	25g
D0031	1-Decanol	25mL	500mL
D2191	Dikegulac Monohydrate		5g
G0029	Gibberellin A_3	100mg 1g	5g
H0206	2-Hydroxybenzoic Acid	25g	500g
L0129	L-(+)-Lysine	5g	25g
M0015	Maleic Hydrazide	25g	500g
D4016	Mepiquat Chloride	1g	5g
N0078	Nicotinamide	25g	500g
N0082	Nicotinic Acid	25g	500g
P0249	Phloroglucinol Anhydrous	25g	250g
P1404	L-Pipecolic Acid	1g	5g
D0239	Putrescine	25g	400g
B0004	*o*-Sulfobenzimide	25g	500g
D0029	Traumatic Acid		100mg
T1049	1-Triacontanol	100mg	1g

A0325



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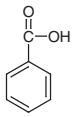

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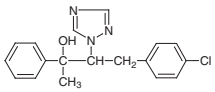

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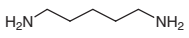

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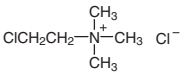

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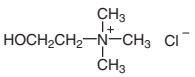

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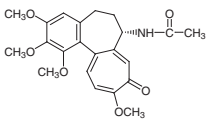

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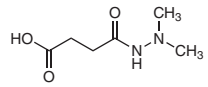

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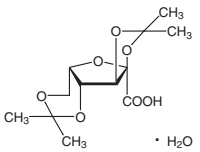
D2191



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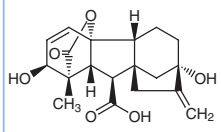

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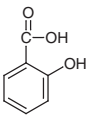

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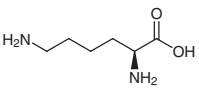

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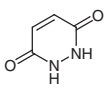

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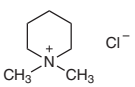

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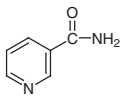

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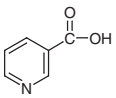

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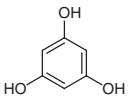

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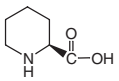

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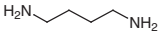

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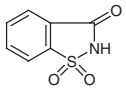

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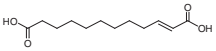

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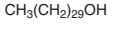


Phytochemicals

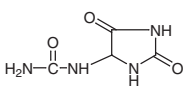
Phytochemical is a general term for natural botanical chemicals found in, for example, fruits and vegetables. Phytochemicals are not necessary for human metabolism, in contrast to proteins, sugars and other essential nutrients, but it is believed that phytochemicals affect human health. Phytochemicals are components of herbs and crude drugs used since antiquity by humans, and significant research into phytochemicals continues today.

Alkaloids (see p.148)
Terpenes (see p.114)
Steroids (see p.126)
Phenylpropanoids & Aromatic Polyketides (see p.136)

Others

Product No.	Product Name	Unit Size		
A0211	Allantoin		25g	500g
A2491	Aloe Emodin		100mg	1g
A0443	Amygdalin		1g	10g
A2459	Andrographolide		1g	5g
H0261	Apocynin	25g	100g	500g
A0522	Arbutin		5g	25g
D0563	Chrysazin			25g
D2117	Deoxyshikonin			100mg
D3986	4,5-Dihydroxyanthraquinone-2-carboxylic Acid		200mg	1g
D2118	(β,β-Dimethylacryl)shikonin			100mg
E0500	Emodin		100mg	1g
G0385	Geniposide		100mg	1g
G0397	Glucotropaeolin Potassium Salt			10mg
M0121	Guaiacol		25g	500g
M1028	(2-Methylbutyryl)shikonin			100mg
P0605	Purpurin			25g
S0903	Sinigrin			100mg
S0897	Swertiamarin			25mg
T0954	L-Theanine		1g	5g
U0023	(+)-Usnic Acid		1g	25g
H0264	Vanillin		25g	500g

A0211



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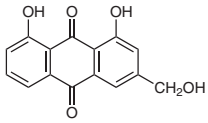

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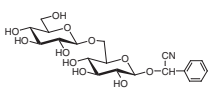

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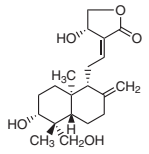

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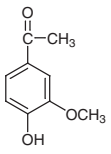

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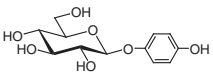
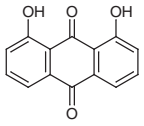


D0563



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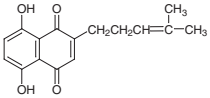

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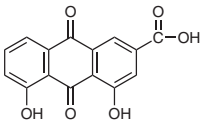

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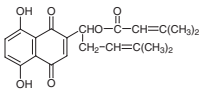
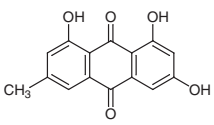
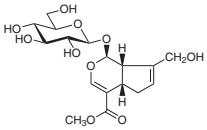


Availability or specification of the listed products are subject to change without prior notice.

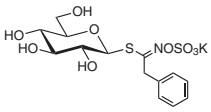
E0500



G0385



G0397



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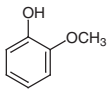

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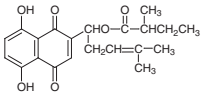

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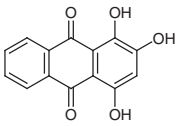

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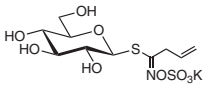

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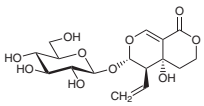

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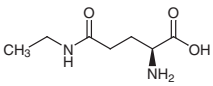

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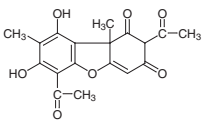

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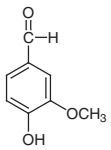

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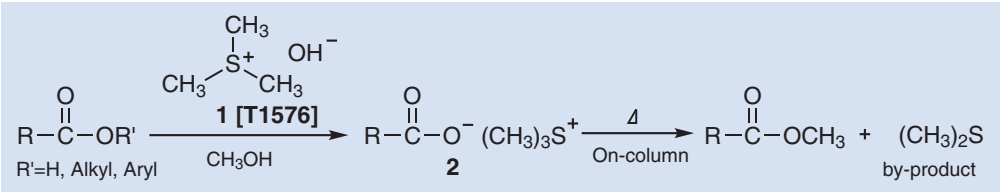
GC Derivatizing Reagents

Silylation Acylation
Esterification & Alkylation
Others

For GC analysis, the substance to be analyzed must be in the gaseous form. Because of this, the analysis of many organic compounds requires that injections, columns, and detectors are kept at relatively high temperatures. However, many organic compounds are thermally unstable. In such cases, it is necessary to convert the substance to be analyzed to a more volatile derivative appropriate for GC analysis. GC derivatizing reagents such as silylating, acylating, and alkylating reagents are used for this conversion.

Meanwhile, GC has been used for the analysis of biogenic substances. This generally requires the use of various derivatizing reagents. As an example, trimethylsulfonium hydroxide **1** can easily convert fatty acids, fatty acid esters, and glycerides into their methyl esters in a single step through the pyrolysis of the corresponding sulfonium salts **2**.[1] The low-boiling by-product, dimethyl sulfide, does not disturb the chromatographic separation of the samples. Therefore, the method using **1** is suitable for detection not only of longer chain fatty acids but also of relatively short chain fatty acids. **1** has been successfully applied for sample preparation in the analysis of fatty acids in microorganisms and human blood serum.[2]



Typical Procedure

A mixture of 1mg of fatty acids is dissolved in 0.1mL toluene, and then 0.5mL trimethylsulfonium hydroxide **1** (0.2mol/L methanol solution) is added. After 30 min at room temperature, the solution is used for gas chromatography.

Silylation

Trimethylsilylation

Product No.	Product Name	Unit Size		
A5601	BSA [=*N*,*O*-Bis(trimethylsilyl)acetamide]			5mL
B0510	BSA (25% in Acetonitrile)			12mL
B0511	BSA		10mL	100mL
A5603	BSTFA [=*N*,*O*-Bis(trimethylsilyl)trifluoroacetamide]			5mL
B0830	BSTFA	5mL	25mL	100mL
B3402	BSTFA-TMCS (99:1)		5mL	25mL
C0306	Chlorotrimethylsilane	25mL	100mL	500mL
H0089	HMDS	25mL	100mL	500mL
M0536	*N*-Methyl-*N*-trimethylsilylacetamide		10g	25g
M0672	*N*-Methyl-*N*-trimethylsilyltrifluoroacetamide		5mL	25mL
A5602	TMS-BA [=*N*,*O*-Bis(trimethylsilyl)acetamide] (25% in Acetonitrile)			5mL
T0274	TMS-HT (=HMDS and TMCS in Anhydrous Pyridine)			12mL
A5604	TMS-HT (=HMDS and TMCS in Anhydrous Pyridine)			5mL
A5605	TMS-Imidazole (=*N*-Trimethylsilylimidazole)			5mL
T0585	TMS-Imidazole		25g	100g
T0623	TMS-PZ (=*N*-Trimethylsilylimidazole in Anhydrous Pyridine) [for wet or dry Sugars, Mono or Poly Saccharides]			12mL
T0590	*N*-Trimethylsilylacetamide			25g
T0492	*N*-(Trimethylsilyl)diethylamine			25mL

Availability or specification of the listed products are subject to change without prior notice.

Product No.	Product Name	Unit Size
T0591	*N*-(Trimethylsilyl)dimethylamine	25mL

*Five products of A5601, A5602, A5603, A5604, and A5605 are purified and controlled so that impure substances having high boiling points, which are detrimental to the analysis, are below 20ppm per one component.

Dimethylsilylation

Product No.	Product Name	Unit Size	
C0778	Chlorodimethylsilane	25mL	250mL
T0833	1,1,3,3-Tetramethyldisilazane	5mL	25mL

Alkyldimethylsilylation

Product No.	Product Name	Unit Size		
B1906	*N*,*O*-Bis(*tert*-butyldimethylsilyl)acetamide			5g
B1043	1-(*tert*-Butyldimethylsilyl)imidazole		1g	5g
B1150	*N*-(*tert*-Butyldimethylsilyl)-*N*-methyltrifluoroacetamide		1g	10g
D1590	Chlorodimethylpropylsilane		5mL	25mL
D0135	Dimethylethylchlorosilane		5g	25g
D1516	1-(Dimethylethylsilyl)imidazole		1g	5g
D1594	Dimethylisopropylchlorosilane		5mL	25mL
D1596	1-(Dimethylisopropylsilyl)imidazole		1g	5g
B0995	TBSCl	5g	25g	100g

Halomethylsilylation

Product No.	Product Name	Unit Size	
B0990	1,3-Bis(chloromethyl)tetramethyldisilazane		5g
B0847	(Bromomethyl)chlorodimethylsilane		25g
C0605	Chloro(chloromethyl)dimethylsilane	25g	250g

Others

Product No.	Product Name	Unit Size	
A1275	Allylchlorodimethylsilane	10mL	25mL
B1435	*N*,*O*-Bis(diethylhydrogensilyl)trifluoroacetamide [Simultaneous cyclic silylene and silyl derivatizing reagent for GC]		1g
D1976	Dichlorodiethylsilane	5g	25g
D1816	1,3-Diphenyltetramethyldisilazane	5mL	25mL
P0854	Pentafluorophenyldimethylchlorosilane	1mL	5mL
P0908	Pentafluorophenyldimethylsilyldiethylamine		100mg

Esterification & Alkylation

N,*N*-Dimethylformamide Dialkylacetals

Product No.	Product Name	Unit Size	
D1303	*N*,*N*-Dimethylformamide Di-*tert*-butyl Acetal	5mL	25mL
D1302	*N*,*N*-Dimethylformamide Dibutyl Acetal	5mL	25mL
D1294	*N*,*N*-Dimethylformamide Diethyl Acetal	5mL	25mL
D1332	*N*,*N*-Dimethylformamide Dimethyl Acetal		0.5mL×10
D2071	*N*,*N*-Dimethylformamide Dimethyl Acetal		25mL
D1595	*N*,*N*-Dimethylformamide Dineopentyl Acetal	5mL	25mL
D1301	*N*,*N*-Dimethylformamide Dipropyl Acetal	5mL	25mL

Triazenes

Product No.	Product Name	Unit Size	
B0949	1-Benzyl-3-*p*-tolyltriazene	1g	25g
E0292	1-Ethyl-3-*p*-tolyltriazene		1g
I0280	1-Isopropyl-3-*p*-tolyltriazene		1g
M0641	1-Methyl-3-*p*-tolyltriazene	1g	25g

Onium Hydroxides

Product No.	Product Name			Unit Size
T0676	Tetramethylammonium Hydroxide (10% in Methanol)	25mL	100mL	500mL
T0961	3-(Trifluoromethyl)phenyltrimethylammonium Hydroxide (5% in Methanol)			25mL
P0245	Trimethylphenylammonium Hydroxide (20-25% in Methanol)			25mL
T1576	Trimethylsulfonium Hydroxide (0.2mol/L in Methanol)		5mL	25mL

BCl_3, BF_3, HCl-Alkanol Solutions

Product No.	Product Name	Unit Size
X0032	Boron Trichloride - 2-Chloroethanol Reagent (5-10%)	1mL×10
X0033	Boron Trichloride - Methanol Reagent (5-10%)	1mL×10
X0034	Boron Trifluoride - Butanol Reagent (10-20%)	1mL×10
X0035	Boron Trifluoride - Isopropyl Alcohol Reagent (10-20%)	1mL×10
X0036	Boron Trifluoride - Methanol Reagent (10-20%)	1mL×10
X0037	Boron Trifluoride - Propanol Reagent (10-20%)	1mL×10
X0039	Hydrogen Chloride - Butanol Reagent (5-10%)	1mL×10
X0038	Hydrogen Chloride - Methanol Reagent (5-10%)	1mL×10
X0041	Hydrogen Chloride - Methanol Reagent (5-10%)	25mL 100mL 500mL

Diazomethane Precursors & Equivalents

Product No.	Product Name			Unit Size
M0527	1-Methyl-3-nitro-1-nitrosoguanidine (wetted with *ca.* 50% Water, containing 5g on a dry weight basis)			5g
T0323	*N*-Methyl-*N*-nitroso-*p*-toluenesulfonamide		25g	500g
N0265	*N*-Methyl-*N*-nitrosourethane			25g
T1146	TMS-Diazomethane (*ca.* 10% in Hexane, *ca.* 0.6mol/L)	10mL	25mL	100mL

Acylation

Product No.	Product Name			Unit Size
A0694	*N*-Acetylimidazole		25g	500g
B0986	Bistrifluoroacetamide		5g	25g
H0024	Heptafluorobutyric Acid		25g	100g
H0337	Heptafluorobutyric Anhydride			10g
H0467	1-(Heptafluorobutyryl)imidazole		5g	25g
M0671	*N*-Methylbis(trifluoroacetamide)		1mL	5mL
P0807	Pentafluorobenzoyl Chloride		5g	25g
P0566	Pentafluoropropionic Anhydride		5g	25g
T0433	Trifluoroacetic Anhydride	20mL	100mL	400mL
T0670	1-(Trifluoroacetyl)imidazole		5g	25g

Others

Product No.	Product Name			Unit Size
B0529	Butylboronic Acid (contains varying amounts of Anhydride)	1g	5g	25g
F0280	Ferroceneboronic Acid (contains varying amounts of Anhydride) [Cyclic boronating reagent for GC/MS]		100mg	1g
C0178	Isobutyl Chloroformate	25g	100g	500g
P0809	Pentafluorobenzyl Bromide	1g	5g	25g
P0822	*O*-(2,3,4,5,6-Pentafluorobenzyl)hydroxylamine Hydrochloride [for Oxime Preparation]		1g	5g
B0857	Phenylboronic Acid (contains varying amounts of Anhydride)	5g	25g	250g

References

1) W. Butte, *J. Chromatogr.* **1983**, *261*, 142.
2) K.-D. Müller, H. P. Nalik, E. N. Schmid, H. Husmann, G. Schomburg, *J. High. Resolut. Chromatogr.* **1993**, *16*, 161; K.-D. Müller, H. Husmann, H. P. Nalik, G. Schomburg, *Chromatographia* **1990**, *30*, 245; L. Akoto, R. Pel, H. Irth, U. A. T. Brinkman, R. J. J. Vreuls, *J. Anal. Appl. Pyrolysis* **2005**, *73*, 69.

Availability or specification of the listed products are subject to change without prior notice.

Standard Materials for GC

n-Paraffins

Product No.	Product Name		Unit Size
S0277	Pentane	>99.5%	5mL
S0278	Hexane	>99.5%	5mL
S0279	Heptane	>99.5%	5mL
S0280	*n*-Octane	>99.5%	5mL
S0281	Nonane	>99.5%	5mL
S0282	Decane	>99.5%	5mL
S0283	Undecane	>99.5%	5mL
S0284	Dodecane	>99.5%	5mL
S0285	Tridecane	>99.5%	5mL
S0286	Tetradecane	>99.5%	5mL
S0287	Pentadecane	>99.5%	5mL
S0288	Hexadecane	>99.5%	5mL
S0289	Heptadecane	>99.5%	5mL
S0290	Octadecane	>99.5%	5mL
S0291	Nonadecane	>99.5%	5mL
S0292	Eicosane	>99.5%	5mL
S0293	Heneicosane	>99.0%	1g
S0294	Docosane	>99.0%	1g
S0295	Tricosane	>99.0%	1g
S0296	Tetracosane	>99.0%	1g
S0297	Pentacosane	>99.0%	1g

Fatty Acid Methyl Esters

Product No.	Product Name		Unit Size
S0299	Methyl Formate	>99.5%	5mL
S0300	Methyl Acetate	>99.5%	5mL
S0301	Methyl Propionate	>99.5%	5mL
S0302	Methyl Butyrate	>99.5%	5mL
S0303	Methyl Valerate	>99.5%	5mL
S0304	Methyl Hexanoate	>99.5%	5mL
S0305	Methyl Heptanoate	>99.5%	5mL
S0306	Methyl *n*-Octanoate	>99.5%	5mL
S0307	Methyl Nonanoate	>99.5%	5mL
S0308	Methyl Decanoate	>99.5%	5mL
S0309	Methyl Laurate	>99.5%	5mL
S0310	Methyl Myristate	>99.5%	5mL
S0311	Methyl Palmitate	>99.5%	5g
S0312	Methyl Stearate	>99.5%	5mL
S0326	Methyl Oleate	>99.0%	5mL
S0325	Methyl Linoleate	>99.0%	1g 5g
S0324	Methyl Linolenate	>98.0%	1g

1-Olefins

Product No.	Product Name		Unit Size
S0335	1-Pentene	>99.5%	5mL
S0336	1-Hexene	>99.5%	5mL
S0337	1-Heptene	>99.5%	5mL
S0338	1-Octene	>99.5%	5mL
S0339	1-Nonene	>99.5%	5mL
S0340	1-Decene	>99.5%	5mL
S0341	1-Undecene	>99.5%	5mL
S0342	1-Dodecene	>99.5%	5mL
S0343	1-Tridecene	>99.5%	5mL
S0344	1-Tetradecene	>99.5%	5mL

Product No.	Product Name		Unit Size
S0345	1-Pentadecene	>99.0%	5mL
S0346	1-Hexadecene	>99.5%	5mL
S0347	1-Heptadecene	>99.5%	5mL
S0348	1-Octadecene	>99.5%	1mL
S0349	1-Nonadecene	>99.5%	1mL
S0350	1-Eicosene	>99.5%	1mL

●Standard Mixtures for GC

n-Paraffins

Product No.	Product Name	Unit Size
S0451	Standard Mixture of *n*-Paraffins (consists of C_5, C_6, C_7, C_8 and C_9)	5mL
S0452	Standard Mixture of *n*-Paraffins (consists of C_{10}, C_{11}, C_{12}, C_{13} and C_{14})	5mL
S0453	Standard Mixture of *n*-Paraffins (consists of C_{15}, C_{16}, C_{17}, C_{18} and C_{19})	5mL
S0454	Standard Mixture of *n*-Paraffins (consists of C_7, C_8, C_9, C_{10} and C_{11})	5mL
S0455	Standard Mixture of *n*-Paraffins (consists of C_{12}, C_{13}, C_{14}, C_{15} and C_{16})	5mL
S0456	Standard Mixture of *n*-Paraffins (consists of C_{17}, C_{18}, C_{19} and C_{20})	5g
S0457	Standard Mixture of *n*-Paraffins (consists of C_{21}, C_{22}, C_{23}, C_{24} and C_{25})	1g

Product No.	Carbon																			
	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}	C_{13}	C_{14}	C_{15}	C_{16}	C_{17}	C_{18}	C_{19}	C_{20}	C_{21}	C_{22}	C_{23}	C_{24}	C_{25}
S0451	★	★	★	★	★															
S0452						★	★	★	★	★										
S0453											★	★	★	★	★					
S0454			★	★	★	★	★													
S0455								★	★	★	★	★								
S0456													★	★	★	★				
S0457																	★	★	★	★	★

Fatty Acid Methyl Esters

Product No.	Product Name	Unit Size
S0458	Standard Mixture of Fatty Acid Methyl Esters (consists of Methyl Formate, Acetate, Propionate, Butyrate and Valerate)	5mL
S0459	Standard Mixture of Fatty Acid Methyl Esters (consists of Methyl Hexanoate, Heptanoate, Octanoate, Nonanoate, and Decanoate)	5mL
S0460	Standard Mixture of Fatty Acid Methyl Esters (consists of Methyl Decanoate, Laurate, Myristate, Palmitate and Stearate)	5mL

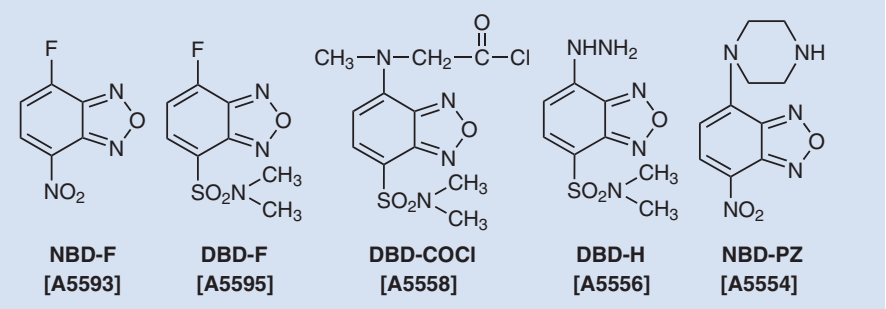
Product code	Carbon													
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{12}	C_{14}	C_{16}	C_{18}
S0458	★	★	★	★	★									
S0459						★	★	★	★	★				
S0460										★	★	★	★	★

Availability or specification of the listed products are subject to change without prior notice.

Labeling Reagents for HPLC

HPLC is used extensively as a means of detecting and determining trace components. In particular, it is effective in the case of non-volatile trace components in complex matrices such as biological substances. Labeling objective substances for analysis with labeling reagents appropriate for detection methods has been performed to obtain higher sensitivity and selectivity. A great number of labeling reagents have been reported for this purpose.

NBD- and DBD-derivatives developed by Imai, Toyo'oka and co-workers are excellent fluorescent labeling reagents with strong and long wave-length fluorescence resulting from their benzoxadiazole skeleton and they are used for analysis of various biological substances. NBD-Cl was the earliest fluorescence reagent which was applied to HPLC and its effectiveness for the secondary amines, such as proline, was reported. Imai and co-workers developed NBD-F[1], in which the chlorine was replaced with fluorine, for HPLC analysis and obtained good results. Also, they developed DBD-F[2] where a dimethylsulfamoyl group was introduced into the benzoxadiazole skeleton and used it for the analysis of amino acids by reversed phase HPLC. Because DBD-F itself is non-fluorescent, DBD-labeled amino acids can be detected and analyzed with high sensitivity. DBD-COCl[3] reacts with a hydroxy group as well as amines and thiols, and forms a stable fluorescence adduct. In addition, NBD- and DBD-H[4], in which a hydrazino group is introduced into the NBD-, DBD- skeleton, are used for analysis of carbonyl groups. NBD- and DBD-PZ[5], in which a piperazino group is introduced, are used for analysis of carboxyl groups.



NBD-F [A5593] **DBD-F [A5595]** **DBD-COCl [A5558]** **DBD-H [A5556]** **NBD-PZ [A5554]**

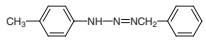
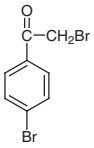
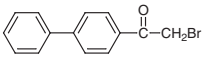
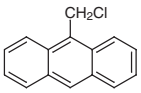
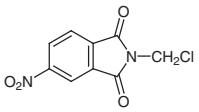
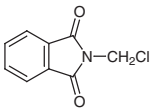
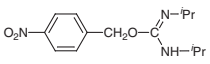
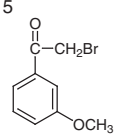
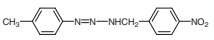
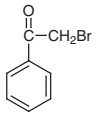
For electrochemical detectors (ECD), ferrocene derivatives and NPCA[6] have been reported. Ferrocenes have been utilized as the most suitable labeling reagents for ECD because they respond to the application of relatively low voltages, such as +0.5 V, and they are an excellent redox system of oxidation and reduction. NPCA has been developed by the research group of University of Shizuoka recently. NPCA reacts with various primary amines under mild conditions, followed by removal of the THP group to obtain the corresponding α-CA derivatives which have a 6-hydroxychroman skeleton. These derivatives exhibit intense electrochemical activity based on the 6-hydroxychroman skeleton and can be separated efficiently by HPLC on an ODS column.

N-(4-Aminobutyl)-*N*-ethylisoluminol has been reported to be usable as a chemiluminescence labeling reagent.[7]

UV Detection

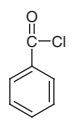
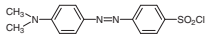
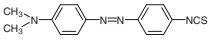
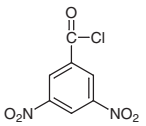
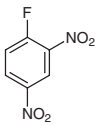
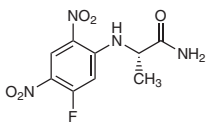
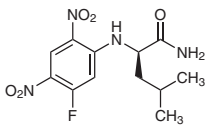
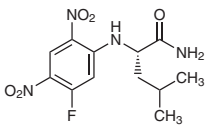
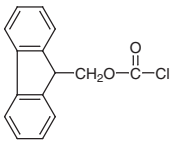
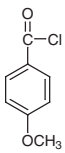
for Carboxyl Group

Product No.	Product Name	Unit Size	
B0949	1-Benzyl-3-*p*-tolyltriazene	1g	25g
A5501	4-Bromophenacyl Bromide		5g
B0633	2-Bromo-4'-phenylacetophenone	5g	25g
A5502	9-Chloromethylanthracene	1g	5g
A5503	*N*-Chloromethyl-4-nitrophthalimide	1g	5g
A5504	*N*-Chloromethylphthalimide		5g
A5506	*N,N'*-Diisopropyl-*O*-(4-nitrobenzyl)isourea		1g
A5505	3'-Methoxyphenacyl Bromide		5g
M0815	3'-Methoxyphenacyl Bromide	5g	25g
A5507	1-(4-Nitrobenzyl)-3-*p*-tolyltriazene		1g
A5508	Phenacyl Bromide		5g

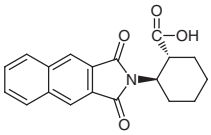
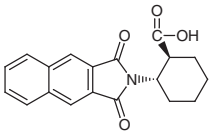
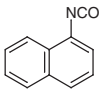
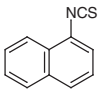
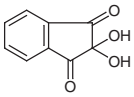
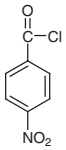
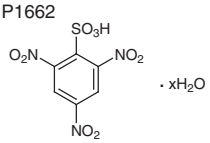
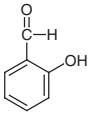
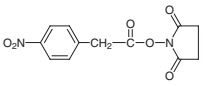
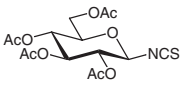
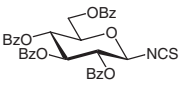
B0949 	A5501 	B0633 	A5502 	A5503 
A5504 	A5506 	A5505 M0815 	A5507 	A5508 

for Amino Group

Product No.	Product Name	Unit Size		
B0105	Benzoyl Chloride		25mL	500mL
D1382	Dabsyl Chloride [*N*-Protecting Agent for Peptides Research]		1g	25g
D1653	4-(Dimethylamino)azobenzene 4'-Isothiocyanate			100mg
A5511	3,5-Dinitrobenzoyl Chloride			5g
A5512	2,4-Dinitrofluorobenzene			5g
D2259	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-L-alaninamide [for *e.e.* Determination]		100mg	1g
A5524	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-D-leucinamide [for *e.e.* Determination]		100mg	1g
A5523	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-L-leucinamide [for *e.e.* Determination]			100mg
F0197	Fmoc-Cl	5g	25g	100g
M0721	4-Methoxybenzoyl Chloride	25g	100g	500g
I0189	Methyl Isothiocyanate		25g	500g
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
I0125	1-Naphthyl Isocyanate		5mL	25mL
I0190	1-Naphthyl Isothiocyanate		5g	25g
I0015	Ninhydrin		25g	500g
N0176	4-Nitrobenzoyl Chloride		25g	500g
I0131	Phenyl Isocyanate		25g	500g
A5513	Phenyl Isothiocyanate			5mL
T1340	Picrylsulfonic Acid Hydrate			5g
P1662	Picrylsulfonic Acid Hydrate			5g
S0004	Salicylaldehyde		25g	500g
A5522	*N*-Succinimidyl 4-Nitrophenylacetate			1g
A5514	2,3,4,6-Tetra-*O*-acetyl-*β*-D-glucopyranosyl Isothiocyanate		100mg	1g
A5515	2,3,4,6-Tetra-*O*-benzoyl-*β*-D-glucopyranosyl Isothiocyanate		100mg	1g

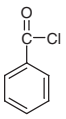
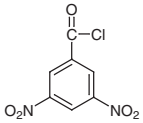
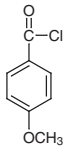
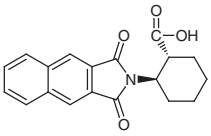
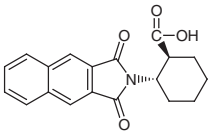
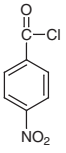
B0105 	D1382 	D1653 	A5511 	A5512 
D2259 	A5524 	A5523 	F0197 	M0721 

Availability or specification of the listed products are subject to change without prior notice.

I0189 	N0713 	N0714 	I0125 	I0190 
I0015 	N0176 	I0131 	A5513 	T1340 P1662 
S0004 	A5522 	A5514 	A5515 	

for Hydroxyl Group

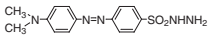
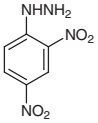
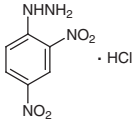
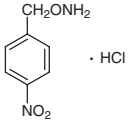
Product No.	Product Name			Unit Size
B0105	Benzoyl Chloride		25mL	500mL
A5511	3,5-Dinitrobenzoyl Chloride			5g
M0721	4-Methoxybenzoyl Chloride	25g	100g	500g
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0176	4-Nitrobenzoyl Chloride		25g	500g
I0131	Phenyl Isocyanate		25g	500g

B0105 	A5511 	M0721 	N0713 	N0714 
N0176 	I0131 			

for Carbonyl Group

Product No.	Product Name			Unit Size
A5533	Dabsyl Hydrazine			100mg
D0845	2,4-Dinitrophenylhydrazine (wetted with *ca.* 50% Water, containing 25g, 100g and 500g on a dry weight basis respectively)	25g	100g	500g
A5531	2,4-Dinitrophenylhydrazine Hydrochloride			5g
A5532	*O*-4-Nitrobenzylhydroxylamine Hydrochloride		1g	5g

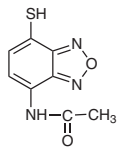
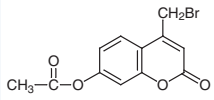
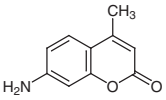
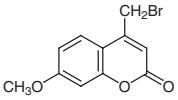
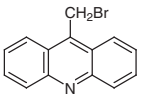
This TCI Reagent Guide is not an all inclusive guide of all the products available from us. Please refer to our catalog for further information or visit our web site.

A5533	D0845	A5531	A5532
			

Fluorescence Detection

for Carboxyl Group

Product No.	Product Name	Unit Size	
A5576	AABD-SH (=4-Acetamido-7-mercapto-2,1,3-benzoxadiazole)		100mg
A0979	7-Acetoxy-4-bromomethylcoumarin		1g
M0760	7-Amino-4-methylcoumarin	1g	5g
A5551	Br-Mmc (=4-Bromomethyl-7-methoxycoumarin)	1g	5g
B1926	9-(Bromomethyl)acridine	1g	5g
A5570	4-Bromomethyl-6,7-dimethoxycoumarin	100mg	1g
A5553	3-Bromomethyl-7-methoxy-1,4-benzoxazin-2-one	100mg	1g
A5502	9-Chloromethylanthracene	1g	5g
A5561	(*R*)-(-)-DBD-APy [=(*R*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]		100mg
A5560	(*S*)-(+)-DBD-APy [=(*S*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]		100mg
A5571	DBD-CO-Hz [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-(*N*-hydrazinocarbonylmethyl-*N*-methyl)amino-2,1,3-benzoxadiazole]		100mg
A5574	DBD-ED [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-aminoethylamino)-2,1,3-benzoxadiazole]		100mg
A5555	DBD-PZ [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-piperazino-2,1,3-benzoxadiazole]		100mg
A5563	(*R*)-(-)-NBD-APy [=(*R*)-(-)-4-Nitro-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]		100mg
A5562	(*S*)-(+)-NBD-APy [=(*S*)-(+)-4-Nitro-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]		100mg
A5573	NBD-CO-Hz [=4-(*N*-Hydrazinocarbonylmethyl-*N*-methylamino)-7-nitro-2,1,3-benzoxadiazole]		100mg
A5554	NBD-PZ (=4-Nitro-7-piperazino-2,1,3-benzoxadiazole)		100mg

A5576	A0979	M0760	A5551	B1926
				
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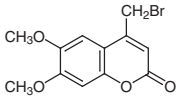	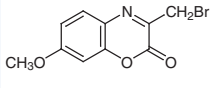	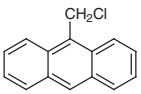	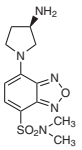	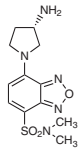
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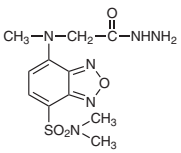
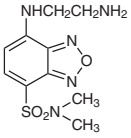
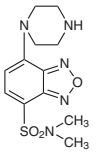
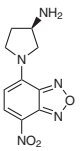
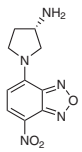
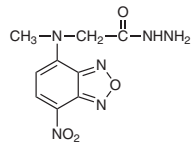
				

Availability or specification of the listed products are subject to change without prior notice.

A5573



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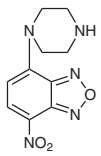
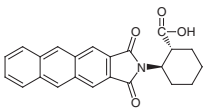


for Amino Group

Product No.	Product Name			Unit Size
A1657	(1*R*,2*R*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
A1658	(1*S*,2*S*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
D0005	Dansyl Chloride (10% in Acetone)			10mL
D0656	Dansyl Chloride	1g	5g	25g
A5558	DBD-COCl [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-(*N*-chloroformylmethyl-*N*-methylamino)-2,1,3-benzoxadiazole]			100mg
A5595	DBD-F [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-fluoro-2,1,3-benzoxadiazole]			100mg
A5575	DBD-NCS [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-isothiocyanato-2,1,3-benzoxadiazole] [for HPLC Labeling and Edman Degradation]			100mg
A5565	(*R*)-(+)-DBD-Pro-COCl [=(*R*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5564	(*S*)-(-)-DBD-Pro-COCl [=(*S*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5568	(*R*)-(-)-DBD-Py-NCS [=(*R*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-isothiocyanatopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5569	(*S*)-(+)-DBD-Py-NCS [=(*S*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-isothiocyanatopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
D3178	6-[[7-(*N*,*N*-Dimethylaminosulfonyl)-2,1,3-benzoxadiazol-4-yl]amino]hexanoic Acid			100mg
A5579	4-(4,5-Diphenyl-1*H*-imidazol-2-yl)benzoyl Chloride Hydrochloride			100mg
F0026	5-FITC (isomer I)		100mg	1g
F0783	6-FITC (isomer II)			100mg
F0192	Fluorescamine		100mg	1g
F0784	Fluorescein Isothiocyanate (mixture of 5- and 6- isomers)		100mg	1g
F0197	Fmoc-Cl	5g	25g	100g
M0722	2-Methoxy-2,4-diphenyl-3(2*H*)-furanone		100mg	1g
A5594	2,3-Naphthalenedialdehyde		100mg	1g
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
A5592	NBD-Cl (=4-Chloro-7-nitro-2,1,3-benzoxadiazole)		1g	5g
A5572	NBD-COCl [=4-(*N*-Chloroformylmethyl-*N*-methylamino)-7-nitro-2,1,3-benzoxadiazole]		100mg	1g
A5593	NBD-F (=4-Fluoro-7-nitro-2,1,3-benzoxadiazole)			100mg
A5566	(*R*)-(+)-NBD-Pro-COCl [=(*R*)-(+)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5567	(*S*)-(-)-NBD-Pro-COCl [=(*S*)-(-)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5577	(*R*)-(-)-NBD-Py-NCS [=(*R*)-(-)-4-(3-Isothiocyanatopyrrolidin-1-yl)-7-nitro-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5578	(*S*)-(+)-NBD-Py-NCS [=(*S*)-(+)-4-(3-Isothiocyanatopyrrolidin-1-yl)-7-nitro-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
P0280	*o*-Phthalaldehyde	5g	25g	100g
S0503	Succinimidyl 6-[[7-(*N*,*N*-Dimethylaminosulfonyl)-2,1,3-benzoxadiazol-4-yl]amino]hexanoate			100mg

A1657



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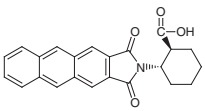

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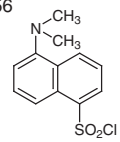

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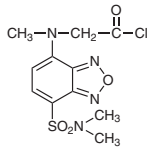

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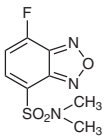

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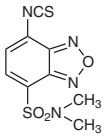

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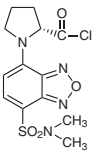

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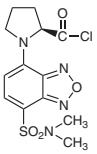

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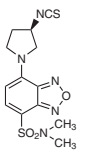

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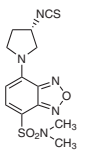
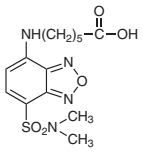
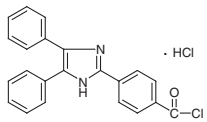
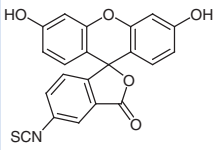
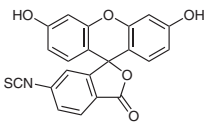
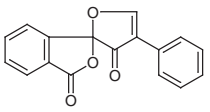
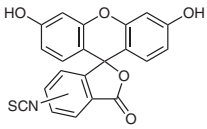
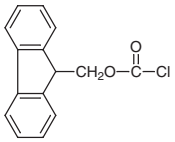
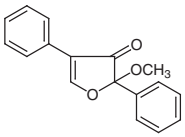
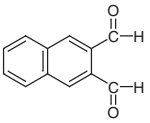
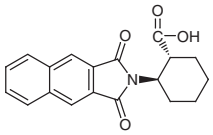
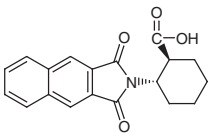
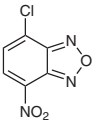
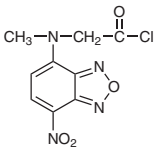
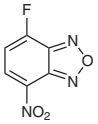
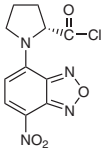
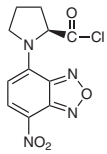
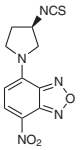
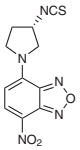
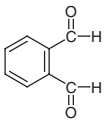
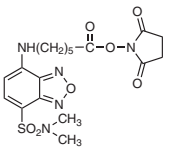
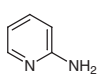
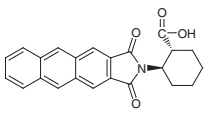
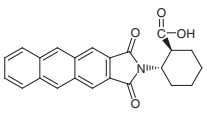
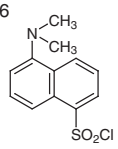
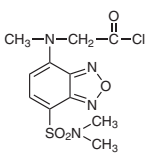


D3178 	A5579 	F0026 	F0783 	F0192 
F0784 	F0197 	M0722 	A5594 	N0713 
N0714 	A5592 	A5572 	A5593 	A5566 
A5567 	A5577 	A5578 	P0280 	S0503 

for Hydroxyl Group

Product No.	Product Name			Unit Size
A0411	2-Aminopyridine	25g	100g	500g
A1657	(1*R*,2*R*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
A1658	(1*S*,2*S*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
D0005	Dansyl Chloride (10% in Acetone)			10mL
D0656	Dansyl Chloride	1g	5g	25g
A5558	DBD-COCl [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-(*N*-chloroformylmethyl-*N*-methylamino)-2,1,3-benzoxadiazole]			100mg
A5565	(*R*)-(+)-DBD-Pro-COCl [=(*R*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5564	(*S*)-(-)-DBD-Pro-COCl [=(*S*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
D3178	6-[[7-(*N*,*N*-Dimethylaminosulfonyl)-2,1,3-benzoxadiazol-4-yl]amino]hexanoic Acid			100mg
A5579	4-(4,5-Diphenyl-1*H*-imidazol-2-yl)benzoyl Chloride Hydrochloride			100mg
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
A5572	NBD-COCl [=4-(*N*-Chloroformylmethyl-*N*-methylamino)-7-nitro-2,1,3-benzoxadiazole]		100mg	1g
A5566	(*R*)-(+)-NBD-Pro-COCl [=(*R*)-(+)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg
A5567	(*S*)-(-)-NBD-Pro-COCl [=(*S*)-(-)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole] [for *e.e.* Determination]			100mg

A0411 	A1657 	A1658 	D0005 D0656 	A5558 

Availability or specification of the listed products are subject to change without prior notice.

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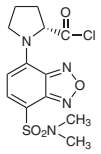

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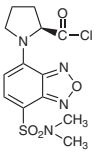

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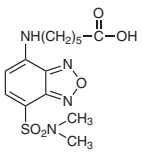

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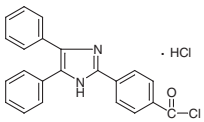

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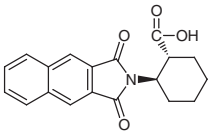

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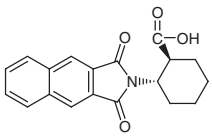

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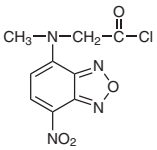

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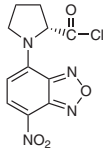

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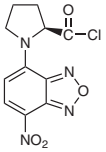
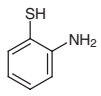


for Carbonyl Group

Product No.	Product Name	Unit Size
A0267	2-Aminobenzenethiol	25mL 100mL 500mL
A5581	1,3-Cyclohexanedione	5g
A5552	Dansyl Hydrazine	1g 5g
A5571	DBD-CO-Hz [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-(*N*-hydrazinocarbonylmethyl-*N*-methyl)amino-2,1,3-benzoxadiazole]	100mg
A5556	DBD-H [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-hydrazino-2,1,3-benzoxadiazole]	100mg
A5573	NBD-CO-Hz [=4-(*N*-Hydrazinocarbonylmethyl-*N*-methylamino)-7-nitro-2,1,3-benzoxadiazole]	100mg
A5557	NBD-H (=4-Hydrazino-7-nitro-2,1,3-benzoxadiazole Hydrazine)	100mg

A0267



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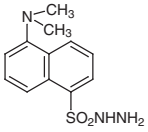

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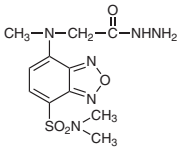

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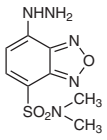

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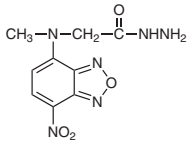

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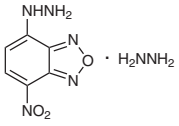
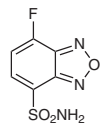


for Mercapto Group

Product No.	Product Name	Unit Size
A5597	ABD-F [=4-(Aminosulfonyl)-7-fluoro-2,1,3-benzoxadiazole]	100mg 500mg
A5596	DAABD-Cl [=4-[2-(Dimethylamino)ethylaminosulfonyl]-7-chloro-2,1,3-benzoxadiazole] [for Proteome Analysis]	100mg
A5595	DBD-F [=4-(*N*,*N*-Dimethylaminosulfonyl)-7-fluoro-2,1,3-benzoxadiazole]	100mg
A5591	NAM [=*N*-(9-Acridinyl)maleimide]	50mg 100mg
A5592	NBD-Cl (=4-Chloro-7-nitro-2,1,3-benzoxadiazole)	1g 5g
A5593	NBD-F (=4-Fluoro-7-nitro-2,1,3-benzoxadiazole)	100mg
P1214	*N*-(1-Pyrenyl)maleimide	250mg

A5597



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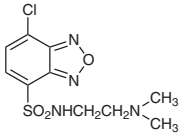

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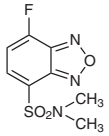

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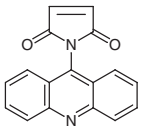

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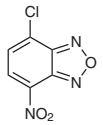

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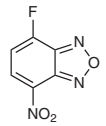

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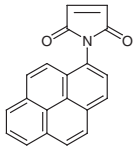
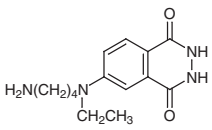


Chemiluminescence Detection

Product No.	Product Name	Unit Size	
A5304	*N*-(4-Aminobutyl)-*N*-ethylisoluminol	100mg	1g
D2339	4-Isoluminol Isothiocyanate		100mg

A5304



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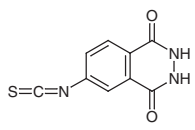
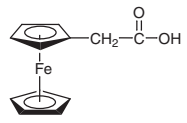


Electrochemical Detection

Product No.	Product Name	Unit Size	
F0406	Ferroceneacetic Acid	1g	5g
F0280	Ferroceneboronic Acid (contains varying amounts of Anhydride)	100mg	1g
H0941	(Hydrazinocarbonyl)ferrocene		1g
S0820	*N*-Succinimidyl Ferrocenecarboxylate	200mg	1g
S0599	Succinimidyl (2*R*)-6-(Tetrahydro-2*H*-pyran-2-yloxy)-2,5,7,8-tetramethylchroman-2-carboxylate		50mg

F0406



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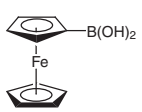

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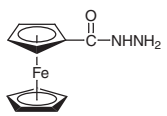

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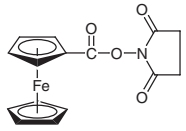

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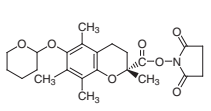

Availability or specification of the listed products are subject to change without prior notice.

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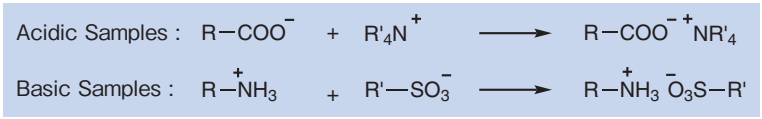
1) K. Imai, Y. Watanabe, *Anal. Chim. Acta* **1981**, *130*, 377; Y. Watanabe, K. Imai, *J. Chromatogr.* **1982**, *239*, 723; Y. Watanabe, K. Imai, *J. Chromatogr.* **1984**, *309*, 279.
2) T. Toyo' oka, T. Suzuki, Y. Saito, S. Uzu, K. Imai, *Analyst* **1989**, *114*, 413; T. Toyo' oka, T. Suzuki, Y. Saito, S. Uzu, K. Imai, *Analyst* **1989**, *114*, 1233; K. Imai, S. Uzu, T. Toyo' oka, *J. Pharm. Biomed. Anal.* **1989**, *7*, 1395.
3) K. Imai, T. Fukushima, H. Yokosu, *Biomed. Chromatogr.* **1994**, *8*, 107; Tokyo Kasei Kogyo Co., Ltd., Jpn. Kokai Tokkyo Koho 7 238075, **1995**.
4) S. Uzu, S. Kanda, K. Imai, K. Nakashima, S. Akiyama, *Analyst* **1990**, *115*, 1477.
5) T. Toyo' oka, M. Ishibashi, Y. Takeda, K. Nakashima, S. Akiyama, S. Uzu, K. Imai, *J. Chromatogr.* **1991**, *588*, 61.
6) NPCA : Succinimidyl (2*R*)-6-(Tetrahydro-2*H*-pyran-2-yloxy)-2, 5, 7, 8-tetramethylchroman-2-carboxylate
T. Sasaki, T. Fukushima, M. Ohishi, T. Toyo' oka, *Biomed. Chromatogr.* **2008**, *22*, 888.
7) T. Kawasaki, M. Maeda, A. Tsuji, *J. Chromatogr.* **1985**, *328*, 121.

Ion-Pair Reagents for HPLC

Ion-exchange chromatography systems have previously been utilized in HPLC analysis of ionic samples. Recently, reversed phase partition chromatography using ion-pair reagents has been developed and utilized. The ionic samples form an ion-pair with ion-pair reagents in the mobile phase to become electrically neutral. The increase in hydrophobic character of the ion-pair results in a greater affinity for the reverse stationary phase and leads to sample resolution.



UV and fluorescence detectors are widely used. Therefore ion-pair reagents must lack UV absorption and fluorescence themselves to obtain highly sensitive detection of samples. The UV absorption of sodium alkanesulfonates and quaternary ammonium salts is minimal so that these reagents can be used for reliable HPLC analysis. On the other hand, when a sample lacks sufficient UV absorption or fluorescence, the use of sodium 9,10-dimethoxyanthracene-2-sulfonate allows for high-sensitivity detection as a fluorimetric ion-pair reagent.

Recently, use of LC-MS in which mass spectrometry is incorporated in HPLC as a detector has become widespread. Sodium alkanesulfonates, general ion-pair reagents, being non-volatile crystals pose a problem in that they contaminate the interface. The IPC-PFFA series is made of highly volatile ion-pair reagents allowing for continuous LC-MS analysis without contaminating the interfaces.

●Ion-Pair Reagents for Acidic Samples

Acidic samples are treated with ion-pair reagents for acidic samples and the resultant ion pairs are retained on reversed-phase analytical systems to be available for separation analysis. As a general analysis, typical quaternary ammonium salts, dialkylammonium acetates for LC-MS are available for purchase.

■Quaternary ammonium salts for typical analysis

- TBA (tetrabutylammonium salts) is commonly used.
- TEA (tetraethylammonium salts) in IPC-TEA-OH acts as an ion-pair and the retention ability for acidic samples in the reverse phase systems is weaker compared to TBA (TEA < TBA).
- When using IPC-TBA-OH or IPC-TEA-OH as ion-pair reagents, analysis is performed with pH adjusted to 7.5 with the addition of phosphoric acid to the mobile phase since these ammonium salts are strongly basic compounds.
- IPC-TBA-P is available without any treatment because it shows a pH value about 7.5 in the addition to the mobile phase (see a preparation procedure below).
- IPC-TBA-Br, IPC-TBA-Cl, IPC-TBA-HS and IPC-DTMA-Cl become acidic solutions when adding to the mobile phase.
- IPC-TBA-Br isn't suitable for the analysis with short wavelength (at UV 210 nm) and gradient elution due to having a relatively large ultraviolet absorption.

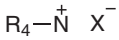
【Preparation procedure for the mobile phase】

1.When using tetrabutylammonium phosphate:
The reagent (10 mL) is diluted to 1 L with an aqueous solvent such as methanol - water.
(pH adjustment is not required because the reagent is already buffered.)

2.When using tetrabutylammonium hydroxide:
1) The reagent (12.5 mL) is diluted to 1 L with an aqueous solvent such as methanol - water.
2) The pH is adjusted to 7.5 by the addition of an aqueous phosphoric acid (10%).

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

for Acidic Samples

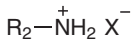


Product No.	Product Name			Unit Size	
I0363	IPC-TEA-OH	Tetraethylammonium Hydroxide (10% in Water)			25mL
I0364	IPC-TBA-OH	Tetrabutylammonium Hydroxide (10% in Water)		25mL	100mL
I0365	IPC-TBA-Br	Tetrabutylammonium Bromide	25g	100g	500g
I0366	IPC-TBA-Cl	Tetrabutylammonium Chloride		5g	25g
I0367	IPC-TBA-P	Tetrabutylammonium Phosphate (0.5mol/L in Water)		10mL	100mL
I0368	IPC-TBA-HS	Tetrabutylammonium Hydrogen Sulfate		25g	100g
I0453	IPC-DTMA-Cl	Dodecyltrimethylammonium Chloride		25g	500g

■Dialkylammonium acetates for typical analysis/ LC-MS analysis

- These reagents are available for LC-MS analysis since they have volatile reagents.
- The greater the number of carbons in the alkyl group, the greater the retention ability (IPC-DPAA < IPC-DBAA < IPC-DAAA < IPC-DHAA).
- The ion-pair reagents are previously prepared to produce the solution with 5 mmol/L and pH adjusted near 7.5 by the dilution with 1 L of a mobile phase solvent.

for LC/MS



Product No.	Product Name		Unit Size	
A5703	IPC-DPAA	Dipropylammonium Acetate (*ca.* 0.5mol/L in Water)		10mL
A5702	IPC-DBAA	Dibutylammonium Acetate (*ca.* 0.5mol/L in Water)	10mL	100mL
A5704	IPC-DAAA	Diamylammonium Acetate (*ca.* 0.5mol/L in Water)	10mL	100mL
A5705	IPC-DHAA	Dihexylammonium Acetate (*ca.* 0.5mol/L in Water)	10mL	100mL

●Ion-Pair Reagents for Basic Samples

Basic samples are treated with ion-pair reagents for basic samples and the resultant ion pairs are electrically neutral to retain on reversed-phase analytical systems to be available for separation analysis. As a general analysis, typical sodium alkanesulfonates, perfluorofatty acids usable for LC-MS analysis are available for purchase.

■Sodium alkanesulfonates for typical analysis

- The greater the number of carbons in the alkyl group, the greater the retention ability (IPC-ALKS-3 << IPC-ALKS-8 << IPC-ALKS-13).
- The solutions are neutral upon adding them to the mobile phase. By adjusting the pH value to around 3 to 4 with the addition of phosphoric acid or other acids, ion-pair forming ability for basic substances can be enhanced (see a preparation procedure below).
- The greater the number of carbons in the alkyl group means a decreasing solubility in water. In an analysis by gradient elution, care must be taken to avoid precipitation of the salts when increasing the amount of the organic solvent (decreasing the ratio of water).

【Preparation procedure for the mobile phase】

1) Sodium 1-heptanesulfonate 1.011 g (0.005 mol) is weighed out.
2) The reagent is dissolved in 1 L of an aqueous solvent such as methanol - water.
3) The pH is adjusted to 3.5 by the addition of aqueous phosphoric acid (50%).

for Basic Samples

$R-SO_3^- \ Na^+$

Product No.	Product Name		Unit Size	
I0341	IPC-ALKS-3	Sodium 1-Propanesulfonate	5g	25g
I0342	IPC-ALKS-4	Sodium 1-Butanesulfonate	5g	25g
I0343	IPC-ALKS-5	Sodium 1-Pentanesulfonate	5g	25g 100g
I0344	IPC-ALKS-6	Sodium 1-Hexanesulfonate	5g	25g 100g
I0345	IPC-ALKS-7	Sodium 1-Heptanesulfonate	5g	25g 100g
I0346	IPC-ALKS-8	Sodium 1-Octanesulfonate	5g	25g 100g
I0347	IPC-ALKS-9	Sodium 1-Nonanesulfonate	5g	25g
I0348	IPC-ALKS-10	Sodium 1-Decanesulfonate	5g	25g
I0349	IPC-ALKS-11	Sodium 1-Undecanesulfonate	5g	25g
I0350	IPC-ALKS-12	Sodium 1-Dodecanesulfonate	5g	25g
I0351	IPC-ALKS-13	Sodium 1-Tridecanesulfonate	5g	25g
I0352	IPC-SDS	Sodium Dodecyl Sulfate	25g	500g

Perfluorofatty acids for typical analysis/ LC-MS analysis

- These reagents are available for LC-MS analysis since they have volatile reagents.
- The greater the number of carbons in the alkyl group, the greater the retention ability (IPC-PFFA-2 << IPC-PFFA-5 << IPC-PFFA-8).
- These reagents need only to be added to the mobile phase (No need of pH adjusting the dilution solvent because it already shows acidity.)
- PFFA-2, PFFA-3, PFFA-4 and PFFA-5 are supplied as 0.5 mol/L aqueous solutions. When the amount of reagent for one bottle (10 mL) is diluted with the LC solvents to just 1.0 L, the concentration of solutions is suitable for the analysis (5 mmol/L).
- PFFA-6, PFFA-7 and PFFA-8 are slightly soluble in water. When the amount of reagent for one bottle (crystals) is dissolved with 1 L of the LC solvents, the concentration of solutions is suitable for the analysis (5 mmol/L). In addition, the high-quality products of PFFA-6, 7 and 8 (A5722, A5721, A5720) for high-sensitive detections are available for purchase.

for LC/MS

Rf—COOH

Product No.	Product Name		Unit Size	
A5711	IPC-PFFA-2	Trifluoroacetic Acid (*ca.* 0.5mol/L in Water)		10mL
A5712	IPC-PFFA-3	Pentafluoropropionic Acid (*ca.* 0.5mol/L in Water)		10mL
A5713	IPC-PFFA-4	Heptafluorobutyric Acid (*ca.* 0.5mol/L in Water)	10mL	100mL
A5714	IPC-PFFA-5	Nonafluorovaleric Acid (*ca.* 0.5mol/L in Water)		10mL
A5715	IPC-PFFA-6	Undecafluorohexanoic Acid (*ca.* 5mmol)		1sample
A5722	IPC-PFFA-6 HG	Undecafluorohexanoic Acid High Grade	1g	5g
A5716	IPC-PFFA-7	Tridecafluoroheptanoic Acid (*ca.* 5mmol)		1sample
A5721	IPC-PFFA-7 HG	Tridecafluoroheptanoic Acid High Grade	1g	5g
A5717	IPC-PFFA-8	Pentadecafluorooctanoic Acid (*ca.* 5mmol)		1sample
A5720	IPC-PFFA-8 HG	Pentadecafluorooctanoic Acid High Grade	1g	5g

Fluorimetric Ion-Pair Reagent

Product No.	Product Name	Unit Size
A5701	Sodium 9,10-Dimethoxyanthracene-2-sulfonate	1g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Solvents for HPLC & Spectrophotometry

for HPLC

Product No.	Product Name	λ, E	Unit Size
A0793	Acetonitrile	210 nm, < 0.10	500mL
B0944	1-Butanol	210 nm, < 1.00	500mL
C1111	Chloroform (stabilized with 2-Methyl-2-butene)	250 nm, < 1.00	500mL
C0819	Chloroform (stabilized with Ethanol)	250 nm, < 1.00	500mL
C0818	Cyclohexane	210 nm, < 0.80	500mL
E0289	1,2-Dichloroethane	230 nm, < 0.70	500mL
M0629	Dichloromethane (stabilized with 2-Methyl-2-butene)	240 nm, < 0.30	500mL
H0491	Heptane	210 nm, < 0.35	500mL
H0490	Hexane	210 nm, < 0.30	500mL
I0277	Isopropyl Alcohol	210 nm, < 0.80	500mL
M0628	Methanol	210 nm, < 0.70	500mL
M0627	Methylcyclohexane	210 nm, < 1.00	500mL
O0151	*n*-Octane	210 nm, < 0.35	500mL
I0276	2,2,4-Trimethylpentane	210 nm, < 0.50	500mL

for Spectrophotometry

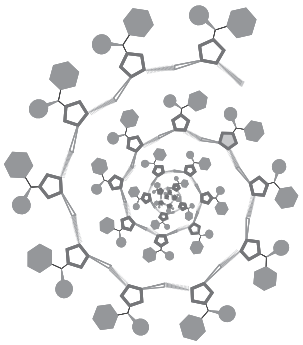
Product No.	Product Name	λ, E	Unit Size
A0054	Acetone	330 nm, < 1.00	500mL
A0293	Acetonitrile	210 nm, < 0.10	100mL
B0020	Benzene	280 nm, < 0.70	500mL
B0806	Bromoform (stabilized with Diphenylamine)	360 nm, < 0.30	100mL
B0228	1-Butanol	210 nm, < 1.00	100mL
E0140	2-Butanone	330 nm, < 1.00	25mL 500mL
A0228	Butyl Acetate	254 nm, < 1.00	500mL
C0175	Chloroform (stabilized with Ethanol)	250 nm, < 0.50	100mL
C0696	Cyclohexane	210 nm, < 0.80	100mL
D0310	1,2-Dichloroethane	230 nm, < 0.70	250mL
D0529	Dichloromethane (stabilized with 2-Methyl-2-butene)	240 nm, < 0.30	100mL
O0120	Diethyl Oxalate	320 nm, < 0.50	250mL
D0939	*N,N*-Dimethylformamide	270 nm, < 0.80	100mL 500mL
D0601	Dimethyl Sulfoxide	270 nm, < 0.20	100mL
A0030	Ethyl Acetate	260 nm, < 0.30	250mL
F0085	Ethyl Formate	270 nm, < 1.00	100mL
H0027	Heptane	210 nm, < 0.35	100mL
H0394	Hexane	210 nm, < 0.30	100mL
A0264	Isoamyl Acetate	260 nm, < 0.50	100mL
I0164	Isopropyl Alcohol	210 nm, < 0.80	100mL 500mL
M0097	Methanol	210 nm, < 0.70	500mL
M0244	Methylcyclohexane	210 nm, < 1.00	100mL
F0086	Methyl Formate	260 nm, < 1.00	100mL
N0019	Nitromethane	380 nm, < 1.00	100mL
O0118	*n*-Octane	210 nm, < 0.50	100mL
T0713	1,2,3,4-Tetrahydronaphthalene	340 nm, < 0.10	250mL
T0260	Toluene	290 nm, < 0.35	100mL
T0715	2,2,4-Trimethylpentane	210 nm, < 0.50	250mL

Chromatography Columns for HPLC

●Chiral Columns "TCI Chiral (for normal phase)/TCI Chiral RP (for reversed phase)"

New type of chiral separation with synthetic organic polymer phase systems - "TCI Chiral"

1. A unique new stationary phase
   Polymaleimide (helical polymer) with asymmetric substituent coated on silica gel.
2. Suitable for separation of a wide range of compounds
   Carbonyls (Ketones, Esters, Carboxylic acids, *N*-Protected amino acids etc.), Alcohols and others
3. High column load capacity
4. High throughput analysis
5. Superior column longevity
   Maximum pressure: 2900 psi (20 MPa)
6. Line of normal and reversed phase columns
7. Affordable prices



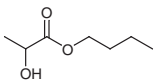
Normal and Reversed Phase Applications

＜Normal Phase＞

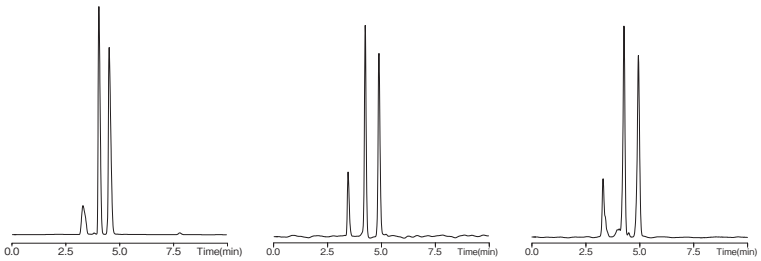
n-Hexane / 2-Propanol = 70 / 30 (TCI Chiral MB-S)
90 / 10 (TCI Chiral BP-S and TCI Chiral CH-S)

Column Size : 4.6 mm I.D. × 250 mm
Detection : UV 210 nm
Flow Rate : 1.0 mL/min
Temperature : 40 ℃

Sample : Butyl Lactate



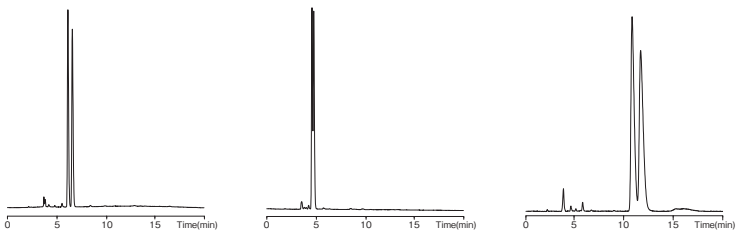
TCI Chiral MB-S (3 μm) TCI Chiral BP-S (3 μm) TCI Chiral CH-S (3 μm)



＜Reversed Phase＞

Acetonitrile / Water = 10 / 90

TCI Chiral MB-S (5 μm) TCI Chiral BP-S (5 μm) TCI Chiral CH-S (5 μm)



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■Normal phase

Column	TCI Chiral MB-S		TCI Chiral BP-S		TCI Chiral CH-S	
Particle Size	3μm	5μm	3μm	5μm	3μm	5μm
2.0mmI.D.× 50mm	S3816	S3846	S3826	S3856	S3836	S3866
2.0mmI.D.×150mm	S3812	S3842	S3822	S3852	S3832	S3862
2.0mmI.D.×250mm	S3813	S3843	S3823	S3853	S3833	S3863
4.6mmI.D.× 50mm	S3815	S3845	S3825	S3855	S3835	S3865
4.6mmI.D.×150mm	S3810	S3840	S3820	S3850	S3830	S3860
4.6mmI.D.×250mm	S3811	S3841	S3821	S3851	S3831	S3861
10.0mmI.D.×250mm	—	S3870	—	S3880	—	S3890
20.0mmI.D.×250mm	—	S3871	—	S3881	—	S3891

■Reversed phase

Column	TCI Chiral MB-S RP	TCI Chiral BP-S RP	TCI Chiral CH-S RP
Particle Size	5μm	5μm	5μm
2.0mmI.D.× 50mm	S3874	S3884	S3894
2.0mmI.D.×150mm	S3875	S3885	S3895
2.0mmI.D.×250mm	S3876	S3886	S3896
4.6mmI.D.× 50mm	S3877	S3887	S3897
4.6mmI.D.×150mm	S3878	S3888	S3898
4.6mmI.D.×250mm	S3879	S3889	S3899

●ODS + Ion-Exchange Mixed-Mode Columns "TCI Dual / Kaseisorb LC"

ODS columns are the most popular HPLC columns and are used for separations of hydrophobic compounds. The use of ion-pair reagents allows retention and separation of acidic or basic compounds on ODS columns. However, there are several problems associated with ion-pair reagents, for example, the lack of influence of ion-pair reagents on retention, the removal of ion-pair reagents retained on the column, HPLC machines, the use of LC-MS, etc.

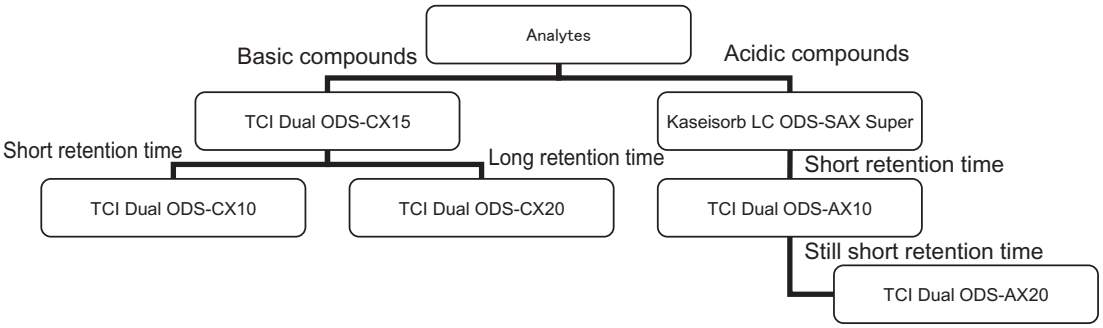
Hence, TCI developed and commercialized packing materials bearing both ODS ligands capable of firmly retaining hydrophobic compounds and ion-exchange ligands capable of retaining acidic or basic compounds in 1996.

1. Target compound is basic → Choose ODS + Cation-Exchange Type
   Target compound is acidic → Choose ODS + Anion-Exchange Type
2. Hydrophobic compounds can be retained on mixed-mode columns.
3. No ion-pair reagent is required.
4. The packing material has both ion-exchange and ODS phases.
   (Not a mixture of packing materials of an ion-exchange and ODS)
5. High NTP values close to ODS's

■Product Line

Column	Ion-Exchange Type	Analytes	Usable Mobile phase pH range	Ion-Exchange pH Range	Pore Diameter (nm)	Particle Size (μm)
TCI Dual ODS-CX10	ODS + Strong Cation-Exchange	Basic compounds	2.5~7.5	2.5~7.5	12	3, 5
TCI Dual ODS-CX15	ODS + Medium Cation-Exchange	Basic compounds	2.5~7.5	2.5~7.5	12	3, 5
TCI Dual ODS-CX20	ODS + Weak Cation-Exchange	Basic compounds	2.5~7.5	4.5~7.5	12	3, 5
Kaseisorb LC ODS-SAX Super	ODS + Strong Anion-Exchange	Acidic compounds	2.5~7.5	2.5~7.5	12	3, 5

Column	Ion-Exchange Type	Analytes	Usable Mobile phase pH range	Ion-Exchange pH Range	Pore Diameter (nm)	Particle Size (μm)
TCI Dual ODS-AX10	ODS + Strong Anion-Exchange	Acidic compounds	2.5~7.5	2.5~7.5	12	3, 5
TCI Dual ODS-AX20	ODS + Weak Anion-Exchange	Acidic compounds	2.5~7.5	2.5~7.5	12	3, 5



■ODS+Cation-Exchange type

Column	TCI Dual ODS-CX10		TCI Dual ODS-CX15		TCI Dual ODS-CX20	
Particle Size	3μm	5μm	3μm	5μm	3μm	5μm
2.0mmI.D.× 50mm	S3786	S3705	S3777	S3765	S3681	S3715
2.0mmI.D.×100mm	S3787	S3707	S3778	S3767	S3682	S3717
2.0mmI.D.×150mm	S3788	S3702	S3779	S3762	S3683	S3712
2.0mmI.D.×250mm	—	S3703	—	S3763	—	S3713
4.6mmI.D.× 50mm	S3789	S3704	S3780	S3764	S3684	S3714
4.6mmI.D.×100mm	S3790	S3709	S3781	S3769	S3685	S3719
4.6mmI.D.×150mm	S3791	S3700	S3782	S3760	S3686	S3710
4.6mmI.D.×250mm	S3792	S3701	S3783	S3761	S3687	S3711
10.0mmI.D.×150mm	—	S3706	—	S3766	—	S3716
10.0mmI.D.×250mm	—	S3708	—	S3768	—	S3718

■ODS+Anion-Exchange type

Column	Kaseisorb LC ODS-SAX Super		TCI Dual ODS-AX10		TCI Dual ODS-AX20	
Particle Size	3μm	5μm	3μm	5μm	3μm	5μm
2.0mmI.D.× 50mm	S1841	S1821	S3691	S3725	S3794	S3735
2.0mmI.D.×100mm	S1842	S1832	S3692	S3727	S3795	S3737
2.0mmI.D.×150mm	S1843	S1298	S3693	S3722	S3796	S3732
2.0mmI.D.×250mm	—	S1299	—	S3723	—	S3733
4.6mmI.D.× 50mm	S1844	S1833	S3694	S3724	S3797	S3734
4.6mmI.D.×100mm	S1845	S1834	S3695	S3729	S3798	S3739
4.6mmI.D.×150mm	S1846	S1292	S3696	S3720	S3799	S3730
4.6mmI.D.×250mm	S1847	S1293	S3697	S3721	S3800	S3731
10.0mmI.D.×150mm	—	S1835	—	S3726	—	S3736
10.0mmI.D.×250mm	—	S1836	—	S3728	—	S3738

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

●Other Reversed phase Columns "TCI Stella / Kaseisorb LC"

■Product Line

Column	Features	Analytes
TCI Stella PFP	Pentafluorophenylpropyl bonded type. Many interactions(Hydrophobic interaction, Hydrogen bond, Dipole-Dipole interaction, π-π interaction). It is a different separation from ODS columns.	hydrophobic similar compounds, polar compounds, basic compounds, structure isomers etc.
Kaseisorb LC ODS-PH Super	Separations by means of dual effects of ODS ligands (hydrophobic interactions) and phenyl groups (π-π interactions)	Hydrophobic compounds Structurally similar compounds Steroids etc.
Kaseisorb LC PH Super	Phenyl-bonded type hydrophobic interaction π-π interaction	Aromatic compounds, conjugated compound, Structure isomers etc.

Column	TCI Stella PFP		Kaseisorb LC ODS-PH Super	Kaseisorb LC PH Super
Particle Size	3μm	5μm	5μm	5μm
2.0mmI.D.× 50mm	S3916	S3905	—	—
2.0mmI.D.×100mm	S3917	S3906	—	—
2.0mmI.D.×150mm	S3918	S3907	S1347	—
2.0mmI.D.×250mm	—	S3908	S1348	—
4.6mmI.D.× 50mm	S3912	S3901	—	—
4.6mmI.D.×100mm	S3913	S3902	—	—
4.6mmI.D.×150mm	S3914	S3903	S1343	S1345
4.6mmI.D.×250mm	S3915	S3904	S1344	S1346
10.0mmI.D.×150mm	—	S3909	S1808	—
10.0mmI.D.×250mm	—	S3910	S1809	S1806
20.0mmI.D.×250mm	—	S3911	S1815	S1824

●ODS Columns "TCI Pack / Kaseisorb LC"

■Product Line

ODS Column	Features	Analytes	Carbon Content (%)	Pore Diameter (nm)	Particle Size (μm)
TCI Pack ODS Tough	・Applicable to a wide range of pH(30℃: pH2.0～12) ・Applicable to high temperature conditions (60℃ :pH3.0～8.0)	Basic compounds Acidic compounds Hydrophobic compounds	15	12	5
Kaseisorb LC ODS 2000-3	・High-performance column using a packing material with particle-size of 3μm ・High number of theoretical plates ・Applications to high throughput analysis ・Excellent batch-to-batch reproducibility ・Validation kit available at cost	Basic compounds Acidic compounds Hydrophobic compounds	17	12	3
Kaseisorb LC ODS 2000	・High-performance column using a packing material with particle-size of 5μm ・High number of theoretical plates ・Excellent batch-to-batch reproducibility ・Validation kit available at cost	Basic compounds Acidic compounds Hydrophobic compounds	17	12	5

Column	TCI Pack ODS Tough	Kaseisorb LC ODS 2000-3	Kaseisorb LC ODS 2000
2.0mmI.D.× 50mm	—	S1499	S1465
2.0mmI.D.×100mm	—	S1498	S1820
2.0mmI.D.×150mm	S3742	S1497	S1486
2.0mmI.D.×250mm	S3743	—	S1487
4.6mmI.D.× 50mm	—	S1496	S1493
4.6mmI.D.×100mm	—	S1495	S1478
4.6mmI.D.×150mm	S3740	S1494	S1480
4.6mmI.D.×250mm	S3741	S1479	S1482
7.5mmI.D.×250mm	—	S1817	S1490
10.0mmI.D.×150mm	—	—	—
10.0mmI.D.×250mm	—	—	S1491
20.0mmI.D.× 50mm	—	—	S1466
20.0mmI.D.×250mm	—	S1816	S1492

●Others "Kaseisorb LC"

■Product Line

Column	Analytes	Feature	Pore Diameter (nm)	Particle Size (μm)
Kaseisorb LC NH2-60-5	Sugars, VC, etc.	Amino propyl-bonded type	6	5
Kaseisorb LC SIL-120-5	Polar compounds	High pure silica gel for normal phase conditions	12	5
Kaseisorb LC CN-60-5	Moderate polarity compounds	Cyanopropyl-bonded type	6	5

Column	Kaseisorb LC NH2-60-5	Kaseisorb LC SIL-120-5	Kaseisorb LC CN-60-5
4.6mmI.D.×150mm	S1099	S1007	S1097
4.6mmI.D.×250mm	S1119	S1107	S1079

●Fitting Type Guard Columns "TCI OPTI-GUARD™"

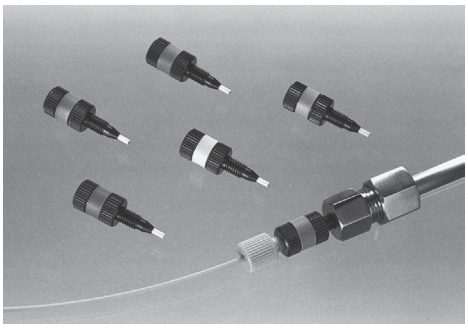
The TCI OPTI-GUARD series are compact, high-performance, and easy-to-use HPLC guard columns.

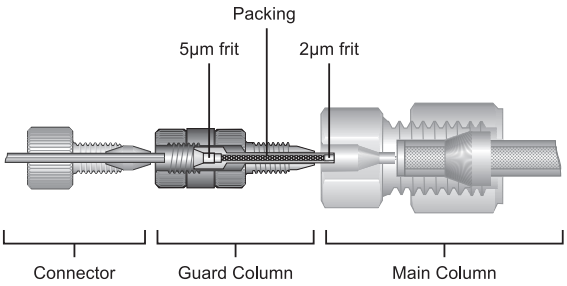
1. Hand-tight connection to a main column
2. Universal filling for most columns and zero dead-volume connection without any effect on column performance
3. Compact and space-saving design

■TCI OPTI-GUARD™ Fit

The TCI OPTI-GUARD Fit series are very compact guard columns. The column size is 1 mmI.D.×15 mm. This series is recommended for the further purification of relatively clean samples using either 4.6 mmI.D. or 2.0 mmI.D. HPLC columns.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.



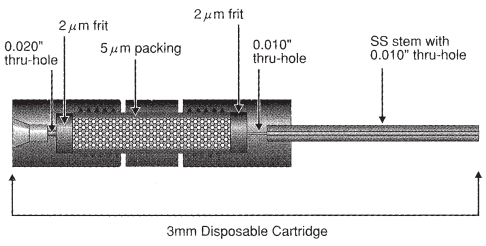


Product Name	Packing material	Product No.
TCI OPTI-GUARD Fit MB-S(3PK)	TCI Chiral MB-S	S3819
TCI OPTI-GUARD Fit BP-S(3PK)	TCI Chiral BP-S	S3829
TCI OPTI-GUARD Fit CH-S(3PK)	TCI Chiral CH-S	S3839
TCI OPTI-GUARD Fit ODS(3PK)	ODS	S1440
TCI OPTI-GUARD Fit C8(3PK)	Octyl	S1453
TCI OPTI-GUARD Fit PH(3PK)	Phenyl	S1441
TCI OPTI-GUARD Fit PO(3PK)	ODS+Phenyl	S1442
TCI OPTI-GUARD Fit SIL(3PK)	Silica gel	S1443
TCI OPTI-GUARD Fit CN(3PK)	Cyano	S1444
TCI OPTI-GUARD Fit NH2(3PK)	Amino	S1445
TCI OPTI-GUARD Fit SCX(3PK)	Strong Cation-Exchange	S1446
TCI OPTI-GUARD Fit SAX(3PK)	Strong Anion-Exchange	S1447
TCI OPTI-GUARD Fit ODS-SCX(3PK)	ODS+Strong Cation-Exchange	S1448
TCI OPTI-GUARD Fit ODS-SAX(3PK)	ODS+Strong Anion-Exchange	S1449

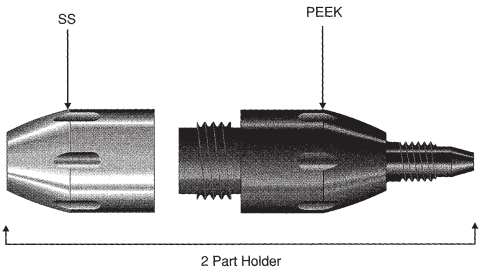
■TCI OPTI-GUARD™-3

The TCI OPTI-GUARD-3 series are guard column cartridges. The cartridges need to be mounted in a holder. The column size is 3 mmI.D.×15 mm.

This series is recommended for purifications using 4.6mmI.D. HPLC columns.



[Guard Columns Cartridge]



[Guard Columns Holder]

Product Name	Packing material	Product No.
TCI OPTI-GUARD-3 Holder	—	S1450
TCI OPTI-GUARD-3 Cartridge ODS(3PK)	ODS	S1451

Product Name	Packing material	Product No.
TCI OPTI-GUARD-3 Cartridge SIL(3PK)	Silica gel	S1452
TCI OPTI-GUARD-3 Cartridge ODS-CX10(3PK)	TCI Dual ODS-CX10	S3770
TCI OPTI-GUARD-3 Cartridge ODS-CX15(3PK)	TCI Dual ODS-CX15	S3771
TCI OPTI-GUARD-3 Cartridge ODS-CX20(3PK)	TCI Dual ODS-CX20	S3772
TCI OPTI-GUARD-3 Cartridge ODS-SAX(3PK)	Kaseisorb LC ODS-SAX Super	S3773
TCI OPTI-GUARD-3 Cartridge ODS-AX10(3PK)	TCI Dual ODS-AX10	S3774
TCI OPTI-GUARD-3 Cartridge ODS-AX20(3PK)	TCI Dual ODS-AX20	S3775
TCI OPTI-GUARD-3 Cartridge MB-S(1PK)	TCI Chiral MB-S	S3849
TCI OPTI-GUARD-3 Cartridge BP-S(1PK)	TCI Chiral BP-S	S3859
TCI OPTI-GUARD-3 Cartridge CH-S(1PK)	TCI Chiral CH-S	S3869

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TLC Stains

GC and HPLC are commonly used as methods for highly sensitive separation analysis. Novel detection methods and high resolution columns have been developed, thereby highly-sensitive and highly-selective separation analysis is now routinely performed. Furthermore, the substances that are being analyzed are of a wide variety, ranging from such things as trace biological constituents to trace environmental pollutants. GC and HPLC are playing important roles in the advancement of today's microanalytical technology.

Thin-layer chromatography (TLC) is also an important analytical tool, being used to confirm the progress of reaction, and for evaluation of HPLC separation conditions. Furthermore, the Japanese Pharmacopoeia (JP) has established that the identification tests by TLC must be conducted for many of the natural medicines, such as Scutellaria Root, Phellodendron Bark and Rhubarb, etc. As mentioned, TLC is still an important method of simple separation analysis, which widely used in the many fields.

The Rf-value is a very important piece of data that is provided by TLC. When TLC development conditions are same, the Rf-value is characteristic for a substance. Therefore, the Rf-values are often used for identification of substances. Additionally, selective detection of compounds is possible by choosing the appropriate TLC stains. For example, after development of the TLC plate, if one seeks to identify a compound containing an amino group, the TLC plate is treated with ninhydrin solution which stain only those compounds with an amino group. There are many types of TLC stains reported and used. To obtain accurate results, it is important to select the appropriate TLC stains.

The below table indicates typical TLC stains and the corresponding functional groups. Each of them is prepared so that can be used straight away after the TLC development.

Prepared TLC Stains

Product No.	Product Name	Treatment	Target Compounds	Unit size
A1674	*p*-Anisaldehyde (Ethanol Solution) (contains Acetic Acid, H_2SO_4)	Heat	Versatile-type, effective with almost all functional groups, esp. nucleophilic ones such as phenols, sugars	500mL
P1484	Phosphomolybdic Acid (Ethanol Solution) (PMA)	Heat	Versatile-type, effective with almost all functional groups	500mL
P1483	Potassium Permanganate Solution (contains K_2CO_3, NaOH)	—	Versatile-type, effective with oxidizable functional groups, multiple-bond, alcohols, amines, sulfides, mercaptans	500mL
N0719	Ninhydrin (Ethanol Solution) (contains Acetic Acid)	Heat	Amines, amino acids, Boc protected amino groups after deprotection while on the TLC plate	500mL
D2968	2,4-Dinitrophenylhydrazine (Ethanol Solution) (contains HCl)	Heat	Aldehydes, ketones	500mL
B2401	Bromocresol Green (BCG) (Ethanol Solution) (contains NaOH)	—	Compounds with acidic functional groups, carboxylic acids, sulfonic acids, etc.	500mL
C1794	Ceric Ammonium Molybdate Solution (CAM) (contains H_2SO_4)	Heat	Effective with almost all functional groups	500mL
V0080	Vanillin (Ethanol Solution) (contains H_2SO_4)	Heat	Alcohols, phenols	500mL

Related product

Product No.	Product Name	Unit Size
N0094	Ninhydrin Spray (0.5% in 1-Butanol)	200mL

NMR Spectrometry

Deuterated Compounds for NMR

Product No.	Product Name		Unit Size
A0636	Acetic Acid-d_1 98atom%D	CH_3COOD	5g
A0637	Acetic Acid-d_4 99.5atom%D	CD_3COOD	5g 25g
A2050	Acetone-d_6 99.9atom%D	C_3D_6O	0.75mL×10
A0638	Acetone-d_6 99.9atom%D	C_3D_6O	10mL
A2074	Acetonitrile-d_3 99.8atom%D	CD_3CN	0.75mL×10
A2018	Acetonitrile-d_3 99.8atom%D	CD_3CN	10g
B3008	Benzene-d_6 99.6atom%D	C_6D_6	0.75mL×10
B0840	Benzene-d_6 99.6atom%D	C_6D_6	25mL
B0825	Butanol-d_1 97atom%D	$CH_3(CH_2)_3OD$	5g
C1423	Chloroform-d 99.6atom%D (containing 0.05wt% TMS) (stabilized with Silver chip)	$CDCl_3$	25g
C0023	Chloroform-d 99.6atom%D (containing 1wt% TMS) (stabilized with Silver chip)	$CDCl_3$	25g
C0583	Chloroform-d 99.6atom%D (stabilized with Silver chip)	$CDCl_3$	10g 100g
C2232	Chloroform-d 99.8atom%D	$CDCl_3$	0.75mL×10
H0341	Deuterium Bromide 98.0atom%D (45% in D_2O)	DBr	5g
W0004	Deuterium Oxide 99.8atom%D	D_2O	0.75mL×10
W0002	Deuterium Oxide 99.8atom%D	D_2O	10mL 100mL
D3569	Dichloromethane-d_2 99.9atom%D	CD_2Cl_2	0.75mL×5
D3529	Dichloromethane-d_2 99.9atom%D	CD_2Cl_2	5g
D3530	*N,N*-Dimethylformamide-d_7 99.5atom%D	$(CD_3)_2NCDO$	0.75mL×5
D3527	Dimethyl Sulfoxide-d_6 99.9atom%D	CD_3SOCD_3	0.75mL×10
D0381	Dimethyl Sulfoxide-d_6 99.9atom%D	CD_3SOCD_3	25g
E0221	Ethanol-d_1 99atom%D	CH_3CH_2OD	25mL
E0357	Ethanol-d_3 99.5atom%D	CD_3CH_2OH	1mL
E0728	Ethanol-d_6 99.5atom%D	CD_3CD_2OD	1mL
F0198	Formic Acid *C*-d 99atom%D	DCOOH	1g 5g
F0247	Formic Acid *O*-d 98.0atom%D	HCOOD	1g
H0693	Hexafluoroacetone Deuterate 95.0atom%D	$CF_3COCF_3{\cdot}3D_2O$	5g
M0551	Methanol-d_1	CH_3OD	5g
M1888	Methanol-d_4 99.8atom%D	CD_3OD	0.75mL×10
M1869	Methanol-d_4 99.8atom%D	CD_3OD	10g
P0648	Pyridine-d_5 99.5atom%D	C_5D_5N	1mL
S0155	Sulfuric Acid-d_2 98.0atom%D	D_2SO_4	10g
T2425	Tetrahydrofuran-d_8 99.5atom%D	C_4D_8O	0.75mL×5
T0597	Trifluoroacetic Acid-d 99.0atom%D	CF_3COOD	5g

Standards for NMR

Product No.	Product Name		Unit Size
C1423	Chloroform-d 99.6atom%D (containing 0.05wt% TMS) (stabilized with Silver chip)		25g
C0023	Chloroform-d 99.6atom%D (containing 1wt% TMS) (stabilized with Silver chip)		25g
H0638	Hexamethyldisilane		10mL 100mL
H0091	Hexamethyldisiloxane	25mL	100mL 500mL
T1638	Sodium 3-(Trimethylsilyl)-1-propanesulfonate		1g 5g
T0154	Tetramethylsilane	25mL	100mL 500mL

Chemical Shift Standards for Multinuclear NMR

Product No.	Product Name		Unit Size
B0527	Boron Trifluoride - Ethyl Ether Complex	25mL	100mL 500mL
D1289	Dimethylselenide		1g
H0085	Hexafluorobenzene		25g 250g
N0209	Nitromethane	25g	100g 500g
T0919	Tetramethyltin		5g 25g
T0488	Trimethyl Phosphite		25mL
Z0007	Zirconocene Dichloride		5g 25g

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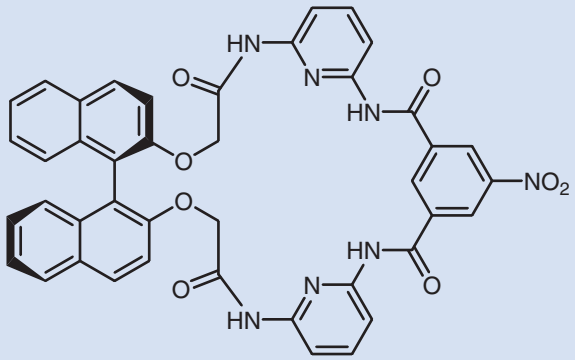
Shift Reagents

Product No.	Product Name	Unit Size
C2184	Chirabite-AR	100mg
S0473	Sodium [(*R*)-1,2-Diaminopropane-*N*,*N*,*N*',*N*'-tetraacetato]samarate(III)	100mg
S0474	Sodium [(*S*)-1,2-Diaminopropane-*N*,*N*,*N*',*N*'-tetraacetato]samarate(III)	100mg
T1511	Tris(6,6,7,7,8,8,8-heptafluoro-2,2-dimethyl-3,5-octanedionato)praseodymium(III)	1g
T1265	Tris(2,2,6,6-tetramethyl-3,5-heptanedionato)europium(III)	1g 5g
T1264	Tris(2,2,6,6-tetramethyl-3,5-heptanedionato)praseodymium(III)	1g

Enantiomer Excess & Absolute Configuration Determination (see p.304)

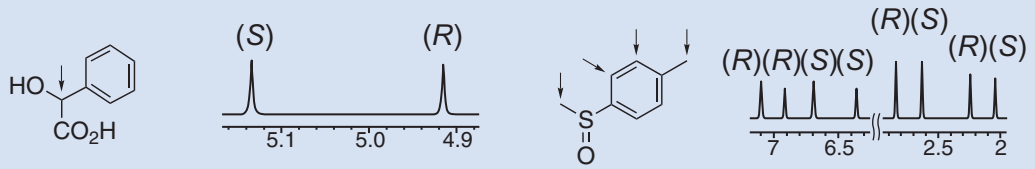
Enantiomer Excess & Absolute Configuration Determination

Most biologically active compounds including pharmaceuticals have chiral molecular structures with one or more stereogenic centers. The absolute configuration of pharmaceuticals is very important for biological activity. Generally one enantiomer has medicinal activity while the other enantiomer has no activity. In some cases the opposite enantiomer gives rise to adverse and harmful effects. For this reason it is of great significance to obtain enantiopure compounds and to develop chiral auxiliaries for the determination of their absolute configurations and enantiomeric excess. Various kinds of reagents have been developed to determine their absolute configurations and enantiomeric excess by NMR[1)], HPLC[2)] and CD exciton chirality method[3)]. A chiral shift reagent, Chirabite-AR (**1**), developed by Ema *et al*. is also one of the such reagents, and the optical purity can be easily measured using NMR.[4)]



C2184 Chirabite-AR **1**

Chirabite-AR (**1**) is a macrocyclic compound and has a very unique cavity where the hydrogen-bond donor and acceptor sites are well organized to enable the binding of a wide range of compounds as guest molecules. The incorporated guest molecules experience a strong anisotropic ring-current effect arising from the BINOL moiety, which is a chiral source, resulting in the chemical-shift nonequivalence between the two enantiomers.



Chirabite-AR (7mg) in $CDCl_3$ at 22℃

When conventional europium complexes are used on high-field NMR spectrometers, which are widely spread nowadays, signal broadening occurs, and as a result, satisfactory NMR spectra cannot be obtained. Because **1** contains no paramagnetic metals, which cause signal broadening, it can be used for both high- and low-field NMR spectrometers. Using **1**, therefore, the enantiomeric purities of various compounds such as carboxylic acids, oxazolidinones, carbonates, lactones, alcohols, sulfoxides, sulfoximines, sulfinamides, isocyanates and epoxides can be determined. Moreover, a protocol for its determination is extremely easy; NMR spectra showing chemical-shift nonequivalences can be obtained just by adding **1** to the NMR tube containing a target sample in $CDCl_3$.

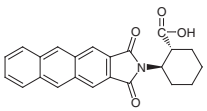
The reagent **1** is characterized by its facile use, versatility, and applicability to the low- and high-field NMR spectrometers. Thus, **1** has been shown to possess a highly effective capacity superior to that of the conventional chiral shift reagents.

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

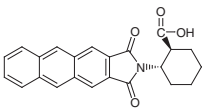
for NMR

Product No.	Product Name			Unit Size
A1657	(1*R*,2*R*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
A1658	(1*S*,2*S*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
B1720	(+)-Benzylmethylphenylsilylacetic Acid			100mg
B1721	(-)-Benzylmethylphenylsilylacetic Acid			100mg
B1143	(*R*)-(-)-1,1'-Binaphthyl-2,2'-diyl Hydrogen Phosphate	100mg	1g	5g
B1144	(*S*)-(+)-1,1'-Binaphthyl-2,2'-diyl Hydrogen Phosphate		100mg	1g
B1161	(*R*,*R*)-(-)-2,3-Butanediol		1g	5g
B1343	(*S*,*S*)-(+)-2,3-Butanediol		100mg	1g
C1021	(-)-Camphanic Acid		1g	5g
C2184	Chirabite-AR			100mg
D2459	(1*R*,2*R*)-(-)-*N*,*N*'-Dimethylcyclohexane-1,2-diamine		100mg	1g
D2460	(1*S*,2*S*)-(+)-*N*,*N*'-Dimethylcyclohexane-1,2-diamine	100mg	1g	5g
D1852	(*R*)-(-)-*N*-(3,5-Dinitrobenzoyl)-α-phenylethylamine			1g
D1853	(*R*)-(-)-*N*-(3,5-Dinitrobenzoyl)-α-phenylglycine		1g	5g
D2176	(1*R*,2*R*)-(+)-1,2-Diphenylethylenediamine		1g	5g
D2175	(1*S*,2*S*)-(-)-1,2-Diphenylethylenediamine		1g	5g
M0662	D-(-)-Mandelic Acid	25g	100g	500g
M0661	L-(+)-Mandelic Acid		25g	250g
M1366	(*R*)-(-)-2-Methoxy-2-(1-naphthyl)propionic Acid			100mg
M1367	(*S*)-(+)-2-Methoxy-2-(1-naphthyl)propionic Acid			100mg
M0830	(*R*)-(-)-α-Methoxyphenylacetic Acid	100mg	1g	5g
M0829	(*S*)-(+)-α-Methoxyphenylacetic Acid		1g	5g
M1339	(+)-α-Methoxy-α-(trifluoromethyl)phenylacetic Anhydride			100mg
I0334	(*R*)-(+)-α-Methylbenzyl Isocyanate	1g	5g	25g
I0335	(*S*)-(-)-α-Methylbenzyl Isocyanate		1g	5g
M0831	(+)-MTPA		1g	5g
M0832	(-)-MTPA		1g	5g
M2214	(+)-MTPA-Cl (*ca.* 18% in Dichloromethane, *ca.* 1.0mol/L)			5g
M1103	(+)-MTPA-Cl		100mg	1g
M2215	(-)-MTPA-Cl (*ca.* 18% in Dichloromethane, *ca.* 1.0mol/L)			5g
M1104	(-)-MTPA-Cl		100mg	1g
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0482	(*R*)-(+)-1-(1-Naphthyl)ethylamine		1g	5g
N0481	(*S*)-(-)-1-(1-Naphthyl)ethylamine		1g	5g
I0336	(*R*)-(-)-1-(1-Naphthyl)ethyl Isocyanate		1g	5g
I0398	(*S*)-(+)-1-(1-Naphthyl)ethyl Isocyanate		1g	5g
P0794	(*R*)-(+)-1-Phenylethylamine	25mL	100mL	500mL
P0793	(*S*)-(-)-1-Phenylethylamine	25mL	100mL	500mL
P1219	(*R*)-(-)-2-Phenylpropionic Acid		1g	5g
P1220	(*S*)-(+)-2-Phenylpropionic Acid		1g	5g
S0473	Sodium [(*R*)-1,2-Diaminopropane-*N*,*N*,*N*',*N*'-tetraacetato]samarate(III)			100mg
S0474	Sodium [(*S*)-1,2-Diaminopropane-*N*,*N*,*N*',*N*'-tetraacetato]samarate(III)			100mg
T3001	(1*R*,4*S*)-1,2,3,4-Tetrahydro-1,4-epoxynaphthalene-1-carboxylic Acid			100mg
T3002	(1*S*,4*R*)-1,2,3,4-Tetrahydro-1,4-epoxynaphthalene-1-carboxylic Acid			100mg
T1520	(*R*)-(-)-2,2,2-Trifluoro-1-(9-anthryl)ethanol		100mg	1g
T1521	(*S*)-(+)-2,2,2-Trifluoro-1-(9-anthryl)ethanol		100mg	1g

A1657



A1658



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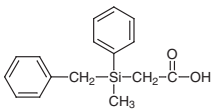

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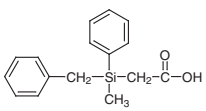

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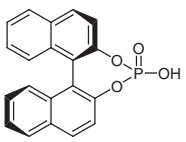

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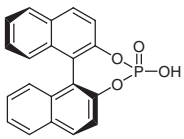

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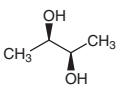
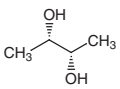
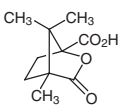


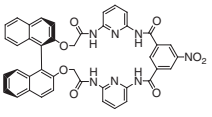
B1343

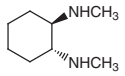
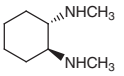
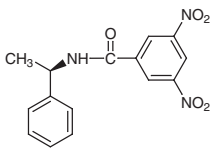
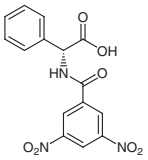
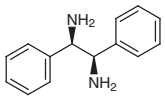
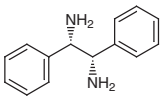
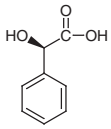
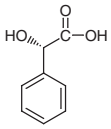
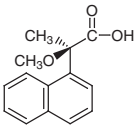
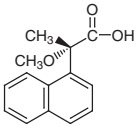
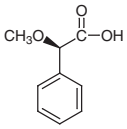
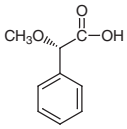
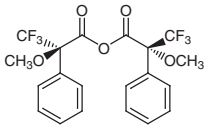
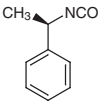
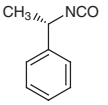
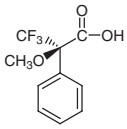
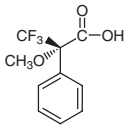
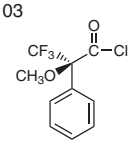
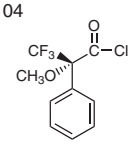
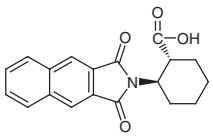
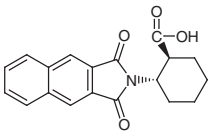
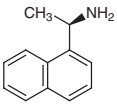
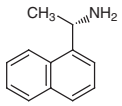
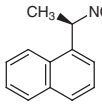
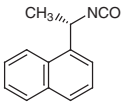
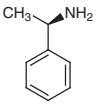
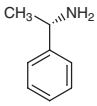
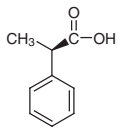
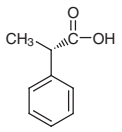
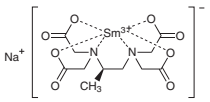
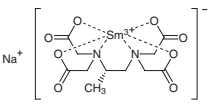
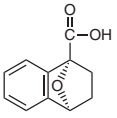
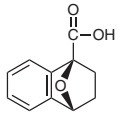
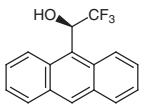
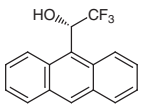


C1021



C2184



D2459 	D2460 	D1852 	D1853 	D2176 
D2175 	M0662 	M0661 	M1366 	M1367 
M0830 	M0829 	M1339 	I0334 	I0335 
M0831 	M0832 	M2214 M1103 	M2215 M1104 	N0713 
N0714 	N0482 	N0481 	I0336 	I0398 
P0794 	P0793 	P1219 	P1220 	S0473 
S0474 	T3001 	T3002 	T1520 	T1521 

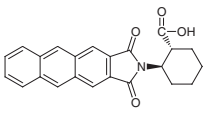
for HPLC

Product No.	Product Name	Unit Size
A1657	(1*R*,2*R*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid	100mg
A1658	(1*S*,2*S*)-2-(Anthracene-2,3-dicarboximido)cyclohexanecarboxylic Acid	100mg

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name			Unit Size
A5561	(*R*)-(-)-DBD-APy [=(*R*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5560	(*S*)-(+)-DBD-APy [=(*S*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5565	(*R*)-(+)-DBD-Pro-COCl [=(*R*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5564	(*S*)-(-)-DBD-Pro-COCl [=(*S*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5568	(*R*)-(-)-DBD-Py-NCS [=(*R*)-(-)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-isothiocyanatopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5569	(*S*)-(+)-DBD-Py-NCS [=(*S*)-(+)-4-(*N*,*N*-Dimethylaminosulfonyl)-7-(3-isothiocyanatopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
D2259	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-L-alaninamide		100mg	1g
A5524	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-D-leucinamide		100mg	1g
A5523	N^{α}-(5-Fluoro-2,4-dinitrophenyl)-L-leucinamide			100mg
M1366	(*R*)-(-)-2-Methoxy-2-(1-naphthyl)propionic Acid			100mg
M1367	(*S*)-(+)-2-Methoxy-2-(1-naphthyl)propionic Acid			100mg
I0334	(*R*)-(+)-α-Methylbenzyl Isocyanate	1g	5g	25g
I0335	(*S*)-(-)-α-Methylbenzyl Isocyanate		1g	5g
N0713	(1*R*,2*R*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
N0714	(1*S*,2*S*)-2-(Naphthalene-2,3-dicarboximido)cyclohexanecarboxylic Acid			100mg
I0336	(*R*)-(-)-1-(1-Naphthyl)ethyl Isocyanate		1g	5g
I0398	(*S*)-(+)-1-(1-Naphthyl)ethyl Isocyanate		1g	5g
A5563	(*R*)-(-)-NBD-APy [=(*R*)-(-)-4-Nitro-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5562	(*S*)-(+)-NBD-APy [=(*S*)-(+)-4-Nitro-7-(3-aminopyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5566	(*R*)-(+)-NBD-Pro-COCl [=(*R*)-(+)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5567	(*S*)-(-)-NBD-Pro-COCl [=(*S*)-(-)-4-Nitro-7-(2-chloroformylpyrrolidin-1-yl)-2,1,3-benzoxadiazole]			100mg
A5577	(*R*)-(-)-NBD-Py-NCS [=(*R*)-(-)-4-(3-Isothiocyanatopyrrolidin-1-yl)-7-nitro-2,1,3-benzoxadiazole]			100mg
A5578	(*S*)-(+)-NBD-Py-NCS [=(*S*)-(+)-4-(3-Isothiocyanatopyrrolidin-1-yl)-7-nitro-2,1,3-benzoxadiazole]			100mg
A5514	2,3,4,6-Tetra-*O*-acetyl-β-D-glucopyranosyl Isothiocyanate		100mg	1g
A5515	2,3,4,6-Tetra-*O*-benzoyl-β-D-glucopyranosyl Isothiocyanate		100mg	1g

A1657



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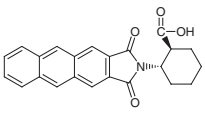

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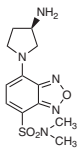

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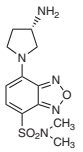

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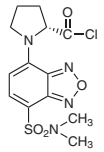

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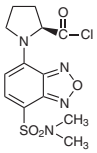

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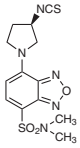

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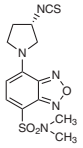
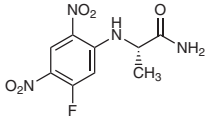


D2259



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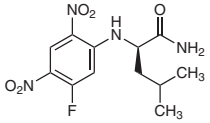

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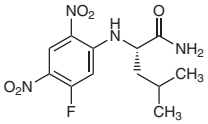

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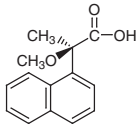

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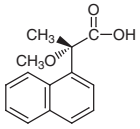

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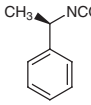
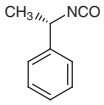


I0335



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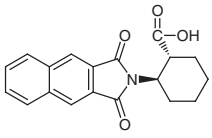

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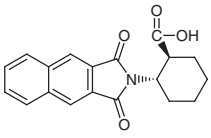

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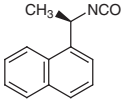

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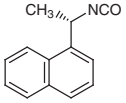

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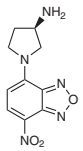

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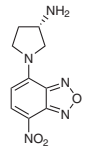

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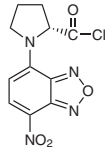

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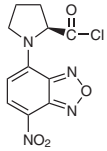

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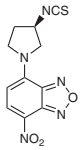

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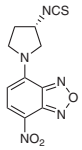

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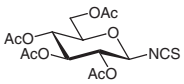

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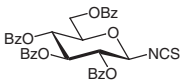
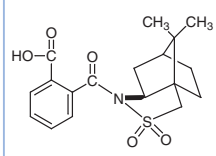


for X-ray Crystallography

Product No.	Product Name	Unit Size
C1766	*N*-(2-Carboxybenzoyl)-(+)-10,2-camphorsultam	500mg
C1682	*N*-(2-Carboxybenzoyl)-(-)-10,2-camphorsultam	500mg
C1767	*N*-(2-Carboxy-4,5-dichlorobenzoyl)-(+)-10,2-camphorsultam	500mg
C1683	*N*-(2-Carboxy-4,5-dichlorobenzoyl)-(-)-10,2-camphorsultam	500mg

C1766



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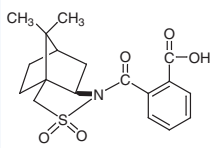

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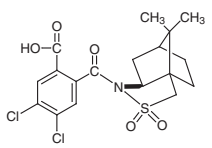

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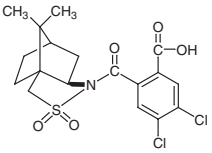


for Exciton Chirality CD Method

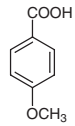
for Hydroxy Groups

Product No.	Product Name			Unit Size
A0482	*p*-Anisic Acid		25g	500g
A1150	2-Anthracenecarboxylic Acid		1g	5g
A0690	9-Anthracenecarboxylic Acid		5g	25g
B0062	Benzoic Acid Zone Refined (number of passes:20)			1sample
B0105	Benzoyl Chloride		25mL	500mL
P0961	Biphenyl-4-carboxylic Acid		25g	100g
B0553	4-Bromobenzoic Acid	25g	100g	500g
B0558	4-Bromobenzoyl Chloride		25g	250g
C0134	4-Chlorobenzoic Acid		25g	500g
C0141	4-Chlorobenzoyl Chloride		25g	500g
C0445	4-Cyanobenzoic Acid	5g	25g	250g
C1182	4-Cyanobenzoyl Chloride		5g	25g
D0724	4-Dimethylaminobenzoic Acid		25g	500g
M0721	4-Methoxybenzoyl Chloride	25g	100g	500g
M1338	5-(4-Methoxycarbonylphenyl)-10,15,20-triphenylporphyrin		100mg	1g
M0576	4-Methoxycinnamic Acid			25g
N0025	2-Naphthoic Acid			25g
N0048	2-Naphthoyl Chloride			25g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Product No.	Product Name	Unit Size	
N0156	4-Nitrobenzoic Acid	25g	500g
N0176	4-Nitrobenzoyl Chloride	25g	500g
P1079	4-Phenylbenzoyl Chloride	5g	25g

A0482



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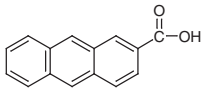

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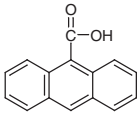

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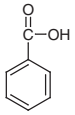

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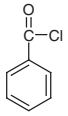

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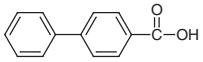

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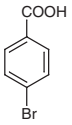

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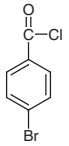

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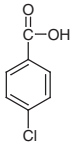

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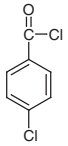

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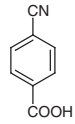

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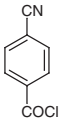

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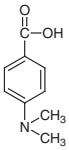

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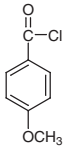

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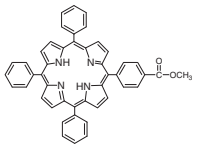

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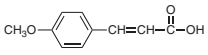

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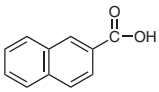

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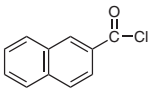

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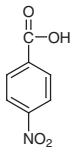

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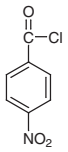

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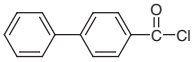
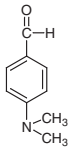


for Primary Amino Groups

Product No.	Product Name			Unit Size
D1495	4-Dimethylaminobenzaldehyde	25g	100g	500g
D0645	4-Dimethylaminobenzaldehyde		25g	500g
D0648	4-Dimethylaminocinnamaldehyde		5g	25g
N0530	2,3-Naphthalenedicarboxylic Anhydride		25g	250g

D1495
D0645



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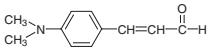

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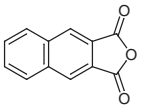
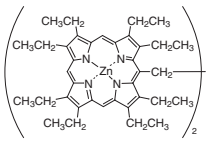


for Monoalcohols, Monoamines

Product No.	Product Name	Unit Size		
B3515	Bis(Zinc Porphyrin) (*ca.* 5μmol/L in Dichloromethane)		5mL	25mL
A1371	*N*-Boc-1,2-diaminoethane	1g	5g	25g
B1185	Boc-Gly-OH		5g	25g
B2124	4-[(*tert*-Butoxycarbonylamino)methyl]pyridine-2-carboxylic Acid		100mg	1g
P1364	Pentamethylene Bis[4-(10,15,20-triphenylporphyrin-5-yl)benzoate]dizinc(II)		10mg	100mg

B3515



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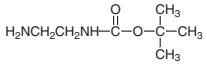

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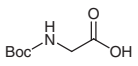

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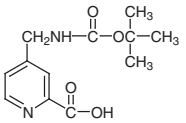

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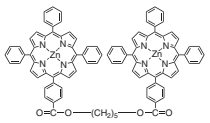

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3) T. Kurtan, N. Nesnas, F. E. Koehn, Y.-Q. Li, K. Nakanishi, N. Berova, *J. Am. Chem. Soc.* **2001**, *123*, 5974.
4) T. Ema, D. Tanida, T. Sakai, *Org. Lett.* **2006**, *8*, 3773; T. Ema, D. Tanida, T. Sakai, *J. Am. Chem. Soc.* **2007**, *129*, 10591.

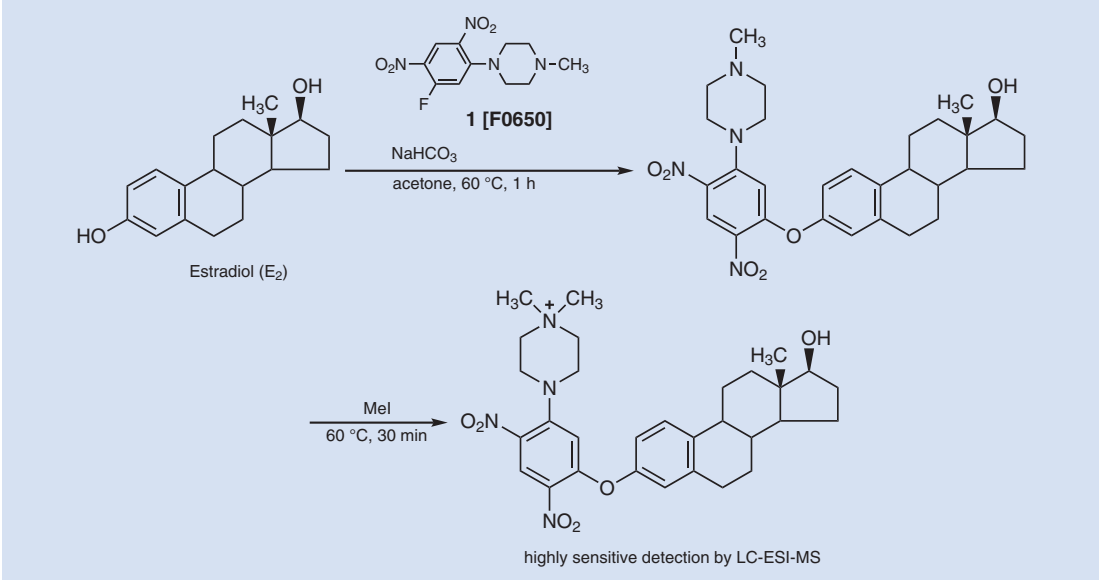
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Derivatization Reagents for Mass Spectrometry

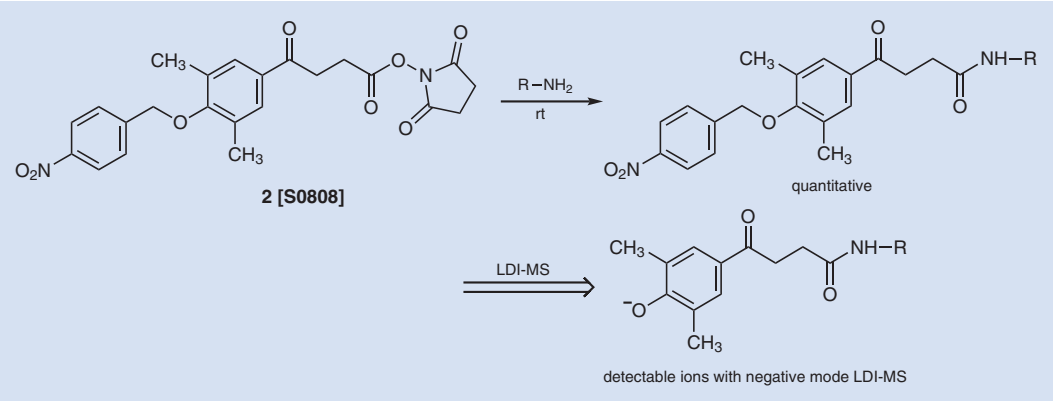
Mass spectrometry (MS) is the method for determining the mass-to-charge ratio (m/z) of a molecule or an atom and obtaining information such as a molecular weight. To determine m/z, first it is necessary to ionize target analytes. Electron impact (EI) is known as the easiest ionization method. However, the mass spectrum obtained by EI is complicated because of easy fragmentation which sometimes makes it hard to analyze. So softer ionization methods which cause less fragmentation have been developed. They include fast atom bombardment ionization (FAB), electron spray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI). These softer ionization methods can provide high-quality spectra without unnecessary fragmentation.

One of the main reasons of today's successful proteome analysis is the development of the mass spectrometry technique using soft ionization methods. The speed of protein analysis has been significantly improved for the two following reasons; 1) establishment of the soft ionization method of proteins using ESI and MALDI, 2) enhancement of precision, sensitivity and speed of time-of-flight mass spectrometry (TOF-MS). In 1993, the peptide mass fingerprinting (PMF) method was developed, which enabled rapid proteome analysis. Now, MS is used as an important analytical tool not only in the field of chemistry but also in the field of biological science.

MS is also used for the analysis of trace amounts of biologically active small molecules in living bodies. For analysis of biologically active small molecules in a complicated biological matrix, LC-MS is commonly used. In these cases the sample is separated by HPLC and the quantity is determined by MS. FAB and ESI are used as ionization methods for LC-MS, in which vaporization of the sample is not required. Especially, ESI is the most used ionization method for LC-MS because it causes less fragmentation and has a wide range of applicable compounds and high operability. However, in today's advanced research, sometimes we can not get sufficient detection for trace amounts of components even using highly-sensitive LC-ESI-MS. In that case, derivatization reagents for MS are used to increase detection sensitivity for ESI-MS. The derivatization reagents have functional groups in the molecule that stabilize positive or negative charge. For example, 1-(5-Fluoro-2,4-dinitrophenyl)-4-methylpiperazine (**1**, PPZ) developed by Higashi *et al*. is one of the derivatization reagents for LC-ESI-MS, and is useful for the analysis of hydroxysteroids.[1] **1** reacts rapidly with the phenolic hydroxy group in estradiol to give 3-*O*-[2,4-dinitro-5-(4-methylpiperazino)phenylestradiol. Then subsequent quaternarization of the piperazine amino group with methyl iodide affords a positively-charged derivative which provides more than a 2000-fold higher sensitivity compared to the original estradiol in LC-ESI-MS determination. Higashi *et al*. have quantified the amount of estrogens in pregnant woman serum, which is clinically important for the diagnosis of the fetoplacental function, with high precision by utilizing this procedure.



Maki *et al*. have reported the utility of a photo-cleavable molecular tag **2** for LDI-MS (MALDI-MS without assistance of a matrix).[2] **2** generates an MS detectable ion selectively and reproducibly upon laser irradiation. For example, **2** reacts with amino acids, short peptides, and sugar derivatives to generate the adducts, which, when followed by negative mode LDI-MS detection, enables easy detection without assistance of a matrix.



2 [S0808]

■Typical Procedure

Determination of estrogens in pregnant women

10μL or 20μL sample of the serum is added to acetonitrile (100μL) containing [2,4,6,6,9-$^{2}H_5$]-E_1 (D_5-E_1) (100pg), vortex mixed for 30 sec and centrifuged at 1500×g (4℃, 5 min). The supernatant is diluted with water (400μL) and purified using a Strata®-X cartridge. After successive washing with water (2mL) and 30% methanol (2mL), estrogens are eluted with ethyl acetate (1mL) and evaporated. To a solution of estrogen in acetone (40μL), **1** (10μg) in acetone (10μL) and 1M $NaHCO_3$ (10μL) are added, and the mixture is then incubated at 60℃ for 1 h. The reaction mixture is diluted with 50% methanol (500μL) and passed through a Strata®-X cartridge for desalting. After washing with water (2mL), the derivatized estrogen is eluted with ethyl acetate (1mL) and evaporated. To the PPZ-derivative, methyl iodide (100μL) is added. The mixture is incubated at 60℃ for 30 min, and then excess reagent is evaporated off. The methylated PPZ-derivative is dissolved in methanol-10mM ammonium formate (1:1, v/v), an aliquot of which is subjected to LC-MS(/MS).

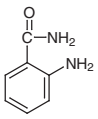
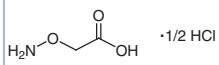
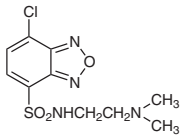
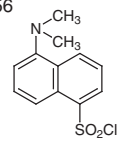
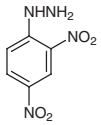
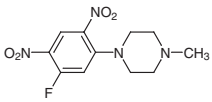
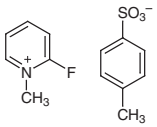
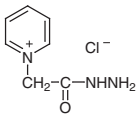
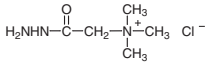
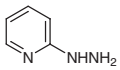
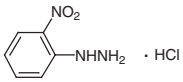
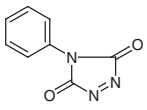
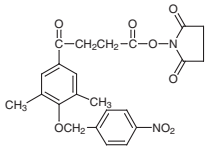
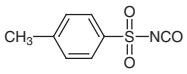
Labeling and detection of amino acids and peptides

An ethanol solution of diisopropylamine and acetonitrile solution of **2** are added sequentially to an aqueous solution of amino acids (or peptides) and left for 30 min. An appropriate amount of this sample solution is put to a MALDI plate. After drying naturally, mass spectra are acquired in negative mode.

We introduce derivatization reagents for MS below.

Product No.	Product Name	Unit Size		
A0262	2-Aminobenzamide	25g	100g	500g
C0205	Carboxymethoxylamine Hemihydrochloride		25g	500g
A5596	DAABD-Cl [=4-[2-(Dimethylamino)ethylaminosulfonyl]-7-chloro-2,1,3-benzoxadiazole] [for Proteome Analysis]			100mg
D0005	Dansyl Chloride (10% in Acetone)			10mL
D0656	Dansyl Chloride	1g	5g	25g
D0845	2,4-Dinitrophenylhydrazine (wetted with *ca.* 50% Water, containing 25g, 100g and 500g on a dry weight basis respectively)	25g	100g	500g
F0650	1-(5-Fluoro-2,4-dinitrophenyl)-4-methylpiperazine		100mg	1g
F0225	2-Fluoro-1-methylpyridinium *p*-Toluenesulfonate		5g	25g
G0030	Girard's Reagent P			25g
B0457	Girard's Reagent T		25g	500g
H0888	2-Hydrazinopyridine		10g	25g
N0231	2-Nitrophenylhydrazine Hydrochloride			25g
P1184	4-Phenyl-1,2,4-triazoline-3,5-dione		1g	5g
S0808	Succinimidyl 4-[3,5-Dimethyl-4-(4-nitrobenzyloxy)phenyl]-4-oxobutyrate			100mg
T0998	*p*-Toluenesulfonyl Isocyanate		25g	500g

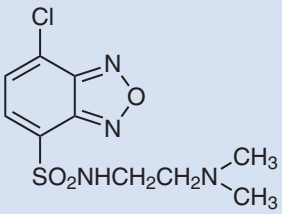
The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

A0262 	C0205 	A5596 	D0005 D0656 	D0845 
F0650 	F0225 	G0030 	B0457 	H0888 
N0231 	P1184 	S0808 	T0998 	

References

1) T. Nishio, T. Higashi, A. Funaishi, J. Tanaka, K. Shimada, *J. Pharm. Biomed. Anal.* **2007**, *44*, 786.
2) T. Maki, K. Ishida, *J. Org. Chem.* **2007**, *72*, 6427; T. Maki, *Kemikaru Enjiniyaringu* **2008**, *53*, 850; Nagasaki University, Jpn. Kokai Tokkyo Koho 2008 064739, **2008**.

Reagent for Protein Analysis DAABD-Cl



DAABD-Cl

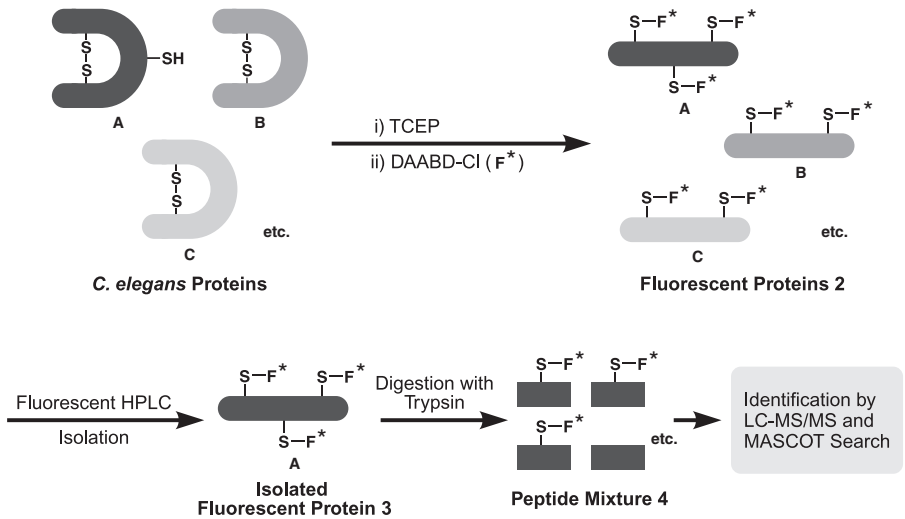
1 [A5596]

Product No.	Product Name	Unit Size
A5596	DAABD-Cl [=4-[2-(Dimethylamino)ethylaminosulfonyl]-7-chloro-2,1,3-benzoxadiazole]	100mg

The relationship between genes and diseases has been studied extensively since the completion of human genome project in 2003. The direct cause of these diseases is sometimes related to the proteins produced in the human body by the human genome. The study of these proteins, "Proteomics" is very important in order to understand the relationship between genes and diseases.

The general method for protein analysis is isolation of the targeted protein by 2-D gel electrophoresis, followed by digestion with proteases to yield peptide fragment mixtures, which are then analyzed by MS/MS to identify the fragments, from which the isolated protein can then be reconstructed. However several problems still remain with 2-D gel electrophoresis, as extremely acidic, basic, or hydrophobic proteins cannot be fully separated. Furthermore, only the highly skilled experts are able to manage the 2-D gel electrophoresis to obtain reproducible data. For these reasons, new and improved methods for protein analysis have been explored.

Imai and co-workers have developed a new method for protein analysis with use of DAABD-Cl (**1**). This new method can analyze proteins with high precision. Imai and co-workers extracted proteins from *C. elegans*, and the extracted proteins were first reacted with tris(2-carboxyethyl)phosphine in a buffer solution in order to reductively cleave the S-S bonds to yield the primary proteins. The resulting SH functional groups of resulting proteins were derivatized by reaction with DAABD-Cl to yield fluorescent labeled protein mixtures (**2**). The fluorescent labeled protein mixtures were separated by fluorescence HPLC to obtain fractions consisting of DAABD labeled proteins (Figure 1). The selected DAABD labeled protein (**3**) was isolated and digested using trypsin to obtain the peptide mixtures (**4**) consisting of DAABD labeled peptides and other peptides. The peptide mixtures were analyzed by LC-MS/MS and the resulting mass spectral data were analyzed to identify the original protein by the MASCOT database system (Scheme 1).



Scheme 1. Identification of *C. elegans* Proteins with DAABD-Cl

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

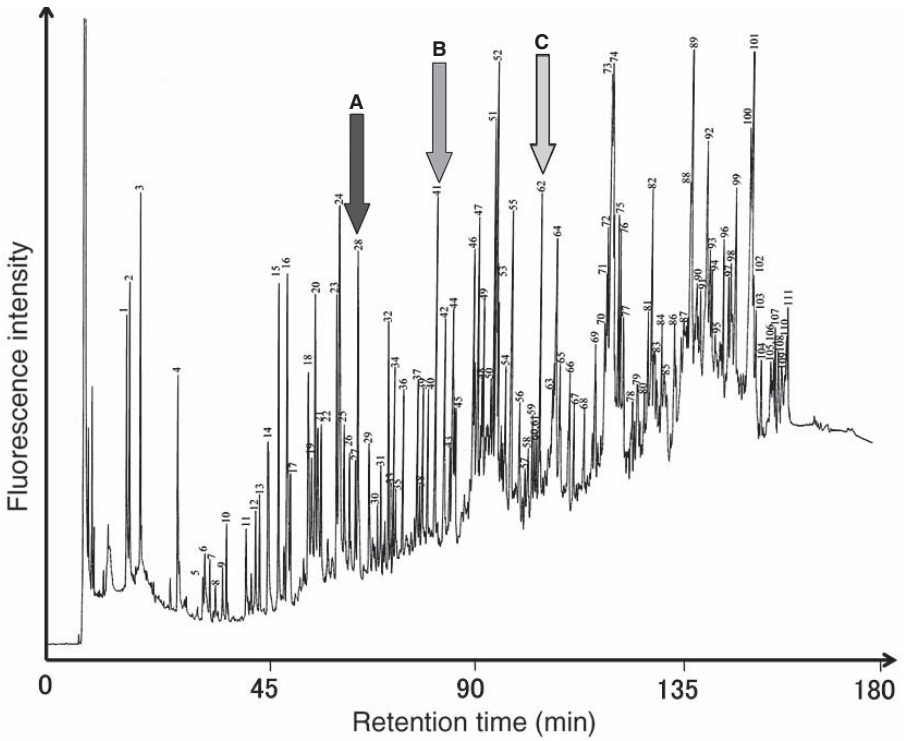


Fig.1 A chromatogram of the proteins (10μg protein) in soluble fraction of *C. elegans* derivatized with DAABD-Cl

The chlorine at 7 position of DAABD-Cl reacts specifically with SH groups. DAABD-Cl itself is non-fluorescent, however the resultant DAABD-derivative is strongly fluorescent, due to the benzoxadiazole skeleton coupled to the SH group. Generally, there are not many S-S bonds and SH group in proteins, and consequently target proteins can be labeled with DAABD-Cl in an efficient manner. Additionally, both excitation and emission wavelengths of DAABD derivatives are long, allowing highly sensitive and selective protein analysis. Furthermore, DAABD-Cl has a dimethylamino group at 4 position, and therefore high intensity cations can be obtained with electron spray ionization during MS analysis. Therefore, extremely small quantities of peptides can be analyzed.

DAABD-Cl is a labeling reagent, which can effectively permit the collection of the target protein through fluorescence HPLC and analysis by MS/MS. This protein analysis reagent that Imai and co-worker have developed allows one to identify a very small amount of protein with good precision. It is expected that this technique can be used in many applications, including the identification of abnormal or pathogenic proteins in living organism.

Related products

Product No.	Product Name	Unit Size
T1656	Tris(2-carboxyethyl)phosphine Hydrochloride	1g 5g 25g
B2904	Buffer Solution pH8.7 (6mol/L Guanidine Hydrochloride)	100mL

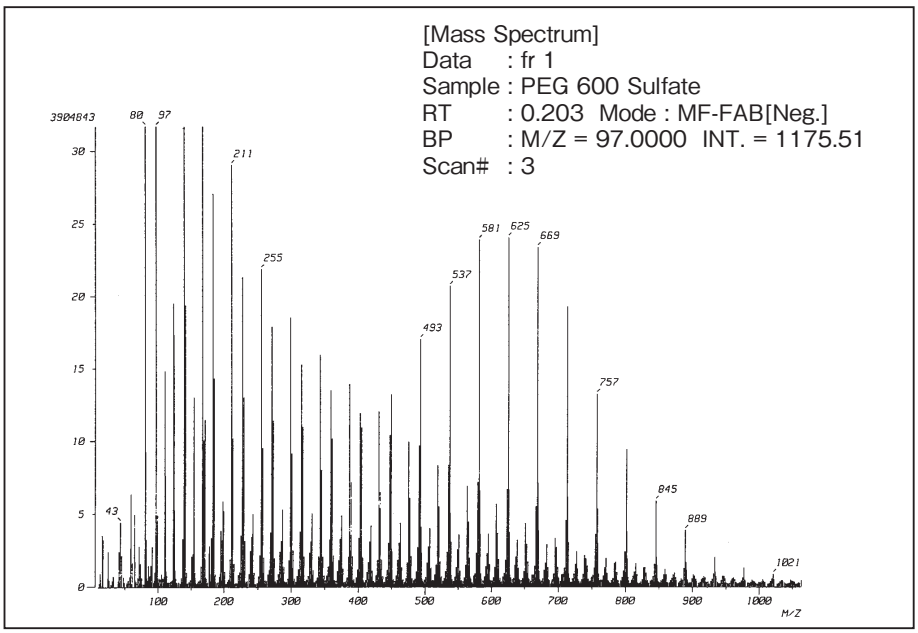
References

M. Masuda, C. Toriumi, T. Santa, K. Imai, *Anal. Chem.* **2004**, *76*, 728; M. Masuda, H. Saimaru, N. Takamura, K. Imai, *Biomed. Chromatogr.* **2005**, *19*, 556; T. Ichibangase, K. Moriya, K. Koike, K. Imai, *J. Proteome Res.* **2007**, *6*, 2841; K. Imai, JP Patent 4558297; *Quantitative Proteome Analysis: Methods and Applications*, ed. by K. Imai, S. L. F. Yau, Pan Stanford Publishing, Singapore, **2013**.

Standards for Mass Spectrometry & Matrix Materials

Standards for Mass Spectrometry

Product No.	Product Name	Unit Size
P0690	Perfluorokerosene (Low boiling)	10g
P1034	Perfluorokerosene (Super-high boiling)	5g
P1061	Perfluorokerosene (Super-high boiling) (50% in PFK Low boiling)	5g
P0074	Perfluorotributylamine	25g 100g
T0858	2,4,6-Tris(pentafluoroethyl)-1,3,5-triazine	0.1mL
T0859	2,4,6-Tris(heptafluoropropyl)-1,3,5-triazine	0.1mL
T0828	2,4,6-Tris(pentadecafluoroheptyl)-1,3,5-triazine	100mg
P1185	Polyethylene Glycol 600 Sulfate	1g



Negative FABMS spectrum of P1185 PEG 600 Sulfate

【PEG Sulfate Reference Mass Table】
Structure : $H(OCH_2CH_2)_nSO_4^-$

n	Calculated mass	n	Calculated mass	n	Calculated mass	n	Calculated mass	n	Calculated mass	n	Calculated mass
3	229.0382	7	405.14306	11	581.24792	15	757.35278	19	933.45764	23	1109.5625
4	273.06441	8	449.16927	12	625.27413	16	801.37899	20	977.48385	24	1153.58871
5	317.09063	9	493.19549	13	669.30035	17	845.40521	21	1021.51007		
6	361.11684	10	537.2217	14	713.32656	18	889.43142	22	1065.53628		

The masses were calculated using C=12.0000000, H=1.007825037, O=15.99491454 and S=31.9720718

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

FABMS & Liquid SIMS Matrix Materials

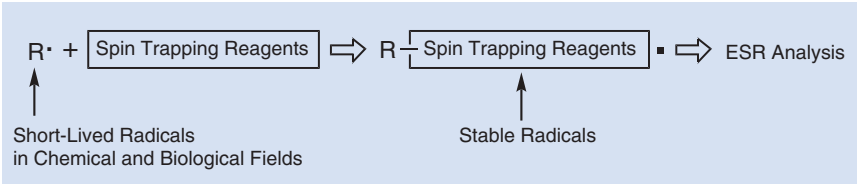
Product No.	Product Name	Unit Size	
S0376	Diethanolamine	1g	10g
S0436	DTT / TG11 [Dithiothreitol + α-Thioglycerol] (1:1 mixture)		1g
S0437	DTT / TG12 [Dithiothreitol + α-Thioglycerol] (1:2 mixture)		1g
S0373	Glycerol	1g	10g
S0375	Magic Bullet [mixture of Dithiothreitol and Dithioerythritol (3:1)]		1g
S0378	3-Nitrobenzyl Alcohol	1g	10g
S0380	2-Nitrophenyl *n*-Octyl Ether	1g	10g
S0374	α-Thioglycerol	1g	10g
S0377	Triethanolamine	1g	10g

MALDI-TOF-MS Matrix Materials

Product No.	Product Name	Unit Size		
A0859	3-Amino-4-hydroxybenzoic Acid		5g	25g
B3635	*trans*-2-[3-(4-*tert*-Butylphenyl)-2-methyl-2-propenylidene]malononitrile		100mg	1g
C1768	α-CHCA			1g
C0353	*trans*-Cinnamic Acid	25g	100g	500g
D2933	2,5-Dihydroxybenzoic Acid			5g
E0386	Esculetin			1g
H0586	4'-Hydroxyazobenzene-2-carboxylic Acid		5g	25g
H1400	4'-Hydroxyazobenzene-4-carboxylic Acid Hydrate		200mg	1g
H0787	3-Hydroxy-2-pyridinecarboxylic Acid		5g	25g
I0025	3-Indoleacrylic Acid		1g	5g
N0082	Nicotinic Acid		25g	500g
D2932	Sinapinic Acid			5g
T1888	2',4',6'-Trihydroxyacetophenone Monohydrate		5g	25g

ESR Spectrometry

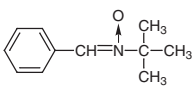
Electron Spin Resonance (ESR) spectrometry is an analytical method to observe and measure absorbed energy on irradiation of the microwave to the radicals in a strong magnetic field. Recently, the function of active oxygen species, such as the hydroxyl radical and super oxide *in vivo*, has attracted attention. These radicals can be studied by the ESR spectrometry. Generally, these radicals are unstable, but when they are first reacted with a spin trapping reagent, they can be trapped and stabilized. On the other hand, with use of a spin labeling reagent, the molecules without radicals can also be measured with ESR.



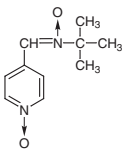
Spin Trapping Reagents

Product No.	Product Name	Unit Size	
B1701	*N*-*tert*-Butyl-α-phenylnitrone	1g	5g
B1735	*N*-*tert*-Butyl-α-(4-pyridyl-1-oxide)nitrone	1g	5g
D3068	5-(Diethylphosphono)-5-methyl-1-pyrroline *N*-Oxide		50mg
D2362	5,5-Dimethyl-1-pyrroline *N*-Oxide	1g	5g
N0367	Nitrosobenzene	5g	25g
M1164	Nitroso-*tert*-butane	1g	5g
T1554	3,3,5,5-Tetramethyl-1-pyrroline *N*-Oxide		1g
T1534	2,4,6-Tri-*tert*-butylnitrosobenzene	100mg	1g

B1701



B1735



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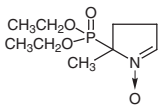

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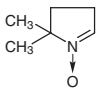
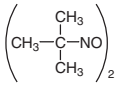


N0367



M1164



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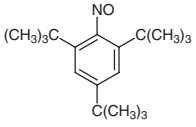
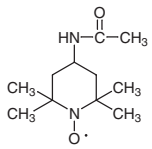


The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

Spin Labels

Product No.	Product Name	Unit Size	
A1348	4-Acetamido-TEMPO	5g	25g
A1343	4-Amino-TEMPO	1g	5g
H0878	4-Benzoyloxy-TEMPO	1g	5g
C1406	3-Carboxy-PROXYL		1g
C1428	4-Carboxy-TEMPO	100mg	1g
C1432	4-(2-Chloroacetamido)-TEMPO	100mg	1g
C1782	4-Cyano-TEMPO		1g
D2399	16-DOXYL-stearic Acid	25mg	100mg
H0865	4-Hydroxy-TEMPO	5g	25g
I0487	4-(2-Iodoacetamido)-TEMPO		100mg
I0486	4-Isothiocyanato-TEMPO	100mg	1g
M1531	4-Methacryloyloxy-TEMPO	1g	5g
M1197	4-Methoxy-TEMPO	1g	5g
O0266	4-Oxo-TEMPO	5g	25g
T1560	TEMPO	5g	25g

A1348



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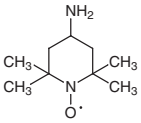

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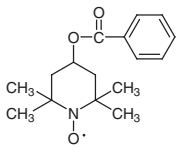

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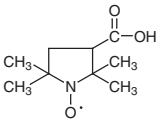

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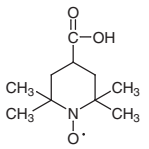

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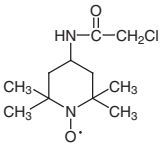

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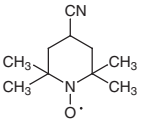

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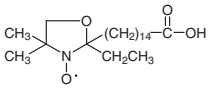

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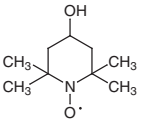

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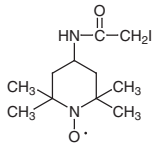

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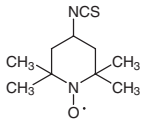

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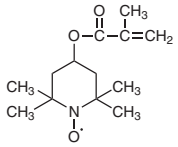

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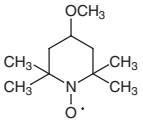

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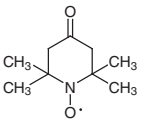

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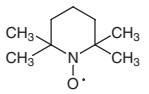


pH Indicators

pH Indicators

Product No.	Product Name[1)]	Ranges of color change[2)]	Unit Size		
G0177	Methyl Violet	(Y)0.1-3.2(V)		25g	100g
B0781	Benzopurpurine 4B	(B)1.0-4.0(R)			25g
M0490	Acid Yellow 36	(R)1.2-2.3(Y)		25g	500g
M0074	*m*-Cresol Purple	(R)1.2-2.8(Y)		1g	25g
S0045	*m*-Cresol Purple Sodium Salt	(R)1.2-2.8(Y)		1g	5g
X0016	*p*-Xylenol Blue	(R)1.2-2.8(Y)		1g	25g
T0235	Thymol Blue	(R)1.2-2.8(Y)		1g	25g
S0049	Thymol Blue Sodium Salt	(R)1.2-2.8(Y)			1g
A0576	Aniline Yellow	(R)1.2-3.0(Y)			25g
P0631	Pentamethoxy Red	(RV)1.2-3.8(C)		1g	25g
B0425	Benzyl Orange	(R)1.9-3.3(Y)		1g	5g
D0109	2,4-Dinitrophenol (wetted with *ca.* 20% Water)	(sY)2.6-4.0(Y)		25g	300g
D0231	Methyl Yellow	(R)2.9-4.0(Y)			25g
T0039	Tetrabromophenol Blue	(YG)3.0-4.6(B)		1g	5g
B0574	Bromochlorophenol Blue	(Y)3.0-4.6(V)			1g
* B0631	Bromophenol Blue	(Y)3.0-4.6(BV)		1g	25g
S0043	Bromophenol Blue Sodium Salt	(Y)3.0-4.6(BV)		1g	5g
C0550	Congo Red	(V)3.0-5.0(RO)			25g
* M0489	Methyl Orange	(R)3.1-4.4(OY)			25g
E0155	Ethyl Orange	(R)3.4-4.8(Y)			25g
A5107	TBPE	(YG)3.4-5.4(BV)			1g
E0054	4-Ethoxychrysoidine Hydrochloride	(R)3.5-5.5(Y)		5g	25g
* B0578	Bromocresol Green	(Y)3.8-5.4(B)	1g	5g	25g
S0041	Bromocresol Green Sodium Salt	(Y)3.8-5.4(B)		1g	5g
D0841	2,5-Dinitrophenol (wetted with *ca.* 20% Water)	(sY)4.0-5.8(Y)			5g
* M0421	Methyl Red	(R)4.2-6.2(Y)		1g	25g
M0424	Methyl Red Sodium Salt	(R)4.2-6.2(Y)		1g	25g
L0079	Lacmoid	(P)4.4-6.6(V)		1g	5g
* N0220	4-Nitrophenol	(sY)4.8-7.6(Y)		25g	500g
* C0245	Chlorophenol Red	(Y)5.0-6.6(R)		1g	5g
C0247	Chlorophenol Red Sodium Salt	(Y)5.0-6.6(R)		1g	5g
N0223	4-Nitrophenol Sodium Salt Dihydrate	(sY)5.0-7.6(Y)		25g	500g
* B0580	Bromocresol Purple	(Y)5.2-6.8(V)		1g	25g
S0042	Bromocresol Purple Sodium Salt	(Y)5.2-6.8(V)		1g	5g
B0632	Bromophenol Red	(Y)5.2-6.8(R)		1g	25g
* B0657	Bromothymol Blue	(Y)6.0-7.6(B)		1g	25g
S0044	Bromothymol Blue Sodium Salt	(Y)6.0-7.6(B)		5g	25g
B0998	Bromoxylenol Blue	(Y)6.0-7.6(B)		5g	25g
N0315	Neutral Red	(R)6.8-8.0(Y)			25g
A0598	Pararosolic Acid	(O)6.8-8.0(VR)			25g
* P0100	Phenol Red	(Y)6.8-8.4(R)	1g	25g	100g
P0102	Phenol Red Sodium Salt	(Y)6.8-8.4(R)		5g	25g
N0222	2-Nitrophenol Sodium Salt	(sY)6.8-8.6(Y)		25g	500g
N0031	α-Naphtholphthalein	(O)7.0-8.6(B)		1g	5g
C0406	Cresol Red	(Y)7.2-8.8(R)		1g	25g
S0046	Cresol Red Sodium Salt	(Y)7.2-8.8(R)		1g	25g
M0074	*m*-Cresol Purple	(Y)7.4-9.0(V)		1g	25g
S0045	*m*-Cresol Purple Sodium Salt	(Y)7.4-9.0(V)		1g	5g
B0817	Ethyl Bis(2,4-dinitrophenyl)acetate	(C)7.5-9.1(B)			5g
* P0094	Phenolphthalein	(C)7.8-10.0(P)		25g	500g
T0235	Thymol Blue	(Y)8.0-9.6(B)		1g	25g
S0049	Thymol Blue Sodium Salt	(Y)8.0-9.6(B)			1g
X0016	*p*-Xylenol Blue	(Y)8.0-9.6(VB)		1g	25g
* C0404	*o*-Cresolphthalein	(C)8.0-9.8(P)			25g
* T0237	Thymolphthalein	(C)8.6-10.5(B)		1g	25g
A0579	Mordant Orange 1	(YO)10.0-12.0(OR)			25g
A0578	Alizarin Yellow GG	(Y)10.0-12.0(BrY)			25g
R0010	Tropaeolin O	(Y)11.0-12.8(R)			1g
T0496	1,3,5-Trinitrobenzene (wetted with *ca.* 40% Water)	(C)11.5-14.0(O)			10g
I0214	Indigo Carmine	(B)11.6-14.0(Y)			25g

The chemical, physical and toxicological properties of some chemicals have not been thoroughly investigated. Please handle with care.

*We have the products available for ready-to-use for the pH determination or as titration indicators.

1) The arrangement is in the order of the ranges in color change.
2) The color notation is abbreviated as follows;
B=Blue, Br=Brown, C=Colorless, G=Green, Gy=Gray, O=Orange, P=Pink, R=Red, V=Violet, Y=Yellow, s=slightly

TCI-*Ace*

Ion Association

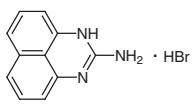
Among organic analytical reagents while chelating reagents are effective only for metallic ions (cations), Ion Association reagents which we introduce here form an ion-pair (ion association) through its interaction of negatively charged association reagents toward cations and those of positively charged association reagents toward anions, respectively.

This ion association, when the concentration rate is considerably high in the aqueous solution, precipitates allowing for use in a weight analysis and precipitation titration. On the other hand, when the concentration rate is low ($<10^{-5}$M), the ion association is extracted by an organic solvent allowing the determination of trace components by measuring through absorption spectrochemical analysis or atomic spectrophotometry analysis. Accordingly, its application extends over considerably wide ranges.

TCI-*Ace* Ion Association reagents have strictly been selected capable of coping with cases where highly sensitive analysis is required.

Product No.	Product Name	Unit Size	
A5133	2-Aminoperimidine Hydrobromide [Precipitation reagent for SO_4]	5g	25g
A5106	Basic Green 1		1g
A5160	Benzyldimethyltetradecylammonium Chloride Hydrate		5g
A5161	CPC Monohydrate (=Cetylpyridinium Chloride Monohydrate)		5g
A5104	Crystal Violet Nonahydrate		1g
A5101	Ethyl Violet [Sensitive spectrophotometric reagent for anionic surfactants]		1g
A5100	Malachite Green, Oxalate [Sensitive spectrophotometric reagent for PO_4]		1g
A5400	MDEPAP [=1-Methyl-4-(4-diethylaminophenylazo)pyridinium Iodide] [Extraction-spectrophotometric reagent for anionic surfactants]		1g
A5105	Methylene Blue		1g
A5132	Potassium Tetrakis(4-chlorophenyl)borate [Anion for the neutral carrier type ion electrode]	1g	5g
A5102	Rhodamine B		1g
A5131	Sodium Tetrakis(4-fluorophenyl)borate Hydrate [Precipitation reagent for Cs and titrimetric reagent for nonionic surfactants]	1g	5g
A5130	Sodium Tetraphenylborate [Precipitation reagent for K]	1g	10g
A5107	TBPE (=Tetrabromophenolphthalein Ethyl Ester Potassium Salt) [Sensitive spectrophotometric reagent for amines, quaternary ammonium salts and other cations]		1g

A5133



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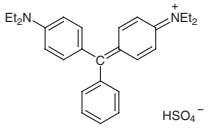

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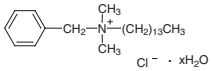

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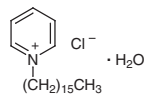

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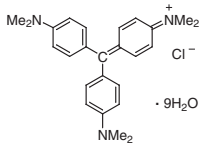

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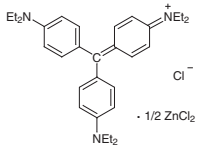

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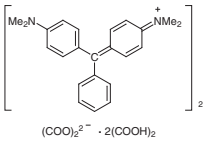

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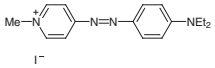

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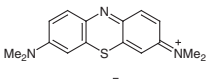

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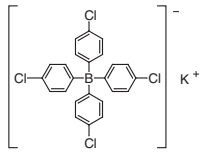

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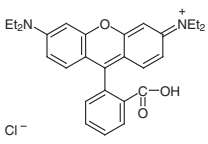

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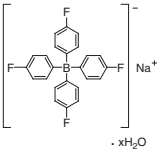

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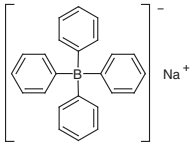

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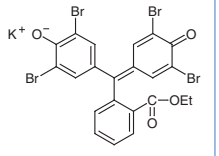


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

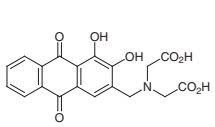
Chelating Reagents

Complexones

Photometric Reagents

Product No.	Product Name	Unit Size		
A0440	Alizarin Complexone	100mg	1g	5g
C0004	Calcein [for Fluorometric Determination of Ca]		1g	5g
U0001	Calcein Blue			1g
C0003	Calcein Sodium Salt [for Fluorometric Determination of Ca]			5g
B0478	Methylthymol Blue Sodium Salt	1g	5g	25g
X0052	Methylxylenol Blue			1g
C0405	Phthalein Complexon		1g	25g
P0344	Phthalein Complexon Sodium Salt			1g
T0238	Thymolphthalein Complexon			1g
B0477	Xylenol Orange		1g	25g

A0440



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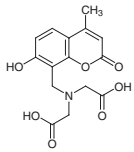

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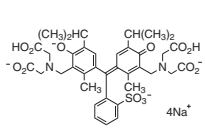

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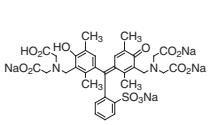

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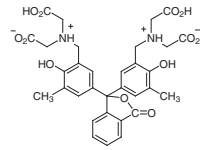

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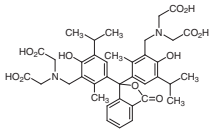

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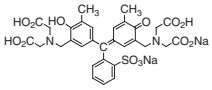
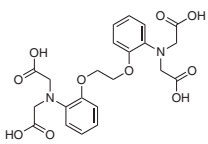


EDTA Analogs

Product No.	Product Name	Unit Size		
B3895	1,2-Bis(2-aminophenoxy)ethane-*N*,*N*,*N*′,*N*′-tetraacetic Acid		100mg	1g
N0408	*N*-(2-Carboxyethyl)iminodiacetic Acid			25g
C2633	*trans*-1,2-Cyclohexanediaminetetraacetic Acid Monohydrate (trace Metals)		Price on request	
C0473	*trans*-1,2-Cyclohexanediaminetetraacetic Acid Monohydrate	25g	100g	500g
D4227	Dexrazoxane			100mg
D2019	1,6-Diaminohexane-*N*,*N*,*N*′,*N*′-tetraacetic Acid		10g	25g
D2424	Diethylenetriaminepentaacetic Dianhydride		5g	25g
T1875	DOTA		200mg	1g
D1330	DPTA-OH		5g	25g
D0504	DTPA		25g	500g
E0084	EDTA		25g	500g
D3901	EDTA 2K Dihydrate		25g	500g
E0091	EDTA 2Na Dihydrate		25g	500g
E0099	EDTA 4Na Dihydrate		25g	500g
E0103	EDTA 2Na Solution			500mL
E0805	EGTA		5g	25g
E0106	EGTA		25g	250g
E0288	Ethylenediamine-*N*,*N*′-diacetic-*N*,*N*′-dipropionic Acid Hydrate			1g
E0480	Ethylenediaminetetraacetic Dianhydride			25g
E0393	*N*,*N*,*N*′,*N*′-Ethylenediamine-tetrakis(methylenephosphonic Acid)	25g	100g	500g
G0229	Glycine-*N*,*N*-bis(methylenephosphonic Acid)			5g
H0243	HEDTA	25g	100g	500g

Product No.	Product Name	Unit Size	
H0047	HEDTA 3Na Dihydrate	25g	500g
M2090	*N*-Methyliminodiacetic Acid	5g	25g
N0474	Nitrilotris(methylenephosphonic Acid) (*ca.* 50% in Water, *ca.* 2.2mol/L)	25mL	500mL
N0100	NTA 2Na	25g	500g
D1329	PDTA	25g	500g
P1605	1,3-Propanediamine-*N*,*N*,*N*',*N*'-tetraacetic Acid	25g	500g
T0806	TTHA	5g	25g

B3895



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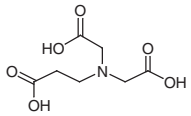

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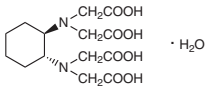

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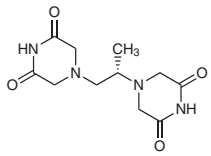

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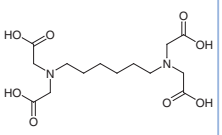

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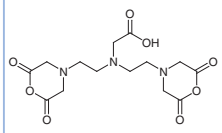

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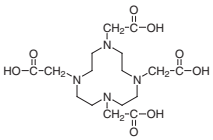

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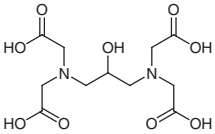

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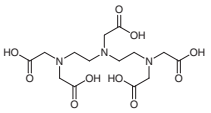

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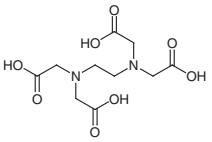

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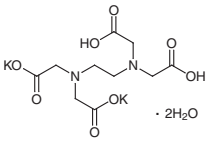

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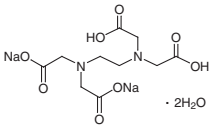

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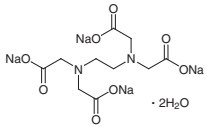

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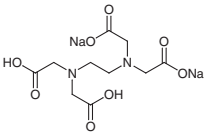

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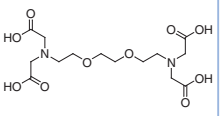

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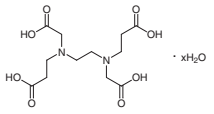

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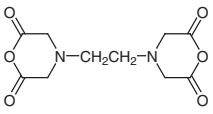

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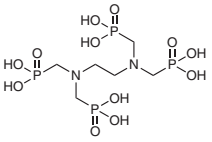

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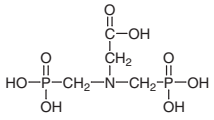

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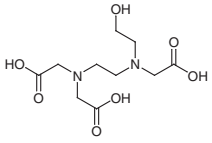

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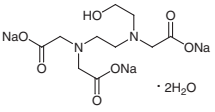

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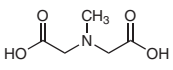

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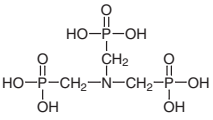

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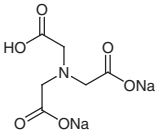

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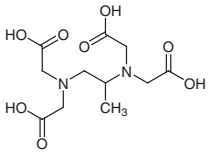

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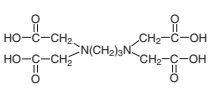

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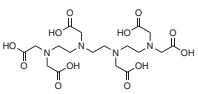


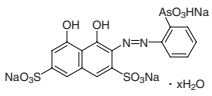
 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Azo Compounds

Naphthylazo Compounds

Product No.	Product Name	Unit Size	
D0578	Arsenazo I Hydrate	1g	25g
A5009	Arsenazo III [Spectrophotometric reagent for U, Th, Zr and other metals, Indicator for the precipitation titration of SO_4 with Ba]	1g	5g
C0008	Calmagite [Metal indicator for Ca, Mg etc.]	1g	5g
H0250	Cal Red (1:100 diluted with K_2SO_4)	1g	25g
A5008	Dimethylsulfonazo III [Spectrophotometric reagent for alkaline earth metals and indicator for the precipitation titration of SO_4 with Ba]	1g	5g
E0008	Eriochrome Black T (contains *ca.* 0.5% Hydroxylamine Hydrochloride) (5g/L in Methanol)		500mL
E0214	Eriochrome Black T		25g
A5017	H-Resorcinol [Spectrophotometric reagent for the determination of B by FIA]		1g
A0581	Mordant Black 17 [Indicator for Complexometry]		25g
A5000	PAN [=1-(2-Pyridylazo)-2-naphthol] [Metal indicator and spectrophotometric reagent for transition metals]	1g	5g
A5010	Sulfonazo III [Spectrophotometric reagent for alkaline earth metals and indicator for the precipitation titration of SO_4 with Ba]	1g	5g
A5003	TAN [=1-(2-Thiazolylazo)-2-naphthol] [Spectrophotometric reagent for transition metals]	1g	5g
H0240	Thorin Hydrate [for Determination of Th, etc.]	1g	25g
D0604	Trisodium 2-(4-Sulfophenylazo)-1,8-dihydroxynaphthalene-3,6-disulfonate Hydrate	5g	25g
A5007	Xylylazo Violet I [Spectrophotometric reagent for Mg]	1g	5g
A5006	Xylylazo Violet II [Spectrophotometric reagent for Mg]	1g	5g

D0578



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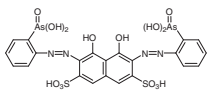

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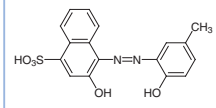

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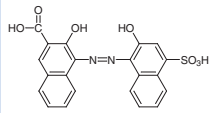

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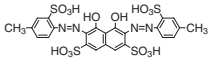

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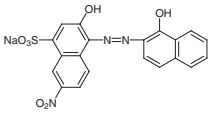

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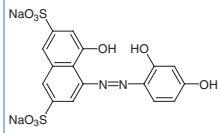

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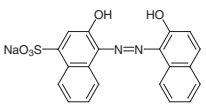

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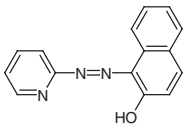

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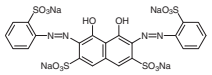

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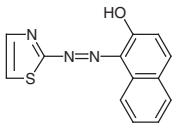

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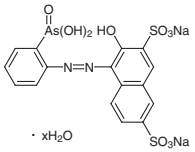

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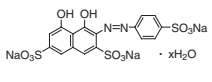

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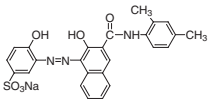

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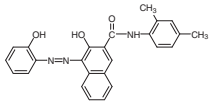
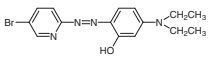


Pyridylazo Compounds

Product No.	Product Name	Unit Size	
B1081	2-(5-Bromo-2-pyridylazo)-5-(diethylamino)phenol	100mg	1g
B1082	2-(5-Bromo-2-pyridylazo)-5-dimethylaminophenol [for Colorimetric Determination of Cd]	100mg	1g
D1552	4-(3,5-Dibromo-2-pyridylazo)-1,3-phenylenediamine [for Colorimetric Analysis of Co, Cd]	100mg	1g
P0910	5-Dimethylamino-2-(2-pyridylazo)phenol [for Determination of Zinc in Serum]	100mg	1g
A5000	PAN [=1-(2-Pyridylazo)-2-naphthol] [Metal indicator and spectrophotometric reagent for transition metals]	1g	5g
A5001	PAR [=4-(2-Pyridylazo)resorcinol] [Spectrophotometric reagent for transition metals]	1g	5g

B1081



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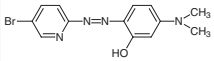

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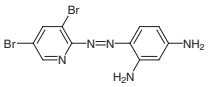

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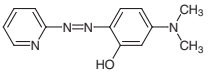

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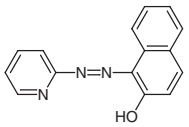

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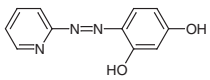
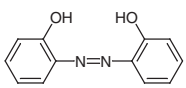


Others

Product No.	Product Name	Unit Size	
A5005	2,2'-Dihydroxyazobenzene [Spectrophotometric and fluorimetric reagent for Al, Mg and other metals]	1g	5g
A5060	Lumogallion [Fluorimetric reagent for Al, Ga and other metals]		1g
N0135	Magneson	1g	25g
A5011	Stilbazo [Spectrophotometric reagent for Al and other metals]	1g	5g
A5002	TAR [=4-(2-Thiazolylazo)resorcinol] [Metal indicator and spectrophotometric reagent for transition metals]	1g	5g

A5005



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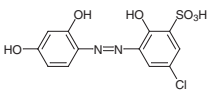

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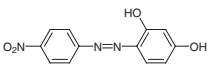

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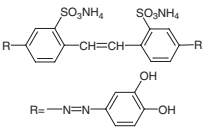

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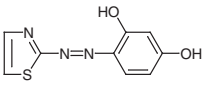

Phenanthrolines

Product No.	Product Name	Unit Size		
B2694	Bathocuproine (purified by sublimation)		1g	5g
D0711	Bathocuproine		1g	5g
B2695	Bathophenanthroline (purified by sublimation)			1g
D0905	Bathophenanthroline		1g	5g
B0989	Bathophenanthrolinedisulfonic Acid Disodium Salt Hydrate [for Determination of Ferrous Ion]			1g
A5083	2,9-Dibutyl-5-picrylamino-1,10-phenanthroline [for Determination of Li]			100mg
D3869	4,7-Dihydroxy-1,10-phenanthroline			1g
D2583	2,9-Dimethyl-5-picrylamino-1,10-phenanthroline			100mg
B0985	Disodium Bathocuproinedisulfonate [for Determination of Cu in Blood]		100mg	1g
M0300	5-Methyl-1,10-phenanthroline Hydrate [for Colorimetric Determination of Iron]		100mg	1g
D0771	Neocuproine Hemihydrate		1g	25g
N0423	Neocuproine Hydrochloride Monohydrate	1g	5g	25g
P0221	1,10-Phenanthroline Monohydrate		1g	25g
P1973	1,10-Phenanthroline-5,6-dione		1g	5g
P0081	1,10-Phenanthroline Hydrochloride Monohydrate			25g

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

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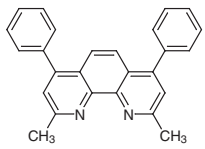
D0711



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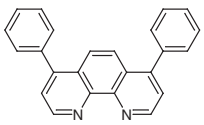

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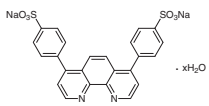

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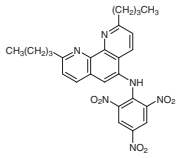

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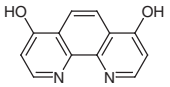

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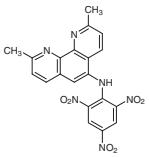

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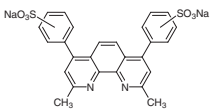

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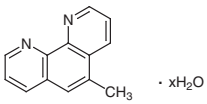

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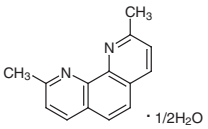

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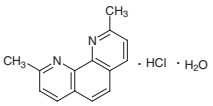

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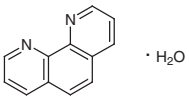

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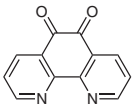

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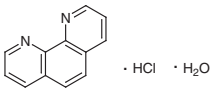
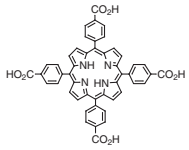


Porphines (see also p.163 Porphyrins)

Product No.	Product Name	Unit Size	
A5015	TCPP [=Tetrakis(4-carboxyphenyl)porphyrin] [Ultra-high sensitive spectrophotometric reagent for Cu, Cd] [For the simultaneous determination of metals by HPLC]	100mg	1g
T2222	5,10,15,20-Tetra(4-pyridyl)porphyrin		1g
A5014	TMPyP [=α,β,γ,δ-Tetrakis(1-methylpyridinium-4-yl)porphyrin *p*-Toluenesulfonate] [Ultra-high sensitive spectrophotometric reagent for Cu, Mg] [For the simultaneous determination of metals by HPLC]	100mg	1g
A5012	TPP (=Tetraphenylporphyrin) [Ultra-high sensitive spectrophotometric reagent for Cu]	1g	25g
A5013	TPPS Hydrate (=Tetraphenylporphyrin Tetrasulfonic Acid Hydrate) [Ultra-high sensitive spectrophotometric reagent for transition metals]	100mg	1g

A5015



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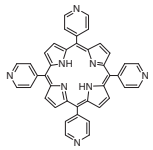

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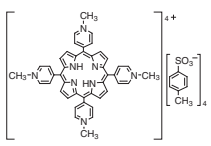

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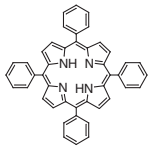

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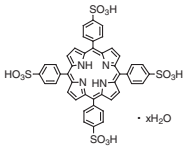
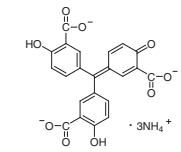


Others

Product No.	Product Name		Unit Size	
A0240	Aluminon (mixture of isomers)		5g	25g
A5016	Azomethine H [Spectrophotometric Reagent for B]		5g	25g
P0158	*N*-Benzoyl-*N*-phenylhydroxylamine		5g	25g
B3509	2,2'-Bicinchoninic Acid		1g	5g
B1077	2,2'-Bicinchoninic Acid Dipotassium Salt Hydrate [for Determination of Cu]		1g	5g
B0468	2,2'-Bipyridyl	25g	100g	500g
D0622	Bismuthiol		25g	500g
B1124	Bismuthiol II Hydrate		5g	25g
D0207	Bromopyrogallol Red		1g	5g
C0077	Chloranilic Acid			25g
C1058	*N*-Cinnamoyl-*N*-(2,3-xylyl)hydroxylamine		1g	5g
N0259	5-Diethylamino-2-nitrosophenol Hydrochloride		5g	25g

Product No.	Product Name	Unit Size	
N0261	5-Dimethylamino-2-nitrosophenol Hydrochloride	5g	25g
D1201	5,6-Diphenyl-3-(2-pyridyl)-1,2,4-triazine		1g
D0596	Disodium Chromotropate Dihydrate	25g	500g
F0079	*α*-Furil Dioxime	1g	5g
H0305	8-Hydroxyquinoline	25g	500g
A5004	8-Mercaptoquinoline Hydrochloride [Extraction-spectrophotometric and fluorimetric reagent for soft metals]	1g	5g
A5082	*N*-Methylfurohydroxamic Acid	1g	5g
C0979	Mordant Blue 29	5g	25g
P0223	Phenyl 2-Pyridyl Ketoxime	1g	5g
P0830	3-(2-Pyridyl)-5,6-bis(4-sulfophenyl)-1,2,4-triazine Disodium Salt Hydrate		1g
P0572	Pyrogallol Red		1g
S0328	2-Salicylideneaminophenol	5g	25g
A5019	Salicylideneamino-2-thiophenol [Spectrophotometric reagent for Tin and other transition metals]	1g	5g
Z0005	Zincon		1g

A0240



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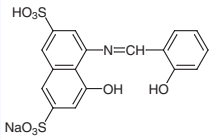

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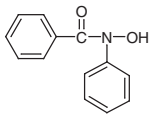

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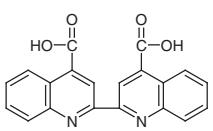

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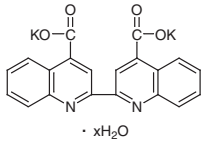

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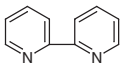

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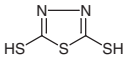

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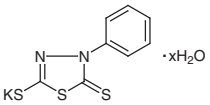

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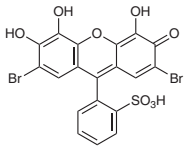

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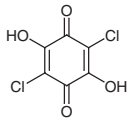

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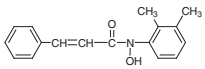

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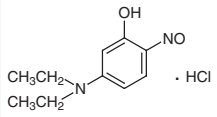

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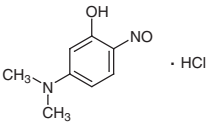

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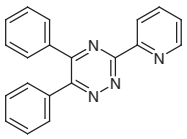

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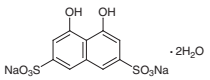

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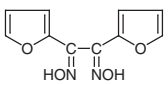

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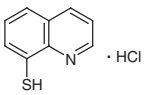

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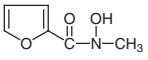

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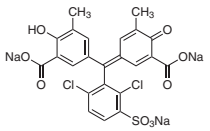

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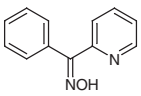

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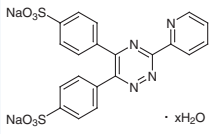

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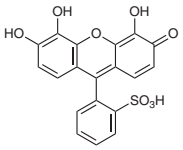

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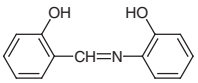

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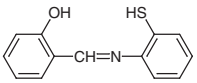

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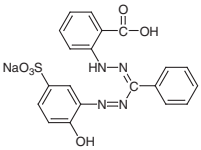
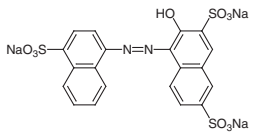
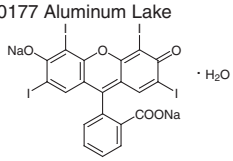
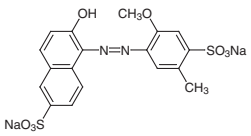
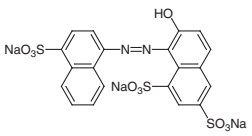
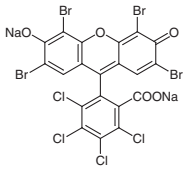
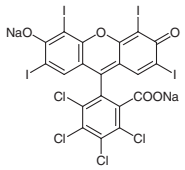
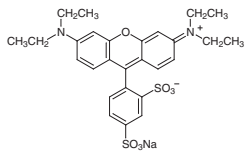
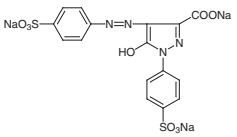
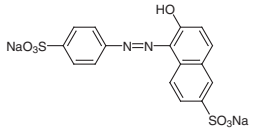
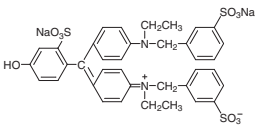
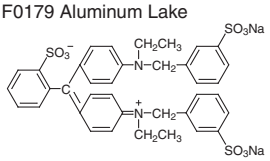
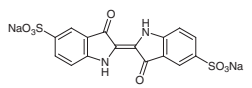


 Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

Food Colors

by Food Sanitation Law in Japan

F0138 	F0139 F0177 Aluminum Lake 	F0325 	F0140 
F0142 	F0001 	F0143 	F0144 F0178 Aluminum Lake 
F0145 	F0146 	F0147 F0179 Aluminum Lake 	F0148 

The undermentioned Food Colors are permitted to use for Food, Confectionery and Toy by Sanitation Law in Japan. (Except these Food Colors, any other Food Colors cannot be used for the applications.)

F0138	Food Red No.2	25g
F0139	Food Red No.3	25g
F0177	Food Red No.3 Aluminum Lake	25g
F0325	Food Red No.40	25g
F0140	Food Red No.102	25g
F0142	Food Red No.104	25g
F0001	Food Red No.105	25g
F0143	Food Red No.106	25g
F0144	Food Yellow No.4	25g
F0178	Food Yellow No.4 Aluminum Lake	25g
F0145	Food Yellow No.5	25g
F0146	Food Green No.3	10g
F0147	Food Blue No.1	25g
F0179	Food Blue No.1 Aluminum Lake	25g
F0148	Food Blue No.2	25g

* F0177, F0178, F0179 are used for coloring not only of Food and Drink, but also of powdered Internal Medicines diluted with Bulking Agents.

(Kind of Medicine)	(Food Color)	(Coloring Concentration)
Poisonous Medicine	Food Blue No.1 Aluminum Lake	0.002%
Drastic Medicine	Food Red No.3 Aluminum Lake	0.001%
General Medicine	Food Yellow No.4 Aluminum Lake	0.005%

Food Color Testing Solutions

The Testing Solution is contrast reagent to distinguish Food Colors which have been used in food, and it is very convenient to examine poisonous or harmful Food Colors in food by TLC or Paper Chromatography easily.

●A Set

Product No.	Product Name	Unit Size
F0118	Food Color Testing Solutions A Set (includes permitted 12 food colors in Japan /each 4mL)	1set (4mL×12)

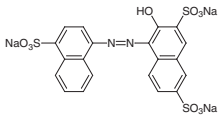
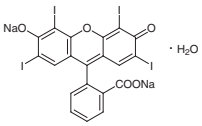
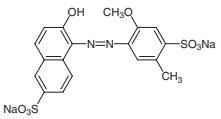
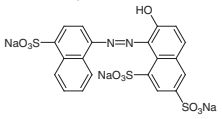
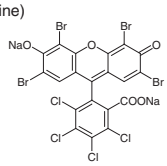
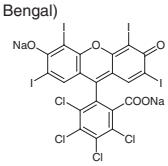
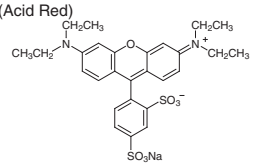
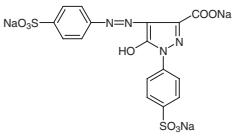
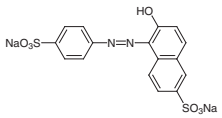
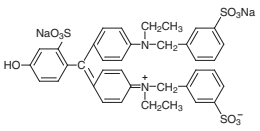
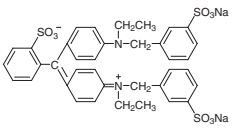
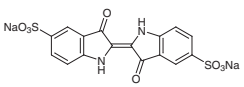
●B Set

Product No.	Product Name	Unit Size
F0119	Food Color Testing Solutions B Set (includes prohibited 14 colors in Japan /each 4mL)	1set (4mL×14)

●A, B Set

Product No.	Product Name	Unit Size
F0153	Food Color Testing Solutions A and B Set (includes permitted 12 food colors and prohibited 14 colors in Japan /each 4mL)	1set (26items)

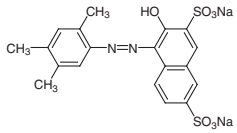
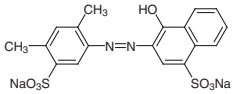
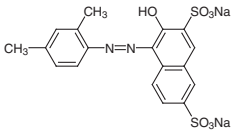
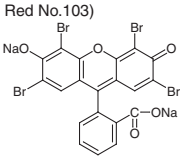
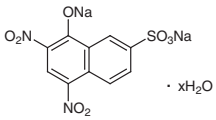
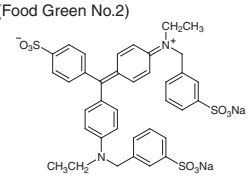
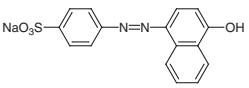
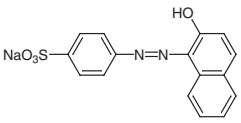
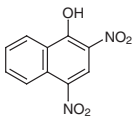
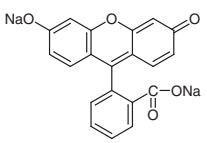
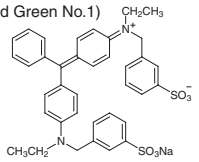
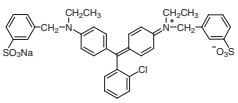
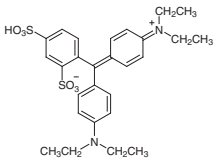
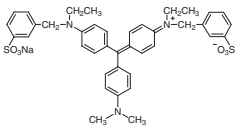
A Set
(0.1% in Water)

(1) Food Red No.2 (Amaranth) 	(2) Food Red No.3 (Erythrosine) 	(3) Food Red No.40 (Allura Red AC) 	(4) Food Red No.102 (New Coccine) 
(5) Food Red No.104 (Phloxine) 	(6) Food Red No.105 (Rose Bengal) 	(7) Food Red No.106 (Acid Red) 	(8) Food Yellow No.4 (Tartrazine) 
(9) Food Yellow No.5 (Sunset Yellow FCF) 	(10) Food Green No.3* (Fast Green FCF) 	(11) Food Blue No.1* (Brilliant Blue FCF) 	(12) Food Blue No.2* (Indigocarmine) 

* We prepared dry powder products for Food Green No.3, Food Blue No.1, and Food Blue No.2. When the examination is conducted each time, please use fresh water solution (approx. 0.1%) after adding water upto height of shoulder of the bottle. Especially, since Food Blue No.2 is unstable in water, we packed it in three separate bottles.

Chemicals itemized in this TCI Reagent Guide are for testing or research purpose only. Therefore, please note those chemicals are not guaranteed in the user's favor relating to various problems under the Patent Law that might occur through their use.

B Set
(0.1% in Water)

(1) Ponceau 3R (Food Red No.1) 	(2) Ponceau SX (Food Red No.4) 	(3) Ponceau R (Food Red No.101) 	(4) Eosine (Food Red No.103) 
(5) Naphthol Yellow S (Food Yellow No.1) 	(6) Light Green SF Yellowish (Food Green No.2) 	(7) Orange I (Food Orange No.1) 	(8) Orange II 
(9) Martius Yellow 	(10) Uranine 	(11) Guinea Green B (Food Green No.1) 	(12) Brilliant Milling Green 
(13) Azure Blue VX 	(14) Acid Violet 6B (Food Violet No.1) 		

◎ These products are prohibited to use for coloring of food, for laboratory use only.
◎ The formation of each set subject to be changed partially in accordance with amendment of the relative law in future.

Reference Materials

Certified by The Japan Petroleum Institute

Reference Material of Sulfur in Fuel Oil

This reference material is an analytical standard for determining sulfur in fuel oil.

S0316	Sulfur Content	0 mass% level	100mL

Reference Material of Sulfur in Gas Oil

These reference materials are analytical standards for determining sulfur in gas oil.

S0526	Sulfur Content	10 mass ppm level	100mL
S0527	Sulfur Content	20 mass ppm level	100mL
S0528	Sulfur Content	50 mass ppm level	100mL
S0432	Sulfur Content	100 mass ppm level	100mL
S0433	Sulfur Content	200 mass ppm level	100mL
S0434	Sulfur Content	500 mass ppm level	100mL
S0435	Sulfur Content	800 mass ppm level	100mL

Reference Material of Sulfur in Residual Fuel Oil

These reference materials are analytical standards for determining sulfur in fuel oil and are perpared by blending a reduced cruced oil, distillate oil.

S0369	Sulfur Content	0.1 mass% level	100mL
S0245	Sulfur Content	0.2 mass% level	100mL
S0225	Sulfur Content	0.5 mass% level	100mL
S0226	Sulfur Content	1 mass% level	100mL
S0227	Sulfur Content	2 mass% level	100mL
S0266	Sulfur Content	3 mass% level	100mL
S0317	Sulfur Content	4 mass% level	100mL

Reference Material of Nitrogen in Residual Fuel Oil

These reference materials are analytical standards for determining nitrogen in fuel oil and are perpared by blending distillation residues at reduced pressure, gas oil and others.

S0250	Nitrogen Content	0.05 mass% level	20mL
S0251	Nitrogen Content	0.1 mass% level	20mL

Reference Material of Nickel and Vanadium in Residual Fuel Oil

These reference materials are analytical standards for determining nickel and vanadium in residual fuel oil and are perpared with a reduced crude oil of the Middle East.

S0264	Low Level (Nickel Content 8.9 mass ppm and Vanadium Content 29.8 mass ppm)	250mL
S0265	High Level (Nickel Content 22 mass ppm and Vanadium Content 53 mass ppm)	100mL

Reference Material of Gasoline Components

This reference material is an analytical standard for determining hydrocarbon types in gasoline.

S0429	Methanol	1.01 vol% level	1set (10mL×3)
	Ethanol	3.1 vol% level	
	MTBE	6.9 vol% level	
	ETBE	6.9 vol% level	
	Benzene	0.61 vol% level	
	Kerosene	4.4 vol% level	

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Reference Material of Hydrocarbon Types in Gasoline by FIA

These reference materials are analytical standard for determining hydrocarbon types in gasoline and is prepared by blending cracked stock, reformate and straight gasolines.

S0333	Olefins Content	5 vol% level	1set (5mL×3)
S0806	Olefins Content	25 vol% level	1set (5mL×3)

Reference Material for Flash Point of Hydrocarbon

These reference materials are pure hydrocarbon compounds and multicomponent mixture of hydrocarbon.

S0554	Decane	250mL
S0555	Hexadecane	250mL
S0556	C10 Tetramer	250mL

Abbreviations

Nucleic Acids

Symbol	Meaning	Designation
G	G	Guanine
A	A	Adenine
T	T	Thymine
U	U	Uracil
C	C	Cytosine
R	G or A	puRine
Y	T or C	pYrimidine
M	A or C	aMino
K	G or T	Keto
S	G or C	Strong interaction (3 H bonds)
W	A or T	Weak interaction (2 H bonds)
H	A or C or T	not-G, H follows G in the alphabet
B	G or T or C	not-A, B follows A
V	G or C or A	not-T (not-U), V follows U
D	G or A or T	not-C, D follows C
N	G or A or T or C	aNy

Amino Acids

Common Amino Acids

One-letter Symbol	Three-letter Symbol	Name	Average Mass (residue)
A	Ala	Alanine	71.08
C	Cys	Cysteine	103.14
D	Asp	Aspartic Acid	115.09
E	Glu	Glutamic Acid	129.11
F	Phe	Phenylalanine	147.17
G	Gly	Glycine	57.05
H	His	Histidine	137.14
I	Ile	Isoleucine	113.16
K	Lys	Lysine	128.17
L	Leu	Leucine	113.16
M	Met	Methionine	131.19
N	Asn	Asparagine	114.10
P	Pro	Proline	97.11
Q	Gln	Glutamine	128.13
R	Arg	Arginine	156.19
S	Ser	Serine	87.08
T	Thr	Threonine	101.11
V	Val	Valine	99.13
W	Trp	Tryptophan	186.21
Y	Tyr	Tyrosine	163.18

Other Amino Acids

Three-letter Symbol	Name
Abu	2-Aminobutyric Acid
Aib	2-Aminoisobutyric Acid
Asu	2-Aminosuberic Acid
Cit	Citrulline
Cha	β-Cyclohexylalanine
Hci	Homocitrulline
Hyp	Hydroxyproline
Nle	Norleucine
Nva	Norvaline
Orn	Ornithine
Pen	Penicillamine
Phg	Phenylglycine
Sar	Sarcosine
Sta	Statine

Saccharides

Class		Symbol	Name
Aldose	Pentose	Ara	Arabinose
		Lyx	Lyxose
		Rib	Ribose
		Xyl	Xylose
	Hexose	All	Allose
		Alt	Altrose
		Gal	Galactose
		Glc	Glucose
		Gul	Gulose
		Ido	Idose
		Man	Mannose
		Tal	Talose
Deoxymonosaccharide		Fuc	Fucose
		Rha	Rhamnose
		Qui	Quinovose
		Abe	Abequose
Aminomonosaccharide		GalN	Galactosamine
		GlcN	Glucosamine
		ManN	Mannosamine
		GalNAc	*N*-Acetylgalactosamine
		GlcNAc	*N*-Acetylglucosamine
		ManNAc	*N*-Acetylmannosamine
		Neu	Neuraminic Acid
		Neu5Ac	*N*-Acetylneuraminic acid
		Neu5Gc	*N*-Glycolylneuraminic acid
Uronic Acid		GlcA	Glucuronic acid
		GalA	Galacturonic acid
		ManA	Mannuronic acid

Bioscience Products / Substances

2,4-DCP	2,4-Dichlorophenol
4-AA	4-Aminoantipyrine
4-CN	4-Chloro-1-naphthol
5-ASA	5-Aminosalicylic Acid
5-HT	5-Hydroxytryptamine (Serotonin)
ABA	Abscisic Acid
ABTS	2,2'-Azinobis(3-ethylbenzothiazoline-6-sulfonic Acid)
AEBSF	4-(2-Aminoethyl)benzenesulfonyl Fluoride
AEC	3-Amino-9-ethylcarbazole
AMP	Adenosine 5'-Monophosphate
ATBTA	4'-(4'-Amino-4-biphenylyl)-2,2':6',2''-terpyridine-6,6''-diylbis(methyliminodiacetic Acid)
BCIP	5-Bromo-4-chloro-3-indolyl Phosphate
BSA	Bovine Serum Albumin
BSA	*N,O*-Bis(trimethylsilyl)acetamide
cAMP	Adenosine 3',5'-Cyclic Phosphate
CBB	Coomassie Brilliant Blue
CD	Cyclodextrin
CMC	Carboxymethyl Cellulose
CMC	1-Cyclohexyl-3-(2-morpholinoethyl)carbodiimide
Cyt	Cytochrome
DAABD	4-[2-(Dimethylamino)ethylaminosulfonyl]-2,1,3-benzoxadiazole
DAB	3,3'-Diaminobenzidine
DBD	4-(*N,N*-Dimethylaminosulfonyl)-2,1,3-benzoxadiazole
DEPC	Diethyl Pyrocarbonate
DHA	*all cis*-4,7,10,13,16,19-Docosahexaenoic Acid
DMA	*N,N*-Dimethylaniline
DMF	*N,N*-Dimethylformamide
DMSO	Dimethyl Sulfoxide
DOPA	3-(3,4-Dihydroxyphenyl)alanine
DPPH	1,1-Diphenyl-2-picrylhydrazyl
DSS	Sodium 3-(Trimethylsilyl)-1-propanesulfonate
DTBTA	4'-[4'-(4,6-Dichloro-1,3,5-triazin-2-ylamino)-4-biphenylyl]-2,2':6',2''-terpyridine-6,6''-diylbis(methyliminodiacetic Acid)
DTT	Dithiothreitol
EDC	1-Ethyl-3-(3-dimethylaminopropyl) Carbodiimide
EDTA	Ethylenediamine-*N,N,N',N'*-tetraacetic Acid
EGTA	Ethylene Glycol Bis(2-aminoethylether)-*N,N,N',N'*-tetraacetic Acid
EPA	*all cis*-5,8,11,14,17-Icosapentaenoic Acid
EtBr	Ethidium Bromide
FA	Folic Acid
FITC	Fluorescein Isothiocyanate
GABA	4-Aminobutyric Acid
GMP	Guanosine 5'-Monophosphate
GSH	Glutathione (reduced form)
HMDS	1,1,1,3,3,3-Hexamethyldisilazane
HOBt	1-Hydroxybenzotriazole
IAA	3-Indoleacetic Acid
IPTG	Isopropyl 1-Thio-β-D-galactopyranoside
NA	Noradrenaline
NADP	Nicotinamide Adenine Dinucleotide Phosphate
NBT	Nitro Blue Tetrazolium
NEM	*N*-Ethylmaleimide
ONPG	2-Nitrophenyl β-D-Galactopyranoside
OPD	1,2-Phenylenediamine
OTAB	Octadecyltrimethylammonium Bromide
OTAC	Octadecyltrimethylammonium Chloride
OVA	Ovalbumin
PBS	Phosphate Buffered Saline
PCA	Perchloric Acid
PEG	Polyethyelene Glycol
PFK	Perfluorokerosene
PNPG	4-Nitrophenyl β-D-Galactopyranoside
POD	Peroxidase
SDS	Sodium Dodecyl Sulfate
TBA	2-Thiobarbituric Acid
TBHBA	2,4,6-Tribromo-3-hydroxybenzoic Acid
TCA	Trichloroacetic Acid
TCEP	Tris(2-carboxyethyl)phosphine
TEMPO	2,2,6,6-Tetramethylpiperidine 1-Oxyl
TFA	Trifluoroacetic Acid
TFE	2,2,2-Trifluoroethanol
THF	Tetrahydrofuran
TMB	3,3',5,5'-Tetramethylbenzidine
TMEDA	*N,N,N',N'*-Tetramethylethylenediamine
TPP	Tetraphenylporphyrin
Tris	Tris(hydroxymethyl)aminomethane
X-Gal	5-Bromo-4-chloro-3-indolyl β-D-Galactopyranoside

Stabilizers

BHT	3,5-Di-*tert*-butyl-4-hydroxytoluene
HQ	Hydroquinone
MEHQ	Hydroquinone Monomethyl Ether (=4-Methoxyphenol)
TBC	4-*tert*-Butylcatechol

Protecting Groups / Functional Groups

Ac	Acetyl
Alloc	Allyloxycarbonyl
Bn	Benzyl
Boc	*tert*-Butoxycarbonyl
Bz	Benzoyl
Bzl	= Bn
Cbz	Carbobenzoxy (= Benzyloxycarbonyl)
DMT	Dimethoxytrityl
Dnp	2,4-Dinitrophenyl
Fmoc	(9*H*-Fluoren-9-ylmethoxy)carbonyl
MEM	(2-Methoxyethoxy)methyl
Mes	2,4,6-Trimethylphenyl (= Mesityl)
MMT	Monomethoxytrityl
MOM	Methoxymethyl
Ms	Methanesulfonyl
Nps	2-Nitrophenylsulfenyl
Ns	Nitrobenzenesulfonyl
NSu	*N*-Succinimidyl
Phth	Phthaloyl

Piv	Pivaloyl (=2,2-Dimethylpropionyl)
PMB	*p*-Methoxybenzyl
PMP	*p*-Methoxyphenyl
*p*NP	*p*-Nitrophenyl
PP	Diphosphate = Pyrophosphate
SEM	2-(Trimethylsilyl)ethoxymethyl
TBDMS	*tert*-Butyldimethylsilyl
TBDPS	*tert*-Butyldiphenylsilyl
TBS	= TBDMS
Teoc	2-(Trimethylsilyl)ethoxycarbonyl
TES	Triethylsilyl
Tf	Trifluoromethanesulfonyl
TIPS	Triisopropylsilyl
TMS	Trimethylsilyl
Tos	= Ts
Tr	Triphenylmethyl (= Trityl)
Troc	2,2,2-Trichloroethoxycarbonyl
Ts	*p*-Toluenesulfonyl
Z	= Cbz

Analytical Sciences

amu	Atomic Mass Units
APCI	Atmospheric Chemical Ionization
CD	Circular Dichroism
CI	Chemical Ionization
CP-MAS	Cross-Polarization-Magic Angle Spinning
DSC	Differencial Scanning Calorimetry
EI	Electron-Impact Ionisation
ELISA	Enzyme-Linked Immunosorbent Assay
EPR	Electron Paramagnetic Resonance
ESI	Electron Spray Ionaization
ESR	Electron Spin Resonance
FAB	Fast-Atom Bombarment
FID	Flame Ionization Detector
FID	Fourier Induction Decay
FISH	Fluorescence in situ Hybridization
FRET	Fluorescence Resonance Energy Transfer
GC	Gas Chromatography
GLC	Gas-Liquid Chromatography

HPLC	High-Performance Liquid Chromatography
ICP	Inductively Coupled Plasma
IPC	Ion-Pair Chromatography
IR	Infrared
MALDI	Matrix Assisted Lasar Disorption Ionization
MRI	Magnetic Resonance Imaging
MS	Mass Spectrometry
NMR	Nuclear Magnetic Resonance
ORD	Optical Rotatory Dispersion
PAGE	Polyacrylamide Gel Electrophoresis
RI	Refractive Index
SIMS	Secondary Ionization MS
SPR	Surface Plasmon Resonance
TCD	Thermal Conductivity Detector
TLC	Thin-Layer Chromatography
TOF	Time-of-flight
UV	Ultraviolet
XAFS	X-ray Absorption Fine Structure

The physical properties of the typical organic solvents [1)]

Organic Solvents	bp (°C)	mp (°C)	d (20/4°C)	Compatibility with Water (°C) (weight % of solvents)	Miscibility with Water[b)]
Methanol (MeOH)	64.5	-97.7	0.791	— a)	○
Ethanol (EtOH)	78.3	-114.5	0.789	78.2(96.0)	○
Propanol (*n*-PrOH)	97.2	-126.2	0.804	87.7(71.7)	○
Isopropyl Alcohol (*i*-PrOH)	82.2	-88.0	0.785	80.1(88.0)	○
Butanol (BuOH)	117.7	-88.6	0.810	92.7(57.5)	△
Isobutyl Alcohol (*i*-BuOH)	107.9	-108	0.802	89.8(67)	△
sec-Butyl Alcohol (*s*-BuOH)	99.5	-114.7	0.807	87.0(73.2)	△
tert-Butyl Alcohol (*t*-BuOH)	82.3	25.6	0.781	79.7(88.2)	○
Ethylene Glycol	197.5	-12.6	1.114	— a)	○
1,2-Dimethoxyethane (Glyme)	84.5	-69	0.869	77.4(89.9)	○
Diethyl Ether (Et_2O)	34.4	-116	0.714	34.2(98.7)	× c)
Diisopropyl Ether (*i*-Pr_2O)	68.5	-85.5	0.724	62.2(95.5)	×
Acetic Acid (AcOH)	117.9	16.7	1.050	— a)	○
Ethyl Acetate (AcOEt)	77.1	-83.6	0.901	70.4(91.5)	× c)
Acetic Anhydride (Ac_2O)	140.0	-73.1	1.083		
Tetrahydrofuran (THF)	66.0	-108.4	0.889	63.4(93.3)	○
1,4-Dioxane	101.3	11.8	1.034	87.8(82)	○
Acetone	56.1	-94.7	0.790	— a)	○
Ethyl Methyl Ketone	79.6	-86.7	0.805	73.4(88.7)	△
Carbon Tetrachloride (CCl_4)	76.6	-22.8	1.594	66(95.9)	×
Chloroform ($CHCl_3$)	61.2	-63.5	1.489	56.1(97.8)	×
Dichloromethane (CH_2Cl_2)	39.6	-94.9	1.326	38.1(98.5)	×
1,2-Dichloroethane ($ClCH_2CH_2Cl$)	83.5	-35.7	1.252	72(91.8)	×
Benzene (C_6H_6)	80.1	5.5	0.879	69.3(91.2)	×
Toluene	110.6	-95.0	0.867	85(79.8)	×
o-Xylene	144.4	-25.2	0.880	93.5(50.1)	×
Cyclohexane	80.7	6.7	0.779	69.0(91)	×
Pentane	36.1	-129.7	0.626	34.6(98.6)	×
Hexane	68.7	-95.3	0.659	61.6(94.4)	×
Heptane	98.4	-90.6	0.684		×
Acetonitrile (CH_3CN)	81.6	-43.8	0.782	76.7(84.2)	○
Nitromethane (CH_3NO_2)	101.2	-28.6	1.138	83.6(76.4)	×
Dimethylformamide (DMF)	153	-60.4	0.949	— a)	○
Hexamethylphosphoric Triamide (HMPA)	233	7.2	1.027		○
Triethylamine (Et_3N)	89.6	-114.7	0.728		○
Pyridine (Py)	115.3	-41.6	0.983	93.6(58.7)	○
Dimethyl Slufoxide (DMSO)	189.0	18.5	1.100	— a)	△
Carbon Disulfide (CS_2)	46.2	-111.6	1.263	42.6(97.2)	×

a) It doesn't form azeotropic mixture

b) ○ : freely miscible
△ : partially miscible
× : practically immiscible (solubility : less than 1%)

c) highly soluble in water

Example of combination of recrystallization solvents

The crystals are obtained from the solution of single or more than one solvent.
In the two solvent system, solvent A and B should be miscible : when solubility is A > B, it is desirable that the boiling point is A < B and the density is A > B.

Freezing mixtures [2)]

Freezing mixtures	Temp. (°C)	Freezing mixtures	Temp. (°C)
Ice	0	Chloroform / N_2	-63
Ethylene Glycol / CO_2	-15	Chloroform / CO_2	-63
Ice(100) / NH_4Cl (25)	-15	Ethanol / CO_2	-72
Ice(100) / NaCl(33)	-21	Ether / CO_2	-77
Carbon Tetrachloride / N_2	-23	Acetone / CO_2	-78
Carbon Tetrachloride / CO_2	-23	Methanol / N_2	-98
Ice(100) / EtOH (100)	-30	*n*-Pentane / N_2	-131
Acetonitrile / N_2	-41	N_2	-180
Ice(100) / $CaCl_2$ (150)	-49		

References

1) "Yuki Kagaku Jikken no Tebiki 1", editors : T. Goto, T. Shiba, T. Matsuura, Kagaku Dojin
2) "Shinhan Kiso Yuki Kagaku Jikken", K. Hata, K. Watanabe, Maruzen

Preparation of Reagents and Solutions

■Concentration of Liquid Acids and Bases: Common Commercial Strength

Substance	Formula	MW	Concentration (mol/L)	Concentration (%)	Specific Gravity
Hydrochloric Acid	HCl	36.46	12	35~37	1.18
Sulfuric Acid	H_2SO_4	98.08	18	> 95	1.84
Nitric Acid	HNO_3	63.01	15	60~62	1.38
Perchloric Acid	$HClO_4$	100.46	9.4	60~62	1.54
Phosphoric Acid	H_3PO_4	98.00	14.8	85	1.70
			15.7	89	1.73
Acetic Acid	CH_3COOH	60.05	17.4	99.5	1.05
Aqueous Ammonia	NH_4OH	35.05	15	28	0.90

Modified from JIS (Japanese Industrial Standard) K 0050 "General rules of chemical analysis"

■Buffer Solution

1. Phosphate Buffer

A. 0.2M $NaH_2PO_4 \cdot H_2O$ (Sodium Diydrogenphosphate Monohydrate; FW 137.99) 27.6g/L H_2O

B. 0.2M $Na_2HPO_4 \cdot 7H_2O$ (Disodium Hydrogenphosphate Heptahydrate; FW 268.07) 53.6g/L H_2O

Mix solution A and B in the proportions indicated shown below, then adjust the final volume to 200mL with deionized water. Adjust the final pH using a sensitive pH meter.

pH (25°C)	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0
NaH_2PO_4 (mL)	92.0	87.7	81.5	73.5	62.5	51.0	39.0	28.0	19.0	13.0	8.5	5.3
Na_2HPO_4 (mL)	8.0	12.3	18.5	26.5	37.5	49.0	61.0	72.0	81.0	87.0	91.5	94.7

G. Gomori, *Methods Enzymol*. **1955**, *1*, 138.

2. Tris-HCl Buffer

A. 0.1M Tris (Tris(hydroxymethyl)aminomethane); MW 121.14) 12.1g/L H_2O

B. 0.1M HCl (Hydrochloric Acid); Dilute commercial concentrated hydrochloric acid to 1/120 with deionized water.

Mix 50mL of solution A and indicated volume of solution B and adjust the final volume to 100mL with deionized water. Adjust the final pH using a sensitive pH meter.

pH (25°C)	7.2	7.4	7.5	7.6	7.8	8.0	8.2	8.4	8.5	8.6	8.8
HCl (mL)	44.7	42.0	40.3	38.5	34.5	29.2	22.9	17.2	14.7	12.4	8.5

Temperature dependency of the pH of Tris buffer

4℃	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4
25℃	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8
37℃	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5

J. Sambrook, D. W. Russell, *Molecular Cloning: A Laboratory Manual,* 3rd. ed, Cold Spring Harbor Laboratory Press, New York, **2001**, Vol.3, p. A1.2.

3. Acetate Buffer

A. 0.1M AcOH (Acetic Acid), 5.8mL/L

B. 0.1M NaOAc (Sodium Acetate, anhydrous; FW 82.03) 8.2g /L H_2O

or (Sodium Acetate Trihydrate; FW 136.08) 13.6g/L H_2O

Mix solution A and B in the proportions indicated shown below, then adjust the final volume to 100mL with deionized water. Adjust the final pH using a sensitive pH meter.

pH (25°C)	3.6	4.0	4.4	4.8	5.0	5.2	5.6
AcOH (mL)	46.3	41.0	30.5	20.0	14.8	10.5	4.8
NaOAc (mL)	3.7	9.0	19.5	30.0	35.2	39.5	45.2

■Visualizing Reagents for Thin-Layer Chromatography[1,2)]

Reagent	Product Code / Recipe	Treatment	Spot Color	Target Compounds
Iodine	I0604 (place some crystals in a chamber)	Place the plate in the chamber.	Brown	General organic compounds
Sulfuric Acid	Dilute with water (50～98%)	Spray the solution and heat the plate at 110～130℃	Brown ～ Black	General organic compounds
Phosphomolybdic Acid	P1484; The prepared solution may be diluted with ethanol 2～4 fold.	Spray the solution and heat the plate at 110℃	Green to brown spot on yellow background	General organic compounds
p-Anisaldehyde	A1674	Spray the solution and heat the plate at 110℃	Depends on the compound: violet, gray, blue, green	General organic compounds
Ceric Ammonium Molybdate	C1794	Spray the solution and heat the plate at 110℃		General organic compounds
Ninhydrin	N0094 (Spray) N0719 (Solution)	Spray the solution and heat the plate at 110℃	Pink ～ yellow	Amino acids, primary, secondary amines
Dragendorff's Reagent	(Solution A) Dissolve 1.7g bismuth(III) nitrate, 20g tartaric acid in 80mL water; (Solution B) Dissolve 16g potassium iodide in 40mL water; (Stock Solution) Mix equal parts of A and B; (Spray Solution) Dissolve 10g tartaric acid in 50mL water and add 10mL to the stock solution.	Spray the solution.	Orange	Tertiary amines, quaternary ammonium salts (alkaloids)
p-Dimethylamino-benzaldehyde	Dissolve D0645 or D1495 1g in ethanol 50mL and conc. HCl 50mL.	Spray the solution and warm the plate	Yellow	Amines
2,4-Dinitrophenyl-hydrazine	D2968	Spray the solution.	Reddish orange	Aldehydes, Ketones
Bromocresol Green	B2401	Spray the solution.	Yellow spots on green to blue background	Carboxylic acids, Sulfonic Acids

1) *TCI Mail* **2006**, *124*, 15; see this *Reagent Guide* p.301

2) H. Jork, W. Funk, W. Fishcer, & H. Wimmer, in *Thin-Layer Chromatography: Reagents and Detection Methods*, ed. by H. Jork, Wiley, New York, **1989**, Vol. 1A; W. Funk, W. Fischer, H. Wimmer, H. Jork, in *Thin-Layer Chromatography: Reagents and Detection Methods*, ed. by H. Jork, Wiley, New York, **1994**, Vol. 1B.

■Solvent Strength in Chromatography

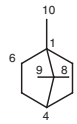
Solvent	Strength Parameter ε°	Solvent	Strength Parameter ε°
Hexane	0.01	Dioxane	0.56
Cyclohexane	0.04	Ethyl Acetate	0.58
Diisopropyl Ether	0.28	Acetonitrile	0.65
Toluene	0.29	Pyridine	0.71
Diethyl Ether	0.38	2-Propanol	0.82
Dichloromethane	0.40	Ethanol	0.88
Tetrahydrofuran	0.45	Methanol	0.95
Acetone	0.56	Acetic Acid	» 1

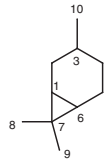
$\varepsilon^\circ = \Delta G_S^\circ / 2.3/RTA_S$: where, ΔG_S° is an adsorption free energy of the solvent, R is the gas constant, T is thermodynamic temperature. A_S is an area of the solvent molecule around the absorbent. The values are obtained in absorption chromatography by using alumina.

L. R. Snyder, in *Principles of Adsorption Chromatography*, Marcel Dekker, **1968**.

Parent Structures of Terpenes (1)

Monoterpenes


Bornane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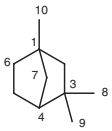
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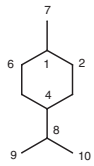
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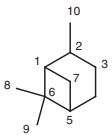
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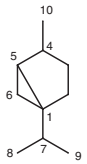
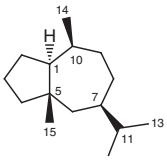

Thujane

Sesquiterpenes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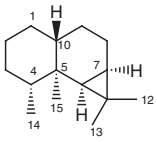
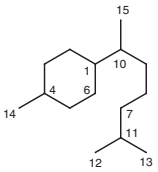

Aristolane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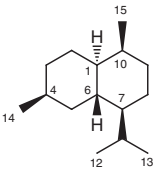
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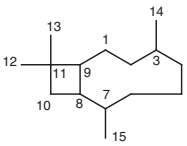
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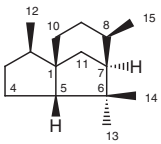
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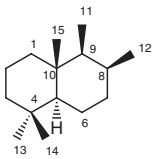
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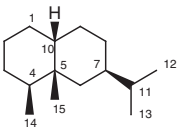
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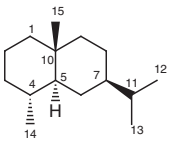
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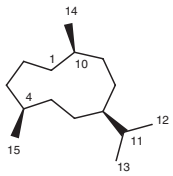
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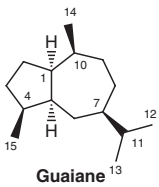
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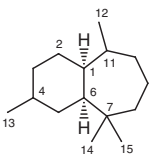
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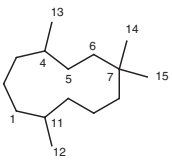
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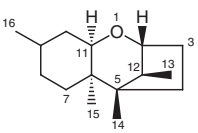
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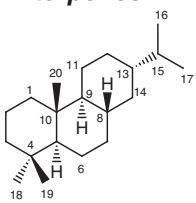
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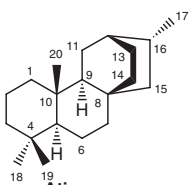
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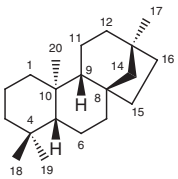
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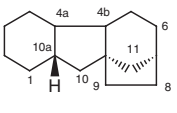
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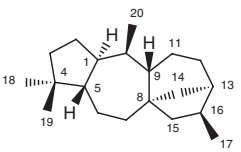
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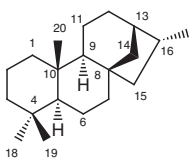
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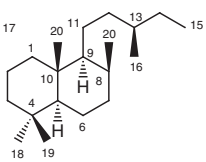
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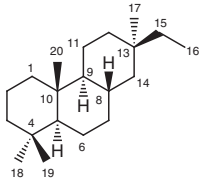
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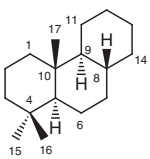
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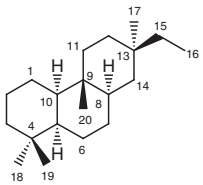
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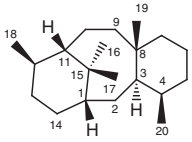
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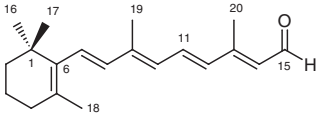
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Parent Structures of Terpenes (2)

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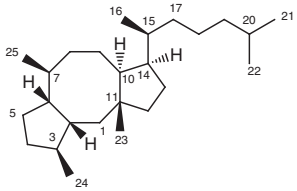
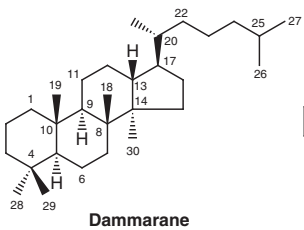


Ophiobolane

Triterpenes



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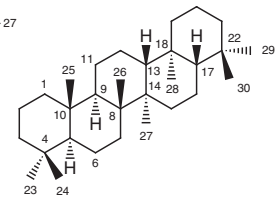

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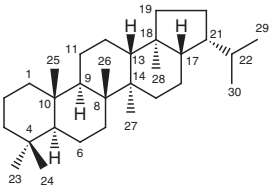

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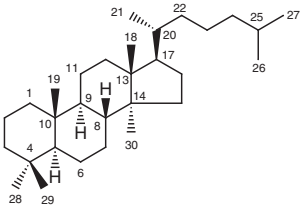

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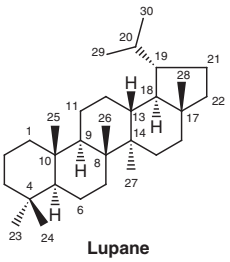

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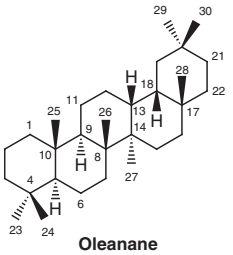

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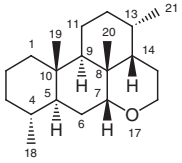

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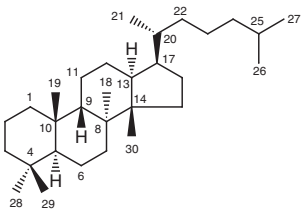

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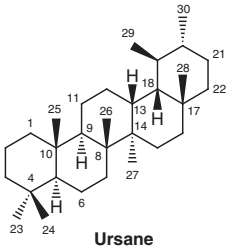
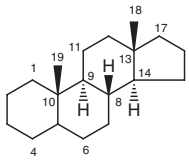


Ursane

Parent Structures of Steroids



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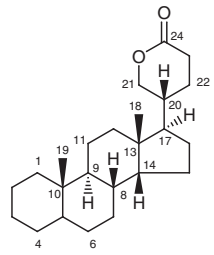

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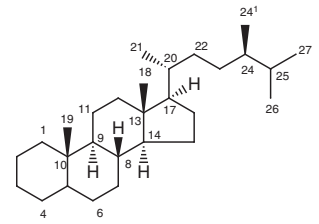

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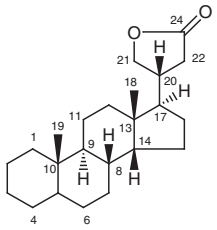

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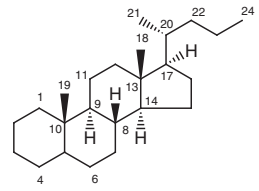

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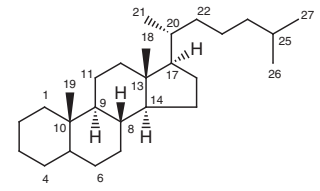

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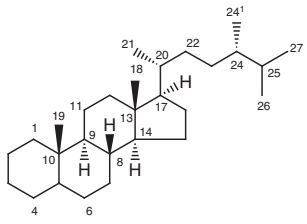

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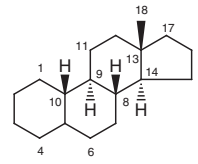

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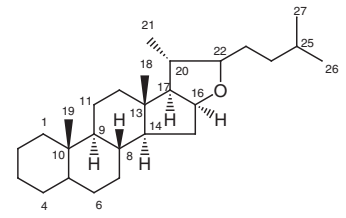

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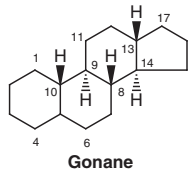

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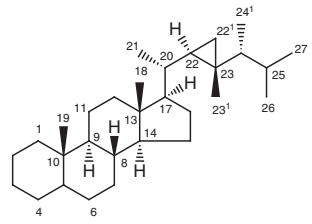

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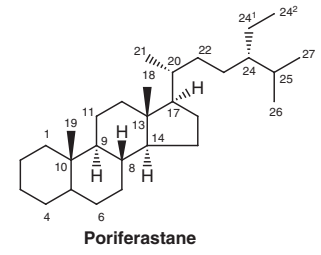

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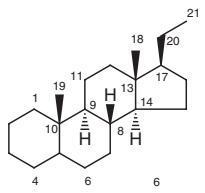

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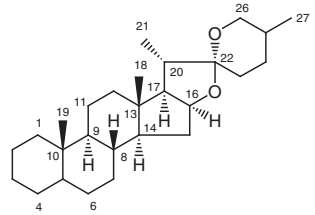

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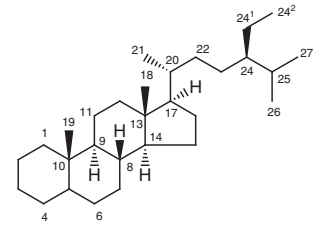
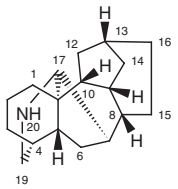


Stigmastane

Parent Structures of Alkaloids (1)



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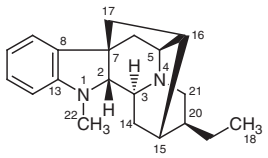

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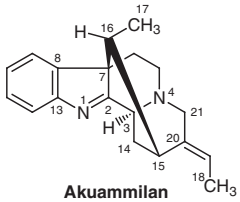

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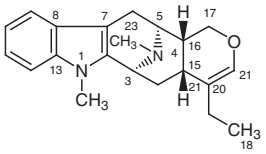

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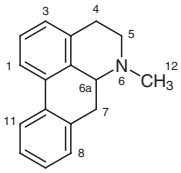

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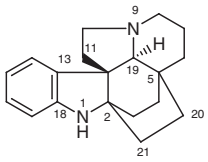

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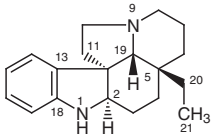

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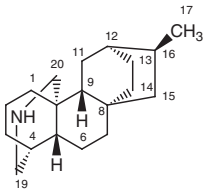

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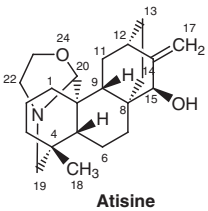

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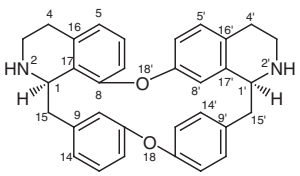

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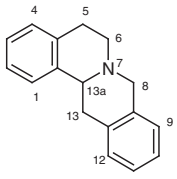

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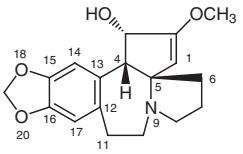
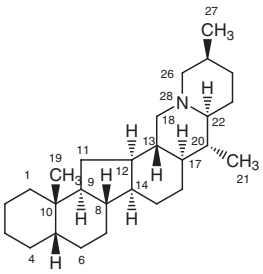


Cephalotaxine



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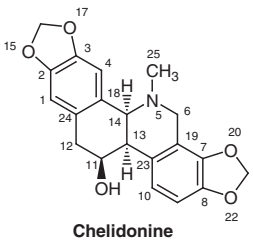

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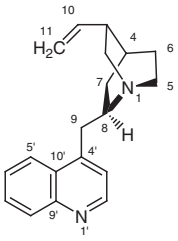
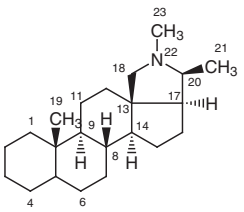


Cinchonan



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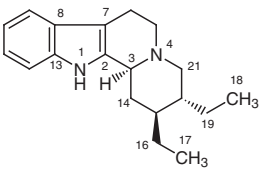

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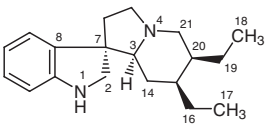

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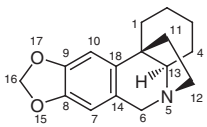

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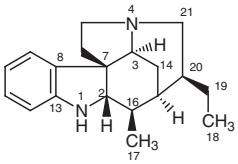
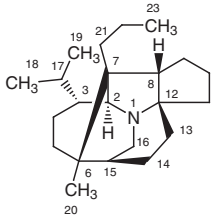


Curan

Parent Structures of Alkaloids (2)



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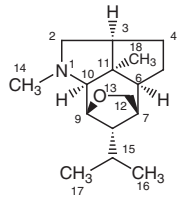

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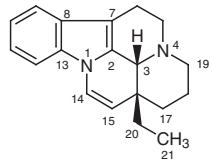

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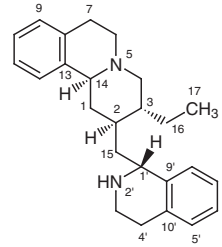

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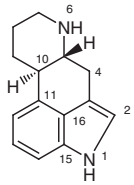

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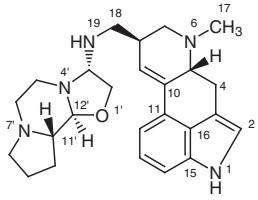

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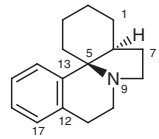

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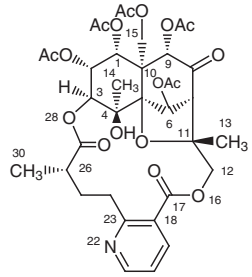

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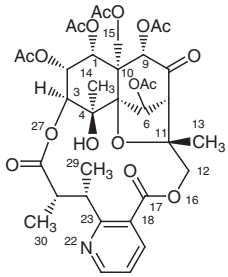

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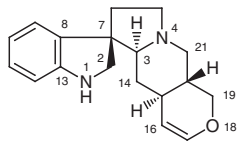

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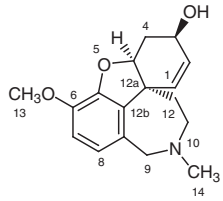

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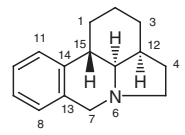

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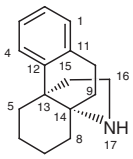

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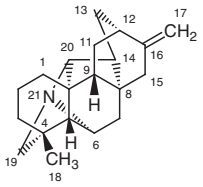

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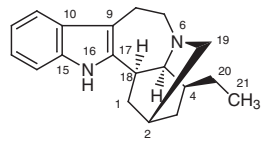

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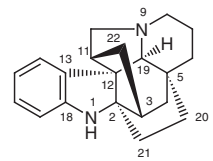

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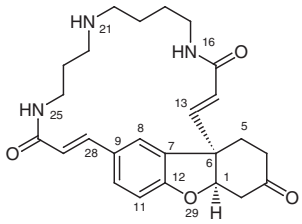

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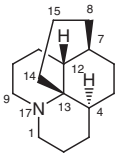

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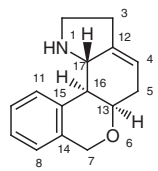

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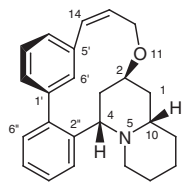
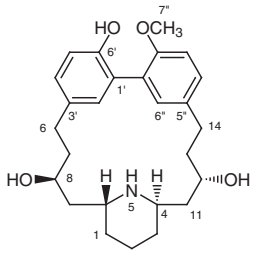


Lythran

Parent Structures of Alkaloids (3)



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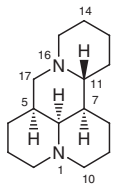

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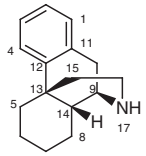

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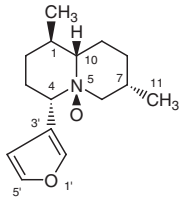

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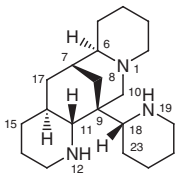

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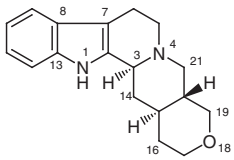

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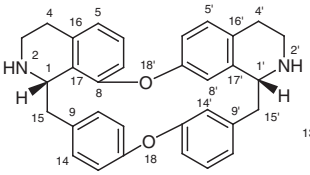

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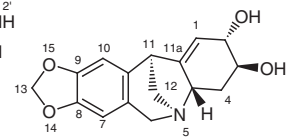

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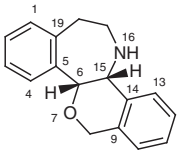

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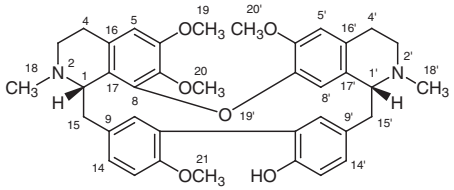

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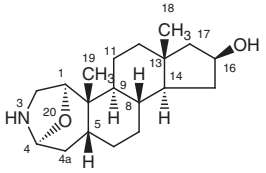

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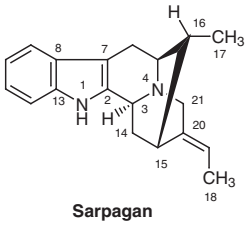

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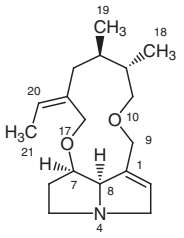

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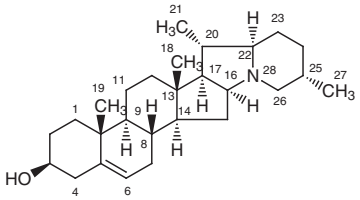

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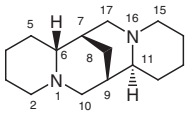

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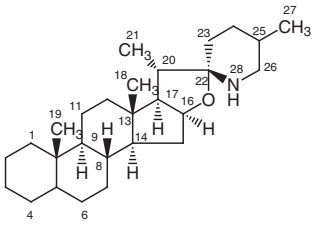

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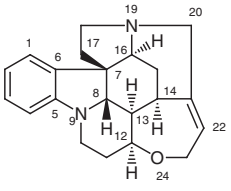

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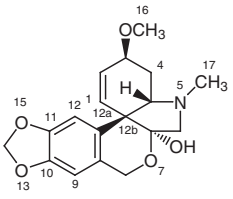

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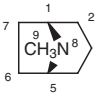
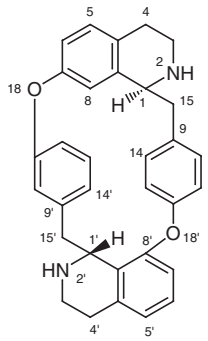


Tropane

Parent Structures of Alkaloids (4)



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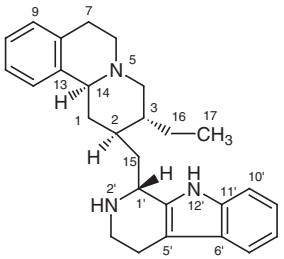

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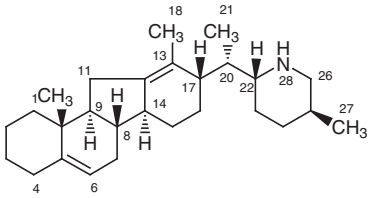

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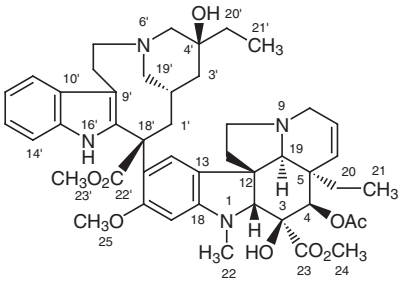

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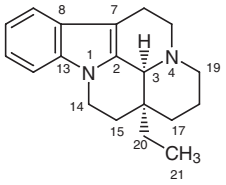

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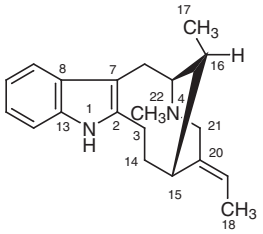

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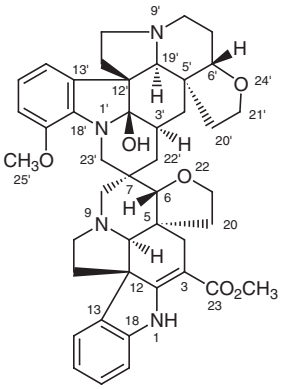

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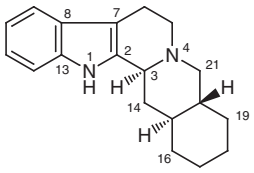
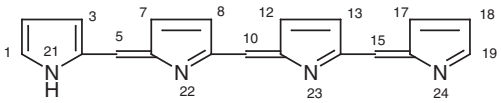


Yohimban

Parent Structures of Miscellaneous Natural Products



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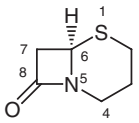

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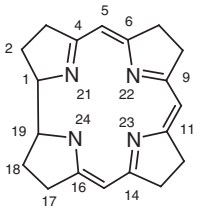

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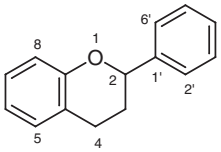

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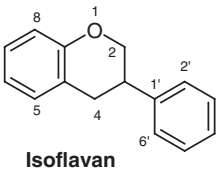

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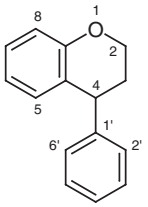
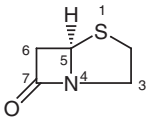
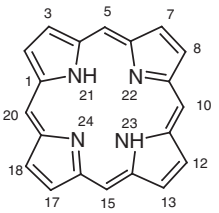


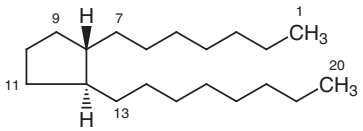
Neoflavan



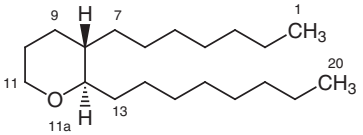
Penam



Porphyrin

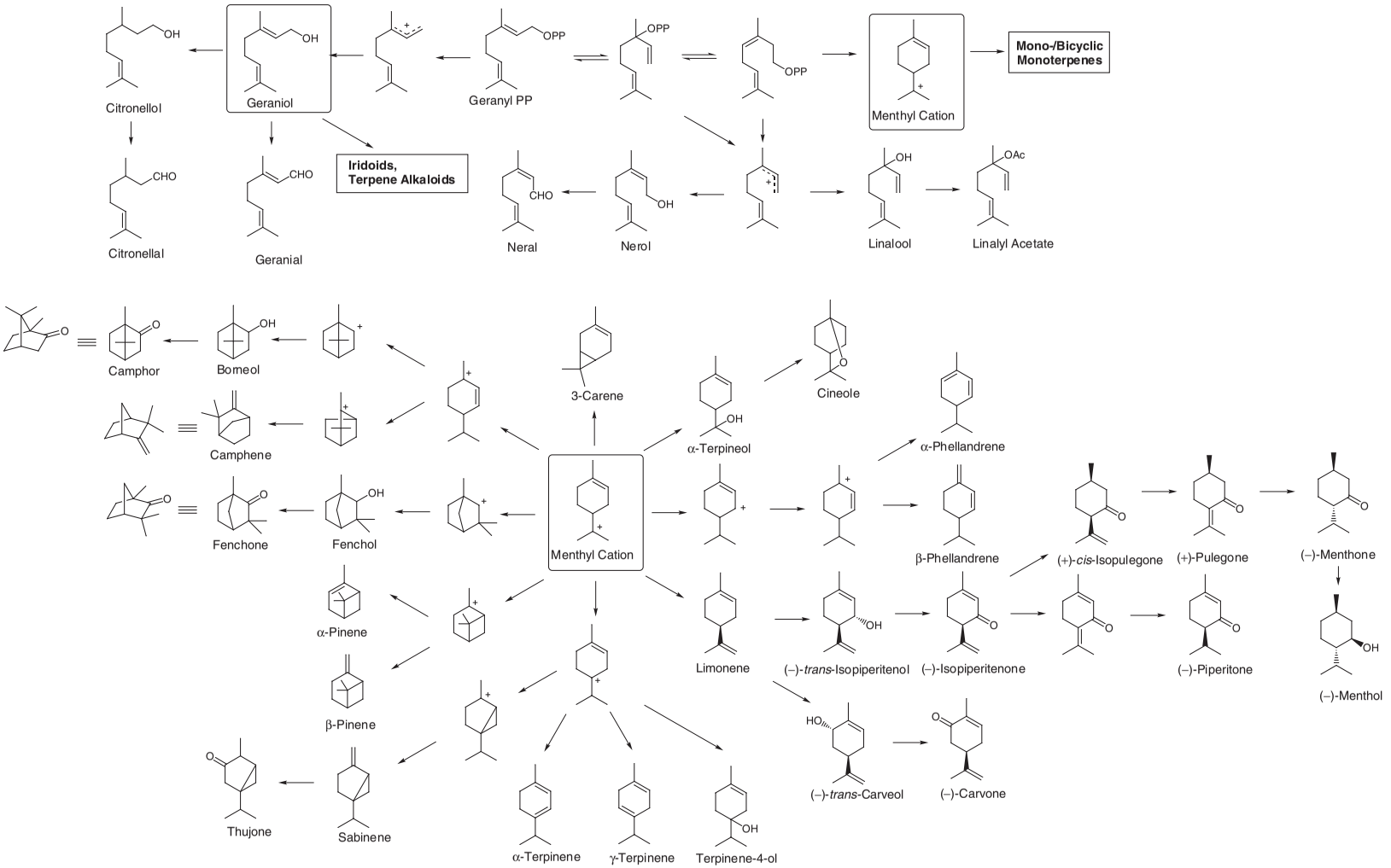


Prostane

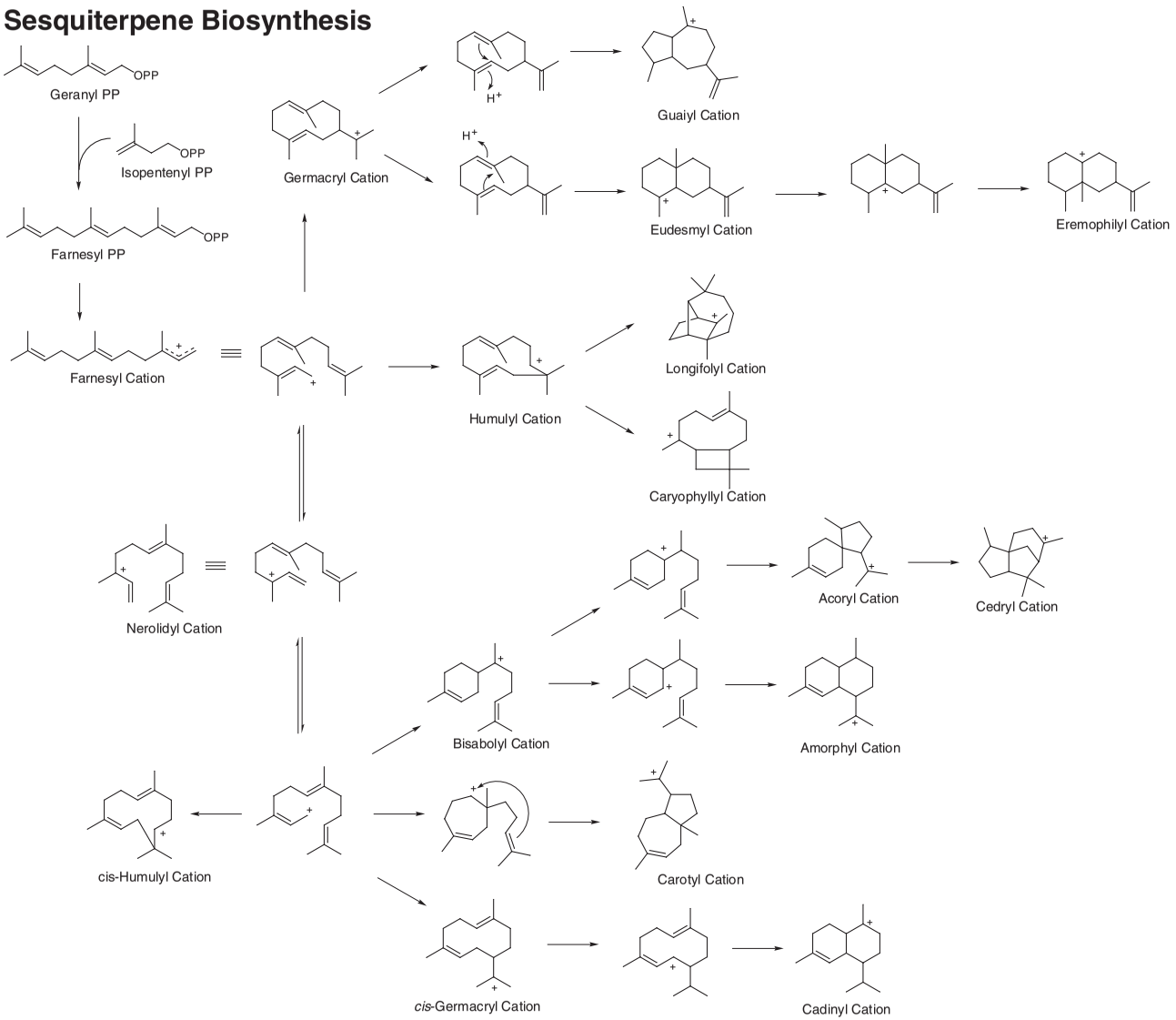


Thromboxane

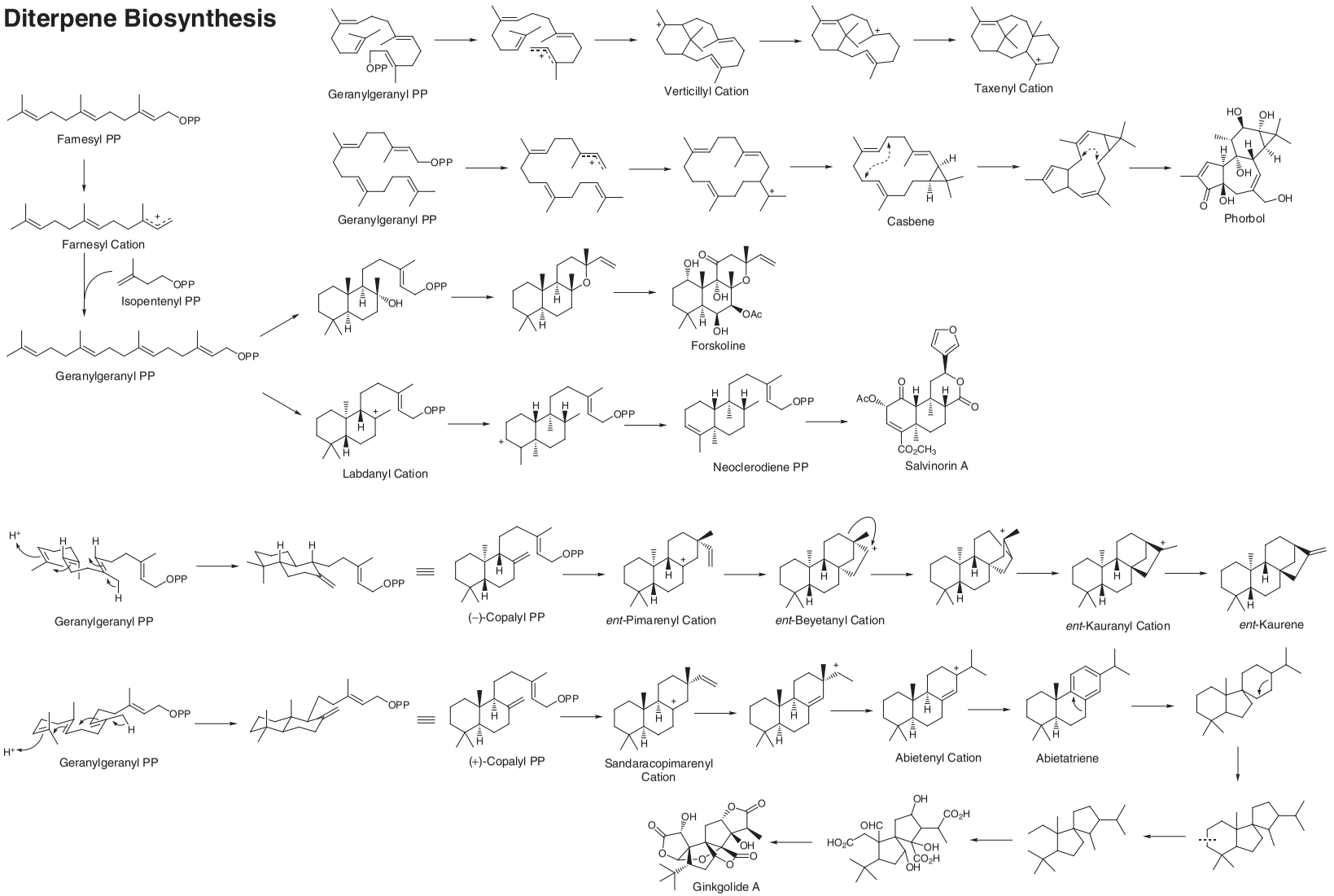
Monoterpene Biosynthesis



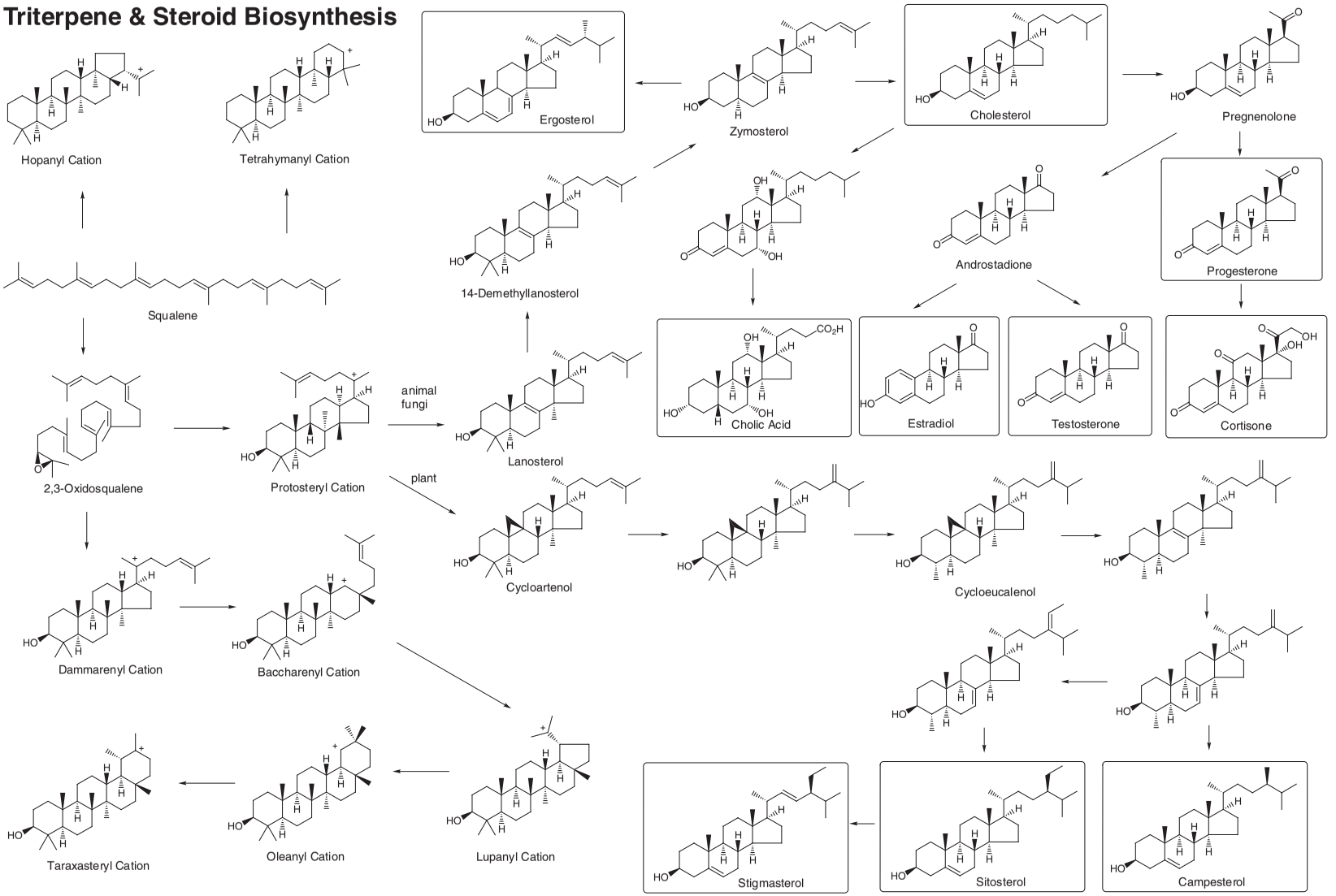
Sesquiterpene Biosynthesis



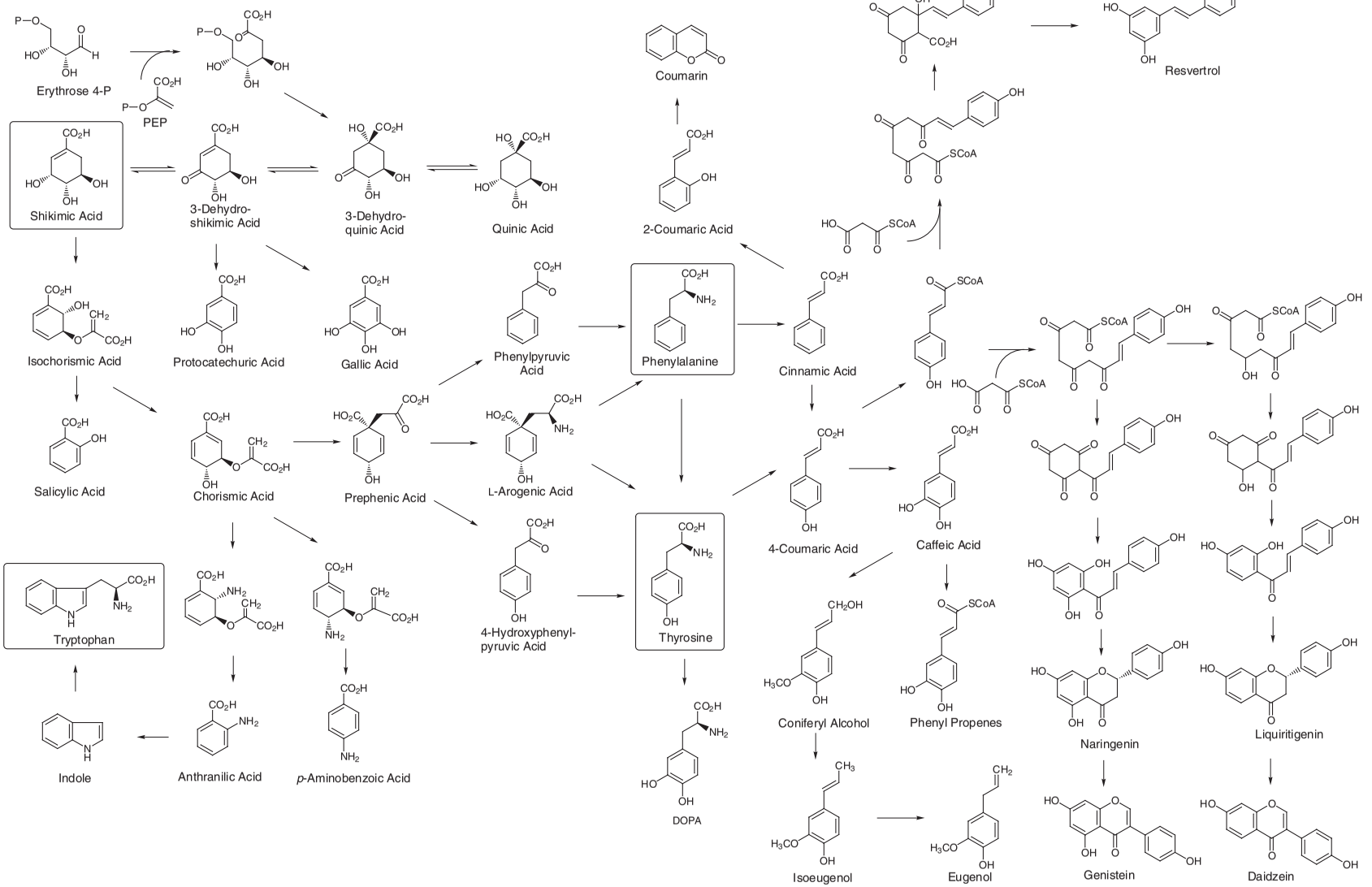
Diterpene Biosynthesis



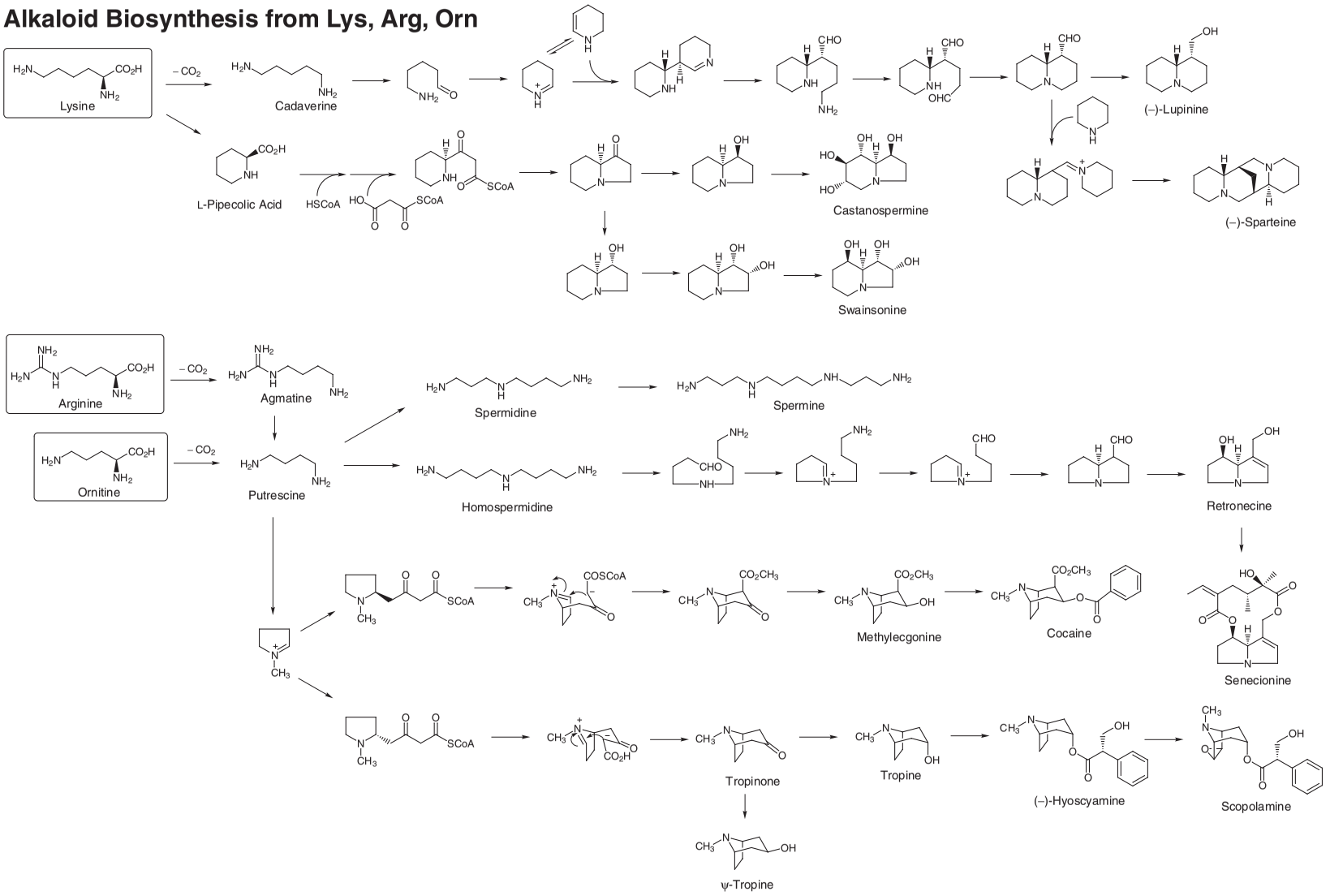
Triterpene & Steroid Biosynthesis



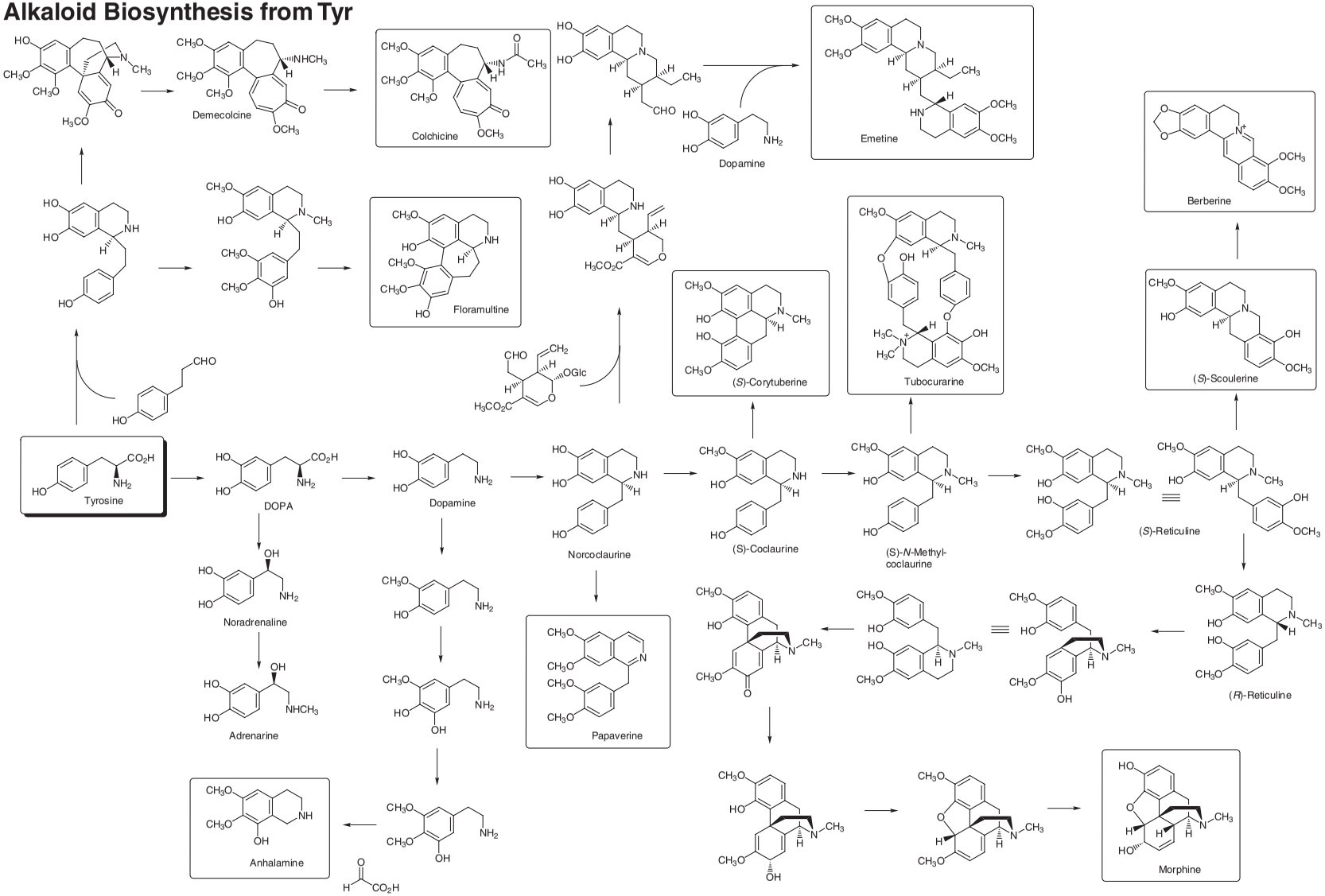
Shikimate Pathway: Biosynthesis of Phe, Tyr, Trp & Flavonoids



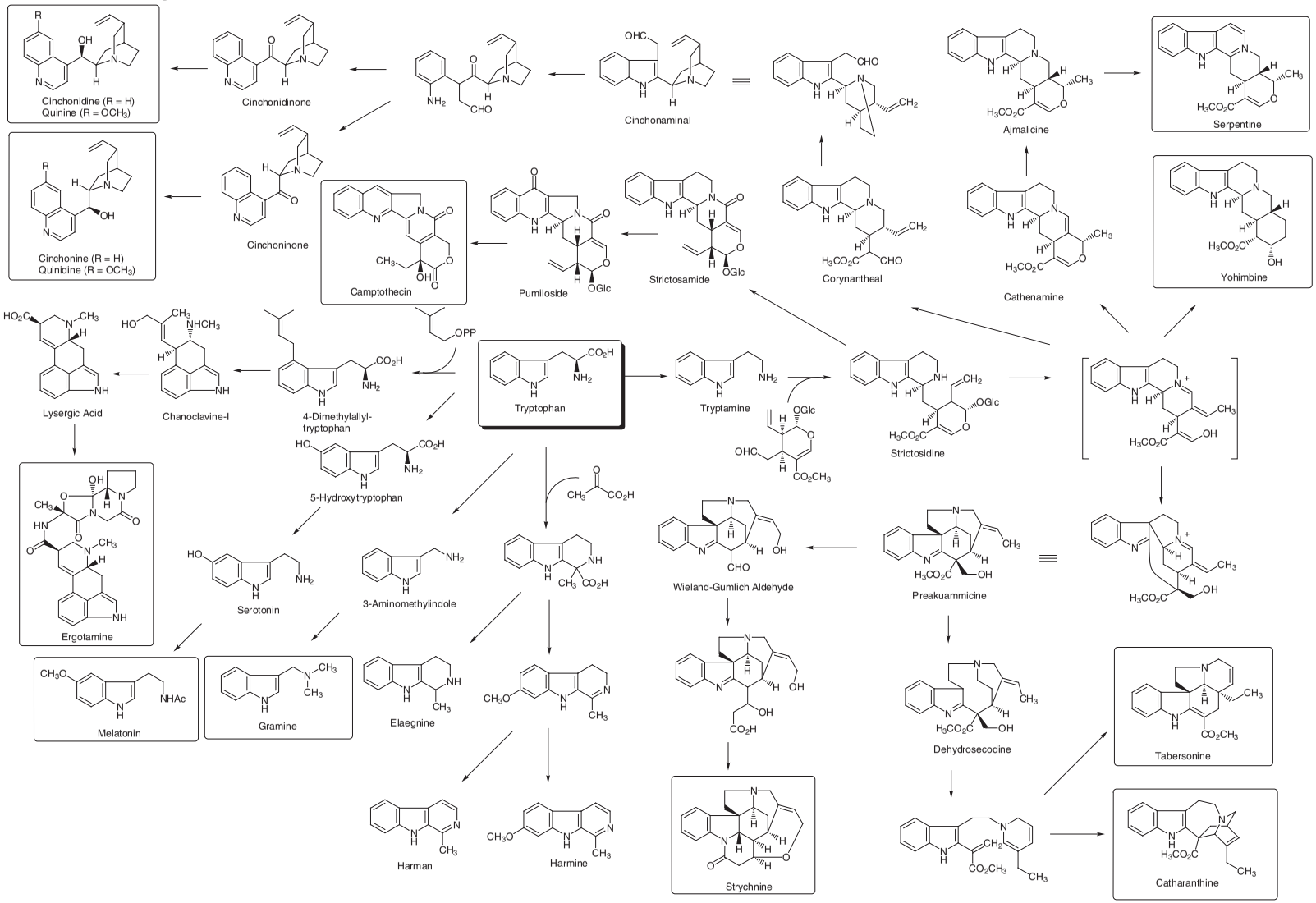
Alkaloid Biosynthesis from Lys, Arg, Orn



Alkaloid Biosynthesis from Tyr



Alkaloid Biosynthesis from Trp



Periodic Table of the Elements

ATOMIC NUMBER
SYMBOL
ATOMIC WEIGHT
i : ionic radius (Å) (coordination no:6)
a : atomic radius (Å)
v : van der waals radius (Å)
χ_p : electronegativity
Atomic Weights : 2009 IUPAC values

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 **H** 1.008 v : 1.20 χ_p: 2.20																	2 **He** 4.002602 v : 1.40
3 **Li** 6.94 i : 0.76 (+) a : 1.57 v : 1.82 χ_p: 0.98	4 **Be** 9.012182 a : 1.12 χ_p: 1.57											5 **B** 10.81 a : 0.88 χ_p: 2.04	6 **C** 12.011 a : 0.77 v : 1.70 χ_p: 2.55	7 **N** 14.007 a : 0.74 v : 1.55 χ_p: 3.04	8 **O** 15.999 i : 1.40 (2-) a : 0.66 v : 1.52 χ_p: 3.44	9 **F** 18. 9984032 i : 1.33 (-) a : 0.64 v : 1.47 χ_p: 3.98	10 **Ne** 20.1797 v : 1.54
11 **Na** 22.98976928 i : 1.02 (+) a : 1.91 v : 2.27 χ_p: 0.93	12 **Mg** 24.3050 i : 0.72 (2+) a : 1.60 v : 1.73 χ_p: 1.31											13 **Al** 26. 9815386 i : 0.54 (3+) a : 1.43 χ_p: 1.61	14 **Si** 28.085 a : 1.17 v : 2.10 χ_p: 1.90	15 **P** 30.973762 a : 1.10 v : 1.80 χ_p: 2.19	16 **S** 32.06 i : 1.84 (2-) a : 1.04 v : 1.80 χ_p: 2.58	17 **Cl** 35.45 i : 1.81 (-) a : 0.99 v : 1.75 χ_p: 3.16	18 **Ar** 39.948 v : 1.88
19 **K** 39.0983 i : 1.38 (+) a : 2.35 v : 2.75 χ_p: 0.82	20 **Ca** 40.078 i : 1.00 (2+) a : 1.97 χ_p: 1.00	21 **Sc** 44.955912 a : 1.64 χ_p: 1.36	22 **Ti** 47.867 a : 1.47 χ_p: 1.54	23 **V** 50.9415 a : 1.35 χ_p: 1.63	24 **Cr** 51.9961 a : 1.29 χ_p: 1.66	25 **Mn** 54.938045 a : 1.37 χ_p: 1.55	26 **Fe** 55.845 a : 1.26 χ_p: 1.83	27 **Co** 58.933195 a : 1.25 χ_p: 1.88	28 **Ni** 58.6934 a : 1.25 v : 1.63 χ_p: 1.91	29 **Cu** 63.546 a : 1.28 v : 1.4 χ_p: 1.90	30 **Zn** 65.38 a : 1.37 v : 1.39 χ_p: 1.65	31 **Ga** 69.723 i : 0.62 (3+) a : 1.53 v : 1.87 χ_p: 1.81	32 **Ge** 72.63 a : 1.22 v : 2.10 χ_p: 2.01	33 **As** 74.92160 a : 1.21 v : 1.85 χ_p: 2.18	34 **Se** 78.96 i : 1.98 (2-) a : 1.17 v : 1.90 χ_p: 2.55	35 **Br** 79.904 i : 1.96 (-) a : 1.14 v : 1.85 χ_p: 2.96	36 **Kr** 83.798 v : 2.02 χ_p: 3.00
37 **Rb** 85.4678 i : 1.52 (+) a : 2.50 χ_p: 0.82	38 **Sr** 87.62 i : 1.18 (2+) a : 2.15 χ_p: 0.95	39 **Y** 88.90585 a : 1.82 χ_p: 1.22	40 **Zr** 91.224 a : 1.60 χ_p: 1.33	41 **Nb** 92.90638 a : 1.47 χ_p: 1.60	42 **Mo** 95.96 a : 1.40 χ_p: 2.16	43 **Tc** (98) a : 1.36 χ_p: 1.90	44 **Ru** 101.07 a : 1.34 χ_p: 2.20	45 **Rh** 102.90550 a : 1.34 χ_p: 2.28	46 **Pd** 106.42 a : 1.37 v : 1.63 χ_p: 2.20	47 **Ag** 107.8682 a : 1.44 v : 1.72 χ_p: 1.93	48 **Cd** 112.411 a : 1.52 v : 1.58 χ_p: 1.69	49 **In** 114.818 i : 0.80 (3+) a : 1.67 v : 1.93 χ_p: 1.78	50 **Sn** 118.710 i : 0.69 (4+) a : 1.58 v : 2.17 χ_p: 1.96	51 **Sb** 121.760 a : 1.41 χ_p: 2.05	52 **Te** 127.60 i : 2.21 (2-) a : 1.37 v : 2.06 χ_p: 2.10	53 **I** 126.90447 i : 2.20 (-) a : 1.33 v : 1.98 χ_p: 2.66	54 **Xe** 131.293 v : 2.16 χ_p: 2.60
55 **Cs** 132.9054519 i : 1.67 (+) a : 2.72 χ_p: 0.79	56 **Ba** 137.327 i : 1.35 (2+) a : 2.24 χ_p: 0.89	57 **La** • 138.90547 a : 1.88 χ_p: 1.10	72 **Hf** 178.49 a : 1.59 χ_p: 1.30	73 **Ta** 180.94788 a : 1.47 χ_p: 1.50	74 **W** 183.84 a : 1.41 χ_p: 2.36	75 **Re** 186.207 a : 1.37 χ_p: 1.90	76 **Os** 190.23 a : 1.35 χ_p: 2.20	77 **Ir** 192.217 a : 1.36 χ_p: 2.20	78 **Pt** 195.084 a : 1.39 v : 1.75 χ_p: 2.28	79 **Au** 196.966569 a : 1.44 v : 1.66 χ_p: 2.54	80 **Hg** 200.59 a : 1.55 v : 1.55 χ_p: 2.00	81 **Tl** 204.38 i : 0.89 (3+) a : 1.71 v : 1.96 χ_p: 2.04	82 **Pb** 207.2 a : 1.75 v : 2.02 χ_p: 2.33	83 **Bi** 208.98040 a : 1.82 χ_p: 2.02	84 **Po** (209) χ_p: 2.00	85 **At** (210) χ_p: 2.20	86 **Rn** (222)
87 **Fr** (223)	88 **Ra** (226)	89 **Ac** ▲ (227)	104 **Rf** (265)	105 **Db** (268)	106 **Sg** (271)	107 **Bh** (270)	108 **Hs** (277)	109 **Mt** (276)	110 **Ds** (281)	111 **Rg** (280)	112 **Cn** (285)	113 **Uut** (284)	114 **Uuq** (289)	115 **Uup** (288)	116 **Uuh** (293)	117 **Uus** (294)	118 **Uuo** (294)

• Lanthanoids	58 **Ce** 140.116	59 **Pr** 140.90765	60 **Nd** 144.242	61 **Pm** (145)	62 **Sm** 150.36	63 **Eu** 151.964	64 **Gd** 157.25	65 **Tb** 158.92535	66 **Dy** 162.500	67 **Ho** 164.93032	68 **Er** 167.259	69 **Tm** 168.93421	70 **Yb** 173.054	71 **Lu** 174.9668
▲ Actinoids	90 **Th** 232.03806	91 **Pa** 231.03588	92 **U** 238.02891	93 **Np** (237)	94 **Pu** (244)	95 **Am** (243)	96 **Cm** (247)	97 **Bk** (247)	98 **Cf** (251)	99 **Es** (252)	100 **Fm** (257)	101 **Md** (258)	102 **No** (259)	103 **Lr** (262)

References : Inorganic Chemistry, Third Edition (D. F. Shriver, P. W. Atkins), Tokyo Kagaku Dojin, **2001**; Kagaku Binran Kisohen Revised Fifth Edition, Maruzen, **2004**
Atomic weights of the elements 2009. *Pure Appl. Chem.* **2011**, *83*, 359.

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B : Reagent Guide Bioscience & Analytical Science
HP : Please visit our website.

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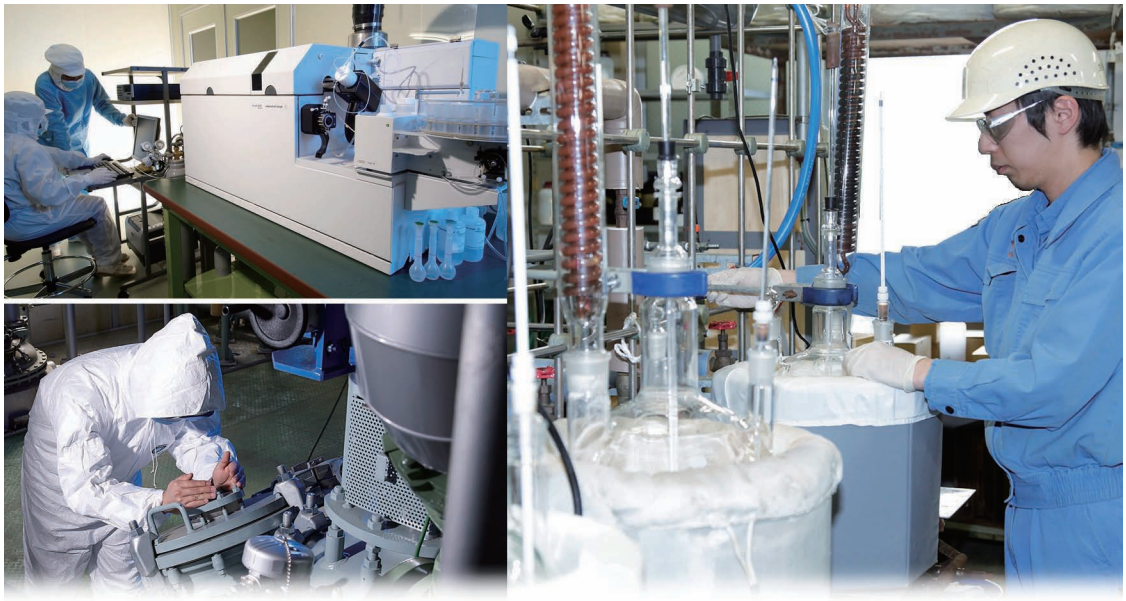

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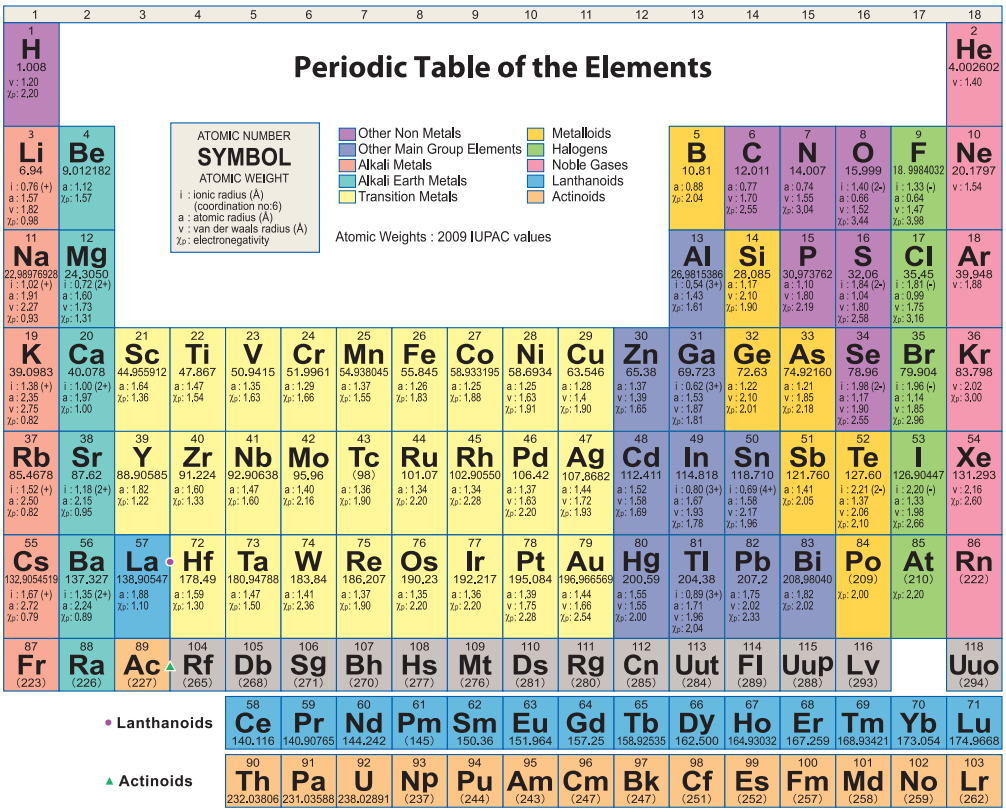

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