

# Chemily Glycoscience



## Product Catalog 2017 – 2018





## Chemily Glycoscience

**Chemily** is a research, development, and consulting company dedicated to advancing **Glycoscience**. We specialize in **carbohydrate-based biochemicals, reagents** and **pharmaceuticals**, and have been manufacturing several categories of products using our proprietary chemo-enzymatic and *in vivo* bioengineering technology. Our products include:

- **Glyco-related enzymes: glycosyltransferases, glycosidases, sugar nucleotide biosynthesized enzymes**
- **Sugar nucleotides and their derivatives**
- **Structure-defined oligosaccharides: N-Glycan, HMO, H, L, and TE**
- **Carbohydrate-based pharmaceuticals and glycoprotein vaccines**

*\* Bulk quantities are available upon request.*

We also offer a wide range of **glycomics and proteomics' services**. We utilize state-of-the-art mass spectrometry instrumentation and workflows to provide protein / glycan analysis. Our team, with years of experience, will provide reliable results to facilitate your research, and we hope to be your first choice when you are seeking a partner to accelerate your projects. Our services include:

- **Protein identification (Protein ID)**
- **Global proteomic profiling**
- **Global profiling of N-linked glycosylation sites**
- **Global glycomic profiling**
- **Glycoprotein analysis**

***We look forward to working with you on your future research needs!***

# Glycoenzymes

## Glycosyltransferases (GTs)

The majority of GTs are Leloir-type enzymes, and utilize nucleotide sugars as their substrate for adding sugar residues to substrate glycoproteins and growing polysaccharides. While nucleotide sugars are locked in their anomeric state, GTs will either retain or invert the anomeric configuration of the sugar, depending on the mechanism of the transferase reaction it employs. For example, an inverting GT will add UDP- $\alpha$ -D-glucuronic acid to a substrate, forming a  $\beta$  glycosidic linkage. GTs have also been investigated for their ability to remove sugars from heterogeneous glycans and then add the sugar back to different glycans during glycoengineering.

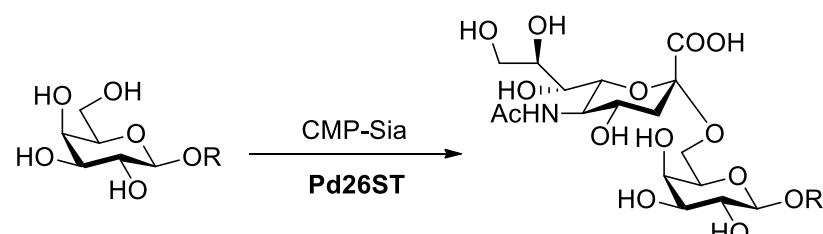
## Sugar nucleotide enzymes

The enzymatic conversion of sugars into nucleotide sugars proceeds through *de novo* and salvage pathways *in vivo*. The *de novo* pathway generally starts with glucose, which is then systematically converted into a closely related family of sugars, such as glucuronic acid and galactose, in a multi-step sequence. Conversely, the salvage pathway generally employs a two step sequence, first phosphorylating the sugar, and then adding the appropriate nucleotide. Promiscuity in salvage pathway enzymes permits some sugar derivatives (e.g. azido sugars) to be converted into nucleotide sugars.

**EN01001  $\alpha$ 2,6-sialyltransferase; Pd26ST**

**E.C.: 2.4.99.1**

*E. coli* recombinant  $\alpha$ 2,6-sialyltransferase from *Photobacterium damsel*



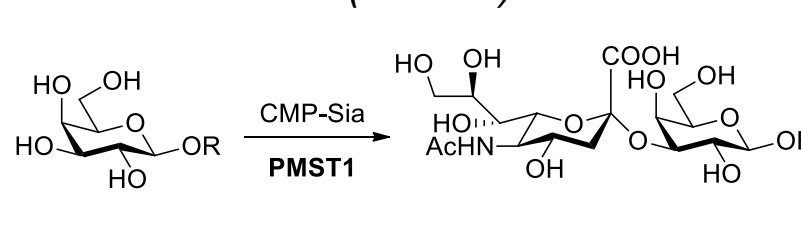
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol Sia $\alpha$ 2,6Lac from CMP-Sia and lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01002  $\alpha$ 2,3-sialyltransferase; PmST1**

**E.C.: 2.4.99.4**

*E. coli* recombinant  $\alpha$ 2,3-sialyltransferase from *Pasteurella multocida* (P-1059)



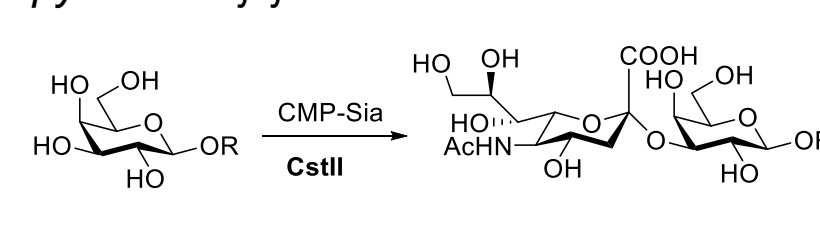
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol Sia $\alpha$ 2,3Lac from CMP-Sia and lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01003  $\alpha$ 2,8-sialyltransferase; CstII**

**E.C.: 2.4.99.8**

*E. coli* recombinant  $\alpha$ 2,8-sialyltransferase from *Campylobacter jejuni*



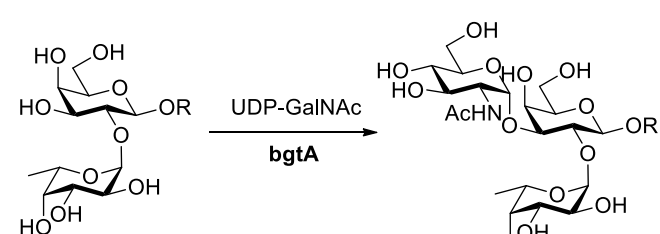
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol Sia $\alpha$ 2,3Lac from CMP-Sia and lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01004  $\alpha$ 1,3-galactosaminyltransferase; BgtA**

**E.C.: 2.4.1.40**

*E. coli* recombinant  $\alpha$ 1,3-N-acetyl-galactosaminyltransferase from *Helicobacter mustelae*



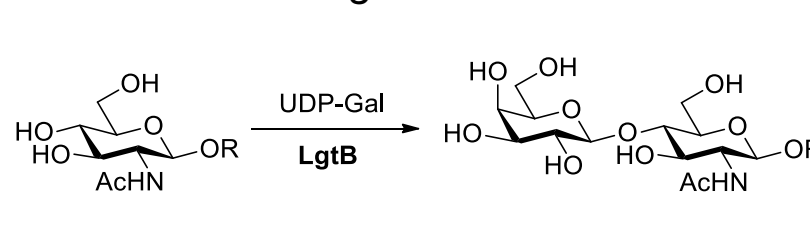
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol GalNAc $\alpha$ 1,3 (Fuc $\alpha$ 1,2)Gal from Fuc $\alpha$ 1,2Gal per min at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01005  $\beta$ 1,4-galactosyltransferase; LgtB**

**E.C.: 2.4.1.90**

*E. coli* recombinant  $\beta$ 1,4-galactosyltransferase from *Neisseria meningitides*



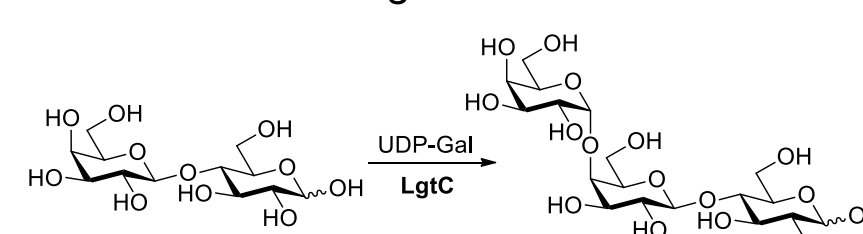
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of Gal $\beta$ 1,4GlcNAc from UDP-Gal and GlcNAc per min at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01006  $\alpha$ 1,4-galactosyltransferase; LgtC**

**E.C.: 2.4.1.228**

*E. coli* recombinant  $\alpha$ 1,4-galactosyltransferase from *Neisseria meningitides*



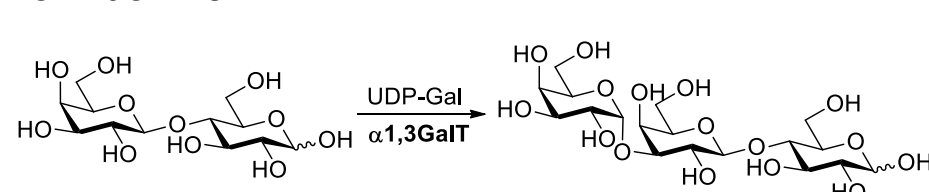
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of Gal $\alpha$ 1,4Lac from UDP-Gal and Lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01007  $\alpha$ 1,3-galactosyltransferase;  $\alpha$ 1,3GalT**

**E.C.: 2.4.1.87**

*E. coli* recombinant  $\alpha$ 1,3-galactosyltransferase from bovine



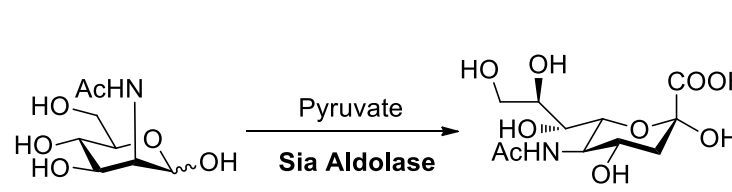
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of Gal $\alpha$ 1,3Lac from UDP-Gal and lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 25 U

**EN01008 Sialic acid aldolase; NPL**

**E.C.: 4.1.3.3**

*E. coli* recombinant sialic acid aldolase from *E. coli* K-12 MG1655



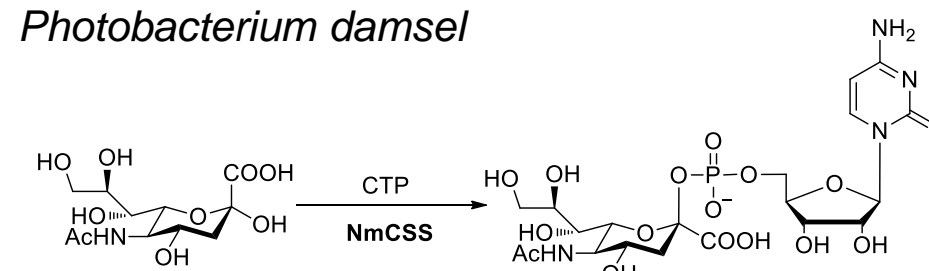
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol Sia from ManNAc and pyruvate per minute at 37  $^{\circ}$ C.

Package: 10 U, 50 U, 250 U

**EN01009 CMP-sialic acid synthetase; NmCSS**

**E.C.: 2.7.7.43**

*E. coli* recombinant  $\alpha$ 2,6sialyltransferase from *Photobacterium damsel*



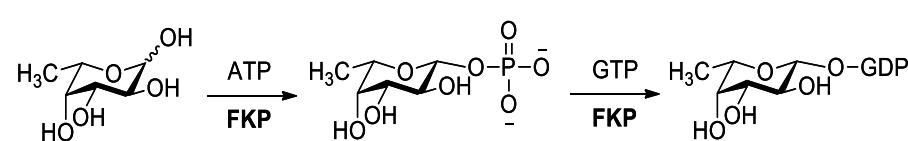
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol CMP-Sia from sialic acid and CTP per minute at 37  $^{\circ}$ C.

Package: 10 U, 50 U, 100 U

**EN01010 L-fucokinase/GDP-fucose pyrophosphorylase; FKP**

**E.C.: 2.7.1.52/2.7.7.30**

*E. coli* recombinant L-fucokinase/GDP-fucose pyrophosphorylase from *Bacteroides fragilis*



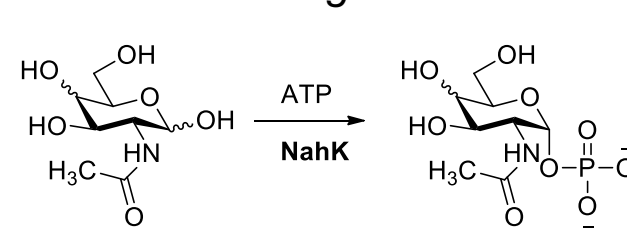
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of Fuc-1-P from L-Fuc and ATP per minute at 37  $^{\circ}$ C.

Package: 2 U, 10 U, 50 U

**EN01011 N-acetylhexosamine kinase; NahK**

**E.C.: 2.7.1.162**

*E. coli* recombinant N-acetylhexosamine kinase from *Bifidobacterium longum*



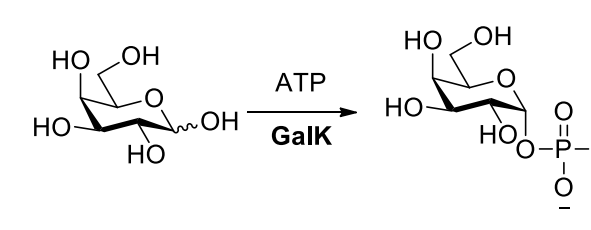
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of GlcNAc-1-P from GlcNAc and ATP per minute at 37  $^{\circ}$ C.

Package: 5 U, 20 U, 100 U

**EN01013 Galactokinase; BiGalK**

**E.C.: 2.7.1.6**

*E. coli* recombinant galactokinase from *Bifidobacterium infantis*



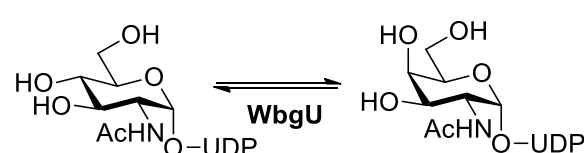
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of Gal-1-P from galactose and ATP per minute at 37  $^{\circ}$ C.

Package: 5 U, 20 U, 100 U

**EN01014 UDP-GlcNAc 4-epimerase; WbgU**

**E.C.: 5.1.3.7**

*E. coli* recombinant UDP-GlcNAc 4-epimerase from *Plesiomonas shigelloides* O17



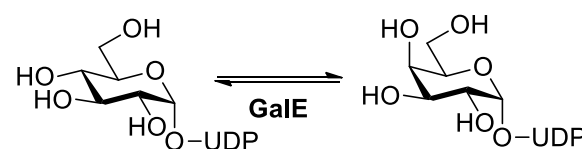
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of UDP-GalNAc from UDP-GlcNAc per minute at 37  $^{\circ}$ C.

Package: 10 U, 50 U, 250 U

**EN01015 UDP-Glc 4-epimerase; GalE**

**E.C.: 5.1.3.2**

*E. coli* recombinant UDP-Glc 4-epimerase from *E. coli* K12



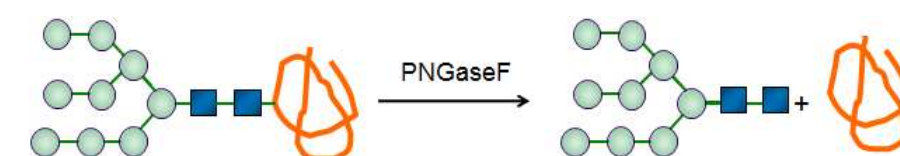
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of UDP-Gal from UDP-Glc per minute at 37  $^{\circ}$ C.

Package: 10 U, 50 U, 250 U

**EN01016 Glycopeptidase; PNGaseF**

**E.C.: 3.5.1.52**

*E. coli* recombinant peptide-N4-(N-acetyl- $\beta$ -glucosaminy) asparagineamidase from *Flavobacterium meningosepticum*



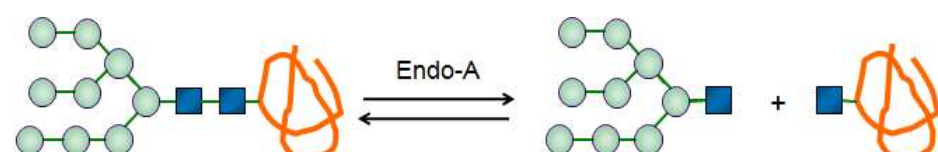
One unit is defined as the amount of enzyme that catalyzes the release of 1 nmol N-glycan from RNaseB per minute at 37  $^{\circ}$ C.

Package: 100 U, 250 U, 500 U

**EN01017 Endo- $\beta$ -N-acetylglucosaminidase A; Endo-A**

**E.C.: 3.2.1.96**

*E. coli* recombinant endo- $\beta$ -N-acetylglucosaminidase from *Arthrobacter protophormia*



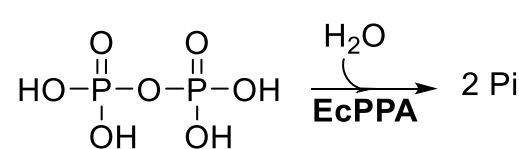
One unit is defined as the amount of enzyme that catalyzes the release of 1 nmol N-glycan from RNaseB per minute at 37  $^{\circ}$ C.

Package: 200 U, 500 U, 1 KU

**EN01018 Inorganic pyrophosphatase; PmPPA**

**E.C.: 3.6.1.1**

*E. coli* recombinant inorganic pyrophosphatase from *Pasteurella multocida*



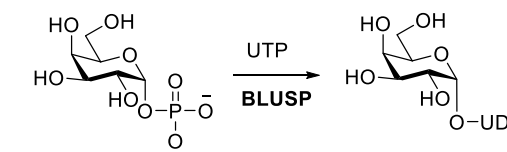
One unit is defined as the amount of enzyme that catalyzes the release of 2  $\mu$ mol of phosphate from pyrophosphate per minute at 37  $^{\circ}$ C.

Package: 1 KU, 2.5 KU, 5 KU

**EN01019 UDP-sugar pyrophosphorylase; BIUSP**

**E.C.: 2.7.7.64**

*E. coli* recombinant UDP-sugar pyrophosphorylase from *Bifidobacterium longum*



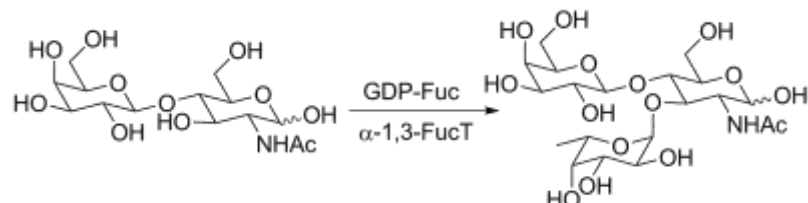
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of UDP-Gal from Gal-1-P and UTP per minute at 37  $^{\circ}$ C.

Package: 5 U, 10 U, 25 U

**EN01020  $\alpha$ -1,3-fucosyltransferase;  $\alpha$ 1,3FucT**

**E.C.: 2.4.1.65**

*E. coli* recombinant  $\alpha$ -1,3-fucosyltransferase from *Helicobacter pylori*



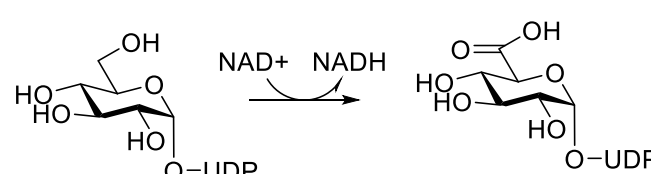
One unit is defined as the amount of enzyme that catalyzes the transfer of 1  $\mu$ mol Fuc from GDP-Fuc to acceptor per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 10 U

**EN01021 UDP-Glc dehydrogenase; UDPDH**

**E.C.: 1.1.1.22**

*E. coli* recombinant uridine-5-diphosphoglucose dehydrogenase from *Streptococcus pyogenes*



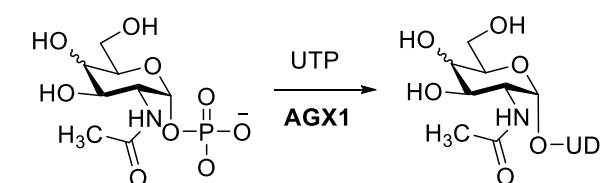
One unit will oxidize 1.0  $\mu$ mol of UDP-glucose to UDP-glucuronic acid per minute at pH 8.7 at 25  $^{\circ}$ C.

Package: 5 U, 25 U, 100 U

**EN01022 N-acetylglucosamine-1-P uridylyltransferase; AGX1**

**E.C.: 2.3.1.157**

*E. coli* recombinant N-acetylglucosamine-1-P uridylyltransferase from *Homo sapien*



One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol of UDP-GlcNAc from GlcNAc-1-P and UTP per minute at 37  $^{\circ}$ C.

Package: 5 U, 25 U, 50 U

**EN01023  $\alpha$ 1,2-fucosyltransferase;  $\alpha$ 1,2FucT**

**E.C.: 2.4.1.69**

*E. coli* recombinant  $\alpha$ 1,2-fucosyltransferase from *Helicobacter mustelae*



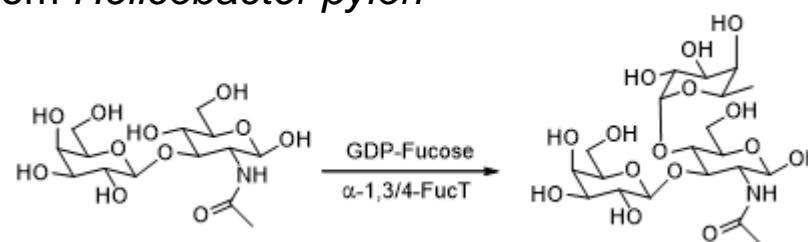
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu$ mol Fuc $\alpha$ 1,2Lac from GDP-Fuc and lactose per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 10 U

**EN01024  $\alpha$ 1,3/4-fucosyltransferase;  $\alpha$ 1,3/4FucT**

**E.C.: 2.4.1.65**

*E. coli* recombinant  $\alpha$ 1,3/4-fucosyltransferase from *Helicobacter pylori*



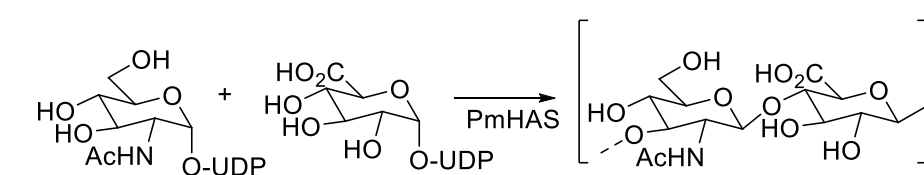
One unit is defined as the amount of enzyme that catalyzes the transfer of 1  $\mu$ mol Fuc from GDP-Fuc to acceptor per minute at 37  $^{\circ}$ C.

Package: 1 U, 5 U, 10 U

**EN01025 Hyaluronan synthase; PmHAS**

**E.C.: 2.4.1.212**

*E. coli* recombinant hyaluronan synthase from *Pasteurella multocida*



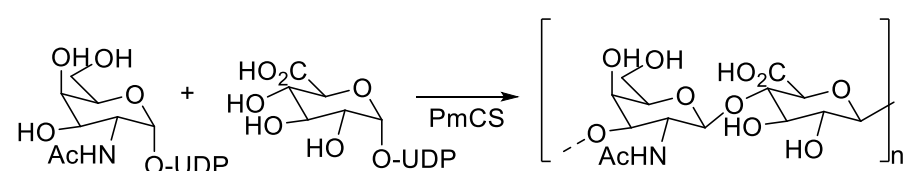
PmHAS polymerizes hyaluronan chain from UDP-GlcNAc and UDP-GlcA sugar nucleotide donors.

Package: 1 mg, 5 mg, 10 mg

**EN01026 Chondroitin synthase; PmCS**

**E.C.: 2.4.1.226**

*E. coli* recombinant chondroitin synthase from *Pasteurella multocida*



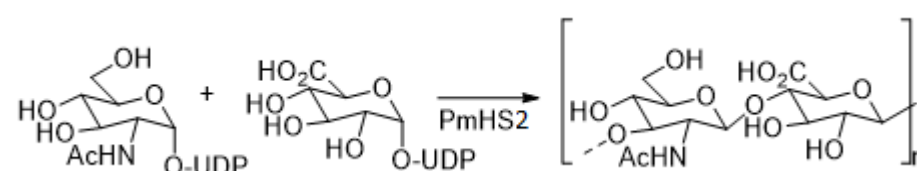
PmCS polymerizes chondroitin chain from UDP-GlcNAc and UDP-GlcA sugar nucleotide donors.

Package: 1 mg, 5 mg, 10 mg

**EN01027 Heparosan synthase 2; PmHS2**

**E.C.: 2.4.1.-**

*E. coli* recombinant heparosan synthase from *Pasteurella multocida*



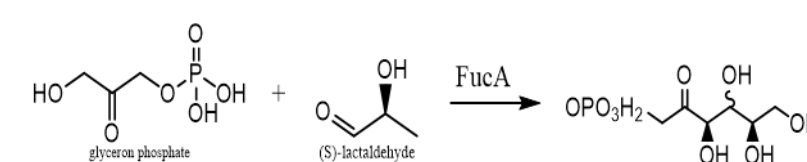
PmHS2 polymerizes heparosan chain from UDP-GlcNAc and UDP-GlcA sugar nucleotide donors.

Package: 1 mg, 5 mg, 10 mg

**EN01028 L-fuculose aldolase; FucA**

**E.C.: 4.1.2.17**

*E. coli* recombinant L-fuculose aldolase from *Thermus thermophilus HB8*



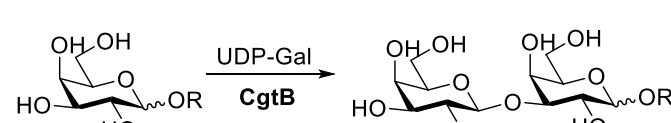
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of glyceraldehyde phosphate and (S)-lactaldehyde from L-fuculose 1-phosphate per minute at 37 °C.

Package: 5 U, 10 U, 25 U

**EN01029 β1,3-galactosyltransferase; CgtB**

**E.C.: 2.4.1.62**

*E. coli* recombinant β1,3-galactosyltransferase from *Campylobacter jejuni*



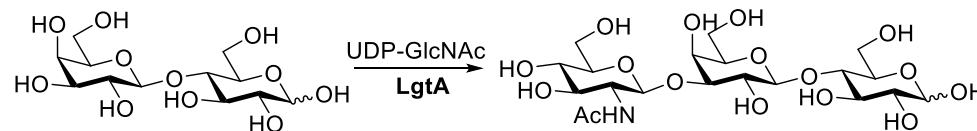
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol Galβ1,3Gal from Gal and UDP-Gal per min at 37 °C.

Package: 1 U, 5 U, 10 U

**EN01030 β1,3-N-acetylhexaminyltransferase; LgtA**

**E.C.: 2.4.1.56**

*E. coli* recombinant β1,3-N-acetylhexosaminyltransferase from *Neisseria meningitidis*



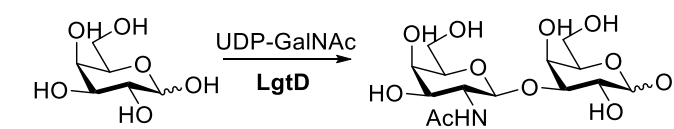
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of GlcNAcβ1,3Lac from UDP-GlcNAc and lactose per min at 37 °C.

Package: 1 U, 5 U, 10 U

**EN01031 β1,3-N-acetylgalactosaminyltransferase; LgtD**

**E.C.: 2.4.1.-**

*E. coli* recombinant β1,3-N-acetylgalactosaminyltransferase from *Neisseria meningitidis*



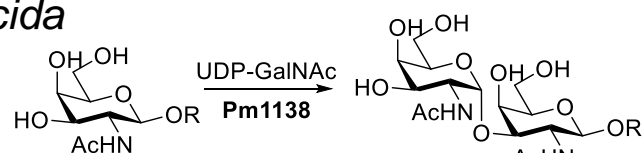
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of GalNAcβ1,3-Gal from UDP-GalNAc and Gal per min at 37 °C.

Package: 1 U, 5 U, 10 U

**EN01032 α1,3-N-acetylgalactosaminyltransferase; Pm1138**

**E.C.: 2.4.1.-**

*E. coli* recombinant α1,3-N-acetylgalactosaminyltransferase from *Pasteurella multocida*



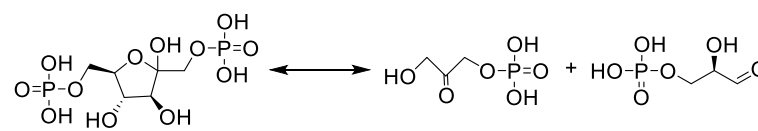
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol GalNAcα1,3-GalNAc from UDP-GalNAc and GalNAc per min at 37 °C.

Package: 1 U, 5 U, 10 U

**EN01033 Fructose 1,6-bisphosphate aldolase; SMALDO**

**E.C.: 4.1.2.13**

*E. coli* recombinant fructose 1,6-bisphosphate aldolase from *E. coli O157:H7*



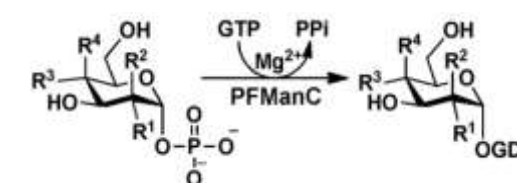
One unit is defined as the amount of enzyme that catalyzes the release of 1 μmol of DHAP and G3P from fructose 1,6-bisphosphate per minute at 37 °C.

Package: 100 U, 500U, 1 KU

**EN01035 GDP-mannose pyrophosphorylase; ManC**

**E.C.: 2.7.7.13**

*E. coli* recombinant GDP-mannose pyrophosphorylase from *Pyrococcus furiosus*



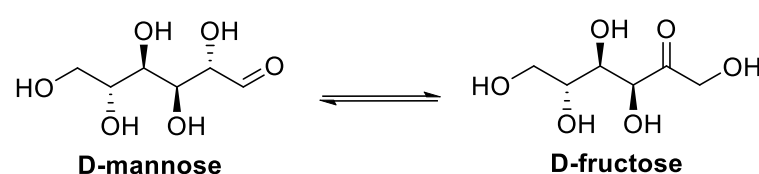
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of GDP-Man from Mannose-1-P and GTP per minute at 37 °C.

Package: 10 U, 25 U, 50 U

**EN01037 D-mannose isomerase**

**E.C.: 5.3.1.7**

*E. coli* recombinant D-mannose isomerase from *E. coli* K12



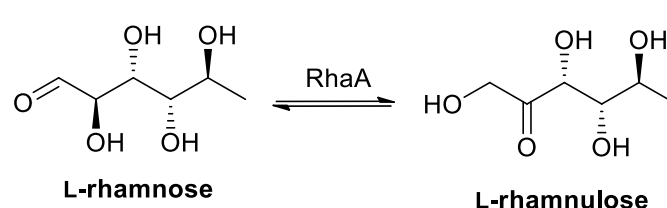
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of D-fructose from d-Mannose per minute at 37 °C.

Package: 100 U, 1 KU, 5 KU

**EN01038 L-rhamnose isomerase; RhaA**

**E.C.: 5.3.1.14**

*E. coli* recombinant L-rhamnose isomerase from *E. coli* K12



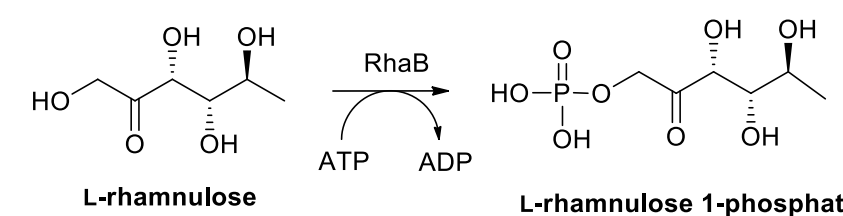
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of L-rhamnulose from L-rhamnose per minute at 37 °C.

Package: 5 U, 20 U, 100 U

**EN01039 L-rhamnulose kinase; RhaB**

**E.C.: 2.7.1.5**

*E. coli* recombinant L-rhamnulose kinase from *E. coli* K12



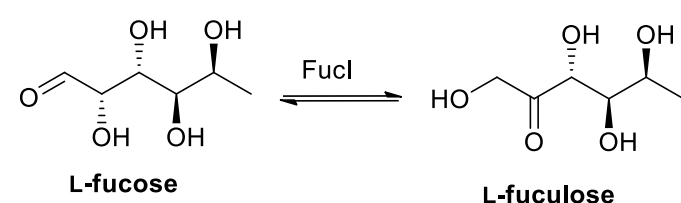
One unit is defined as the amount of enzyme that catalyzes the formation of 1 μmol of L-rhamnulose -1-phosphate from L-rhamnulose and ATP per minute at 37 °C.

Package: 10 U, 50 U, 250 U

**EN01040 L-fucose isomerase; FucI**

**E.C.: 5.3.1.25**

*E. coli* recombinant L-fucose isomerase from *E. coli* K12



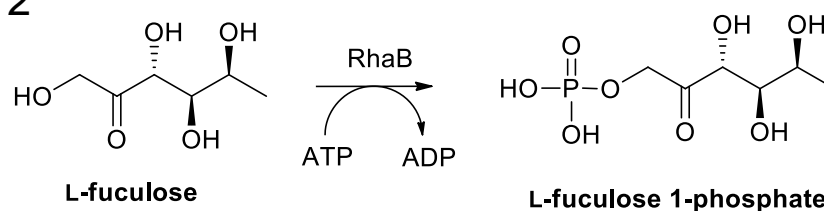
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of L-fuculose from L-fucose per minute at 37  $^{\circ}\text{C}$ .

Package: 10 U, 50 U, 250 U

**EN01041 L-fucose kinase; FucK**

**E.C.: 2.7.1.52**

*E. coli* recombinant L-fucose kinase from *E. coli* K12



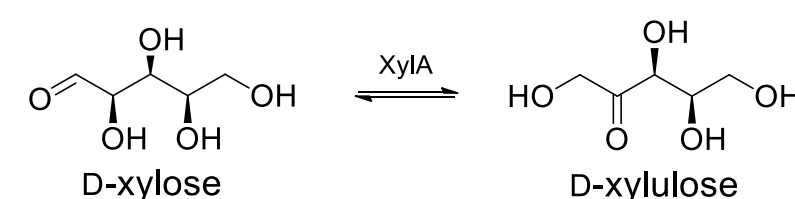
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of L-Fuculose - 1-phosphate from L-fucose and ATP per minute at 37  $^{\circ}\text{C}$ .

Package: 100 U, 500 U, 1 KU

**EN01042 D-xylose isomerase; XylA**

**E.C.: 5.3.1.5**

*E. coli* recombinant D-xylose isomerase from *E. coli* K12



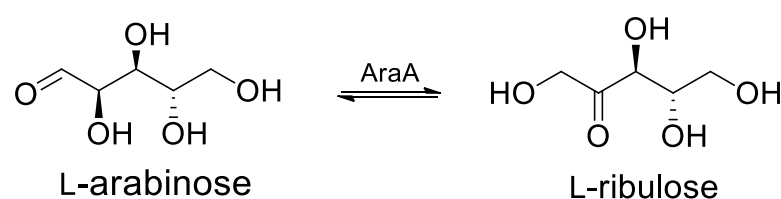
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of D-xylulose from D-xylose per minute at 37  $^{\circ}\text{C}$ .

Package: 100 U, 500 U, 1 KU

**EN01043 L-arabinose isomerase; AraA**

**E.C.: 5.3.1.4**

*E. coli* recombinant L-arabinose isomerase from *E. coli* O157:H7



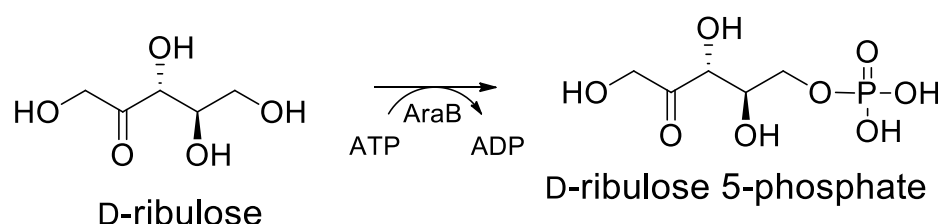
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of L-ribulose from L-arabinose per minute at 37  $^{\circ}\text{C}$ .

Package: 1 KU, 5 KU

**EN01044 D-ribulose kinase; AraB**

**E.C.: 2.7.1.47**

*E. coli* recombinant D-ribulose kinase from *E. coli*



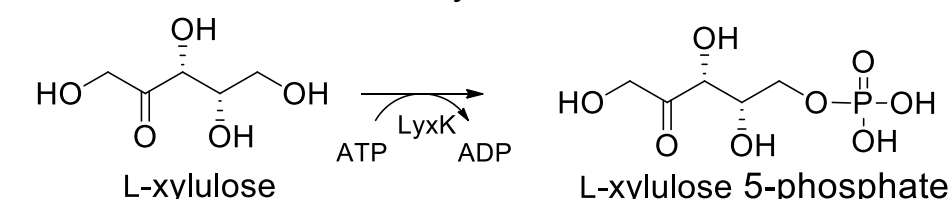
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of D-ribulose 5-phosphate from D-ribulose and ATP per minute at 37  $^{\circ}\text{C}$ .

Package: 5 U, 20 U, 100 U

**EN01045 L-xylulose kinase; LyxK**

**E.C.: 2.7.1.53**

*E. coli* recombinant L-xylulose kinase from *E. coli*



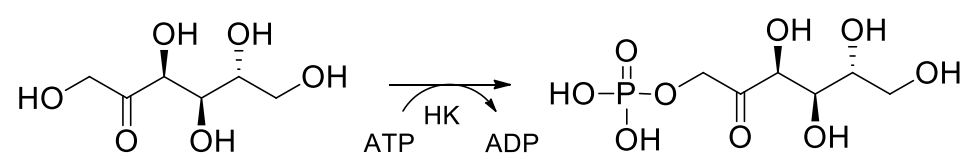
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of L-xylulose 5-phosphate from L-xylulose and ATP per minute at 37  $^{\circ}\text{C}$ .

Package: 5 U, 20 U, 100 U

**EN01046 Fructose kinase; FruK**

**E.C.: 2.7.1.4**

*E. coli* recombinant fructose kinase from *Bacillus subtilis*



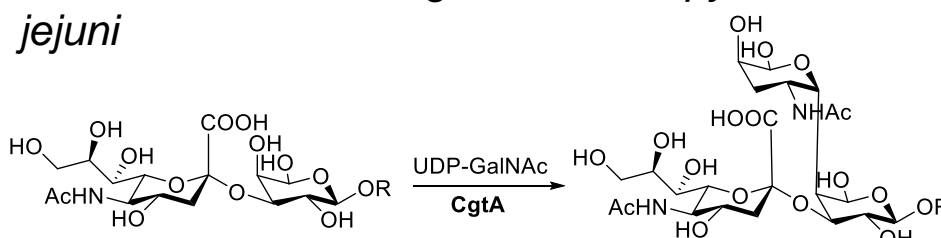
One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of D-fructose 1-phosphate from D-fructose and ATP per minute at 37  $^{\circ}\text{C}$ .

Package: 1 U, 5 U, 20 U

**EN01049  $\beta$ 1,4-N-acetylgalactosaminyltransferase; CgtA**

**E.C.: 2.4.1.92**

*E. coli* recombinant CgtA from *Campylobacter jejuni*



One unit is defined as the amount of enzyme that catalyzes the formation of 1  $\mu\text{mol}$  of Sia $\alpha$ 2,3(GalNAc $\beta$ 1,4)Lac from Sia $\alpha$ 2,3Lac and UDP-GalNAc per minute at 37  $^{\circ}\text{C}$ .

Package: 1 U, 5 U, 20 U

# Sugar Nucleotides

## Sugar nucleotides

The basic building blocks of complex carbohydrates are activated nucleotide sugars, just as the basic building blocks of DNA are nucleotide triphosphates. Nucleotide sugars contain a nucleotide, such as UDP, GDP or CMP, at the reducing end of the sugar ring, locking the structure in either the  $\alpha$  or  $\beta$  anomeric state. Glycosyltransferases add the reducing end of the nucleotide sugar to a substrate, such as a protein side chain or growing chain of sugars, which liberates the nucleotide as a good leaving group.

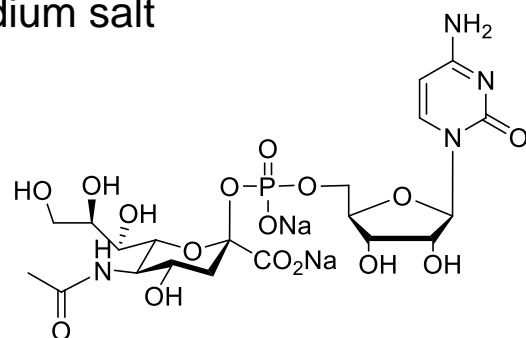
## Rare Sugars

Sugar nomenclature is largely derived from the number of carbons and orientation of hydroxyl (i.e. -OH) groups in each sugar structure. For every sugar commonly spoken of, there are one or more sugars with different hydroxyl orientations, and distinct names and functions. Often these sugars, such as psicose and tagatose, are rarely found in nature but have implications for energy metabolism, energy storage, and diverse structural applications.



**SN02001 CMP-Neu5Ac.2Na**

Cytidine-5'-monophospho-N-acetylneuraminic acid disodium salt



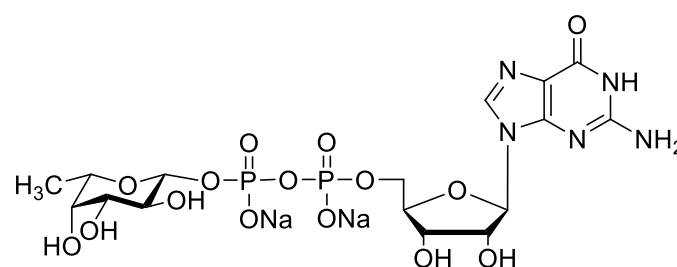
$C_{20}H_{29}N_4O_{16}PNa_2$ ; M.W.: 658.41 g/mol

CAS: 3063-71-6

Package: 10 mg, 50 mg, 100 mg

**SN02002 GDP-L-Fuc.2Na**

Guanosine 5'-diphospho-β-L-fucose disodium salt



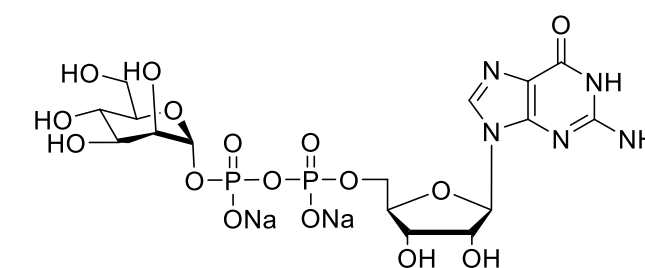
$C_{16}H_{23}N_5O_{15}P_2Na_2$ ; M.W.: 633.31 g/mol

CAS: 15839-70-0

Package: 10 mg, 50 mg, 100 mg

**SN02003 GDP-D-Man.2Na**

Guanosine 5'-diphospho-D-mannose disodium salt



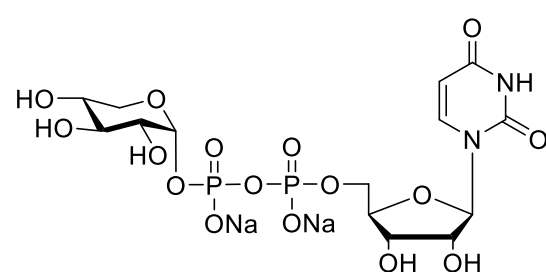
$C_{16}H_{23}N_5O_{16}P_2Na_2$ ; MW: 649.30 g/mol

CAS: 103301-73

Package: 10 mg, 50 mg, 100 mg

**SN02004 UDP-Xyl.2Na**

Uridine 5'-diphospho-xylose disodium salt



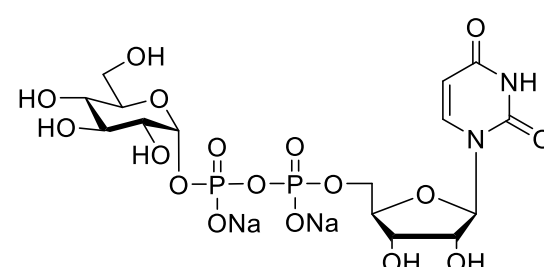
$C_{14}H_{19}N_2O_{16}P_2Na_2$ ; MW: 536.276 g/mol

CAS: 3616-06-6

Package: 10 mg, 50 mg, 100 mg

**SN02005 UDP-Glc.2Na**

Uridine 5'-diphospho-glucose disodium salt



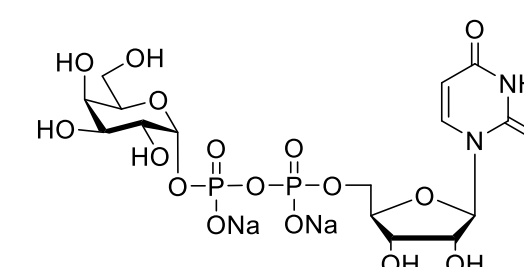
$C_{15}H_{22}N_2O_{17}P_2Na_2$ ; MW: 610.27 g/mol

CAS: 117756-22-6, 28053-08-9

Package: 10 mg, 50 mg, 100 mg

**SN02006 UDP-Gal.2Na**

Uridine 5'-diphospho-galactose disodium salt



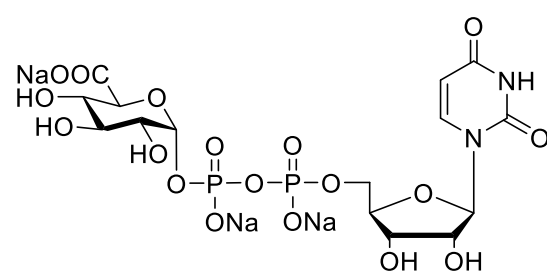
$C_{15}H_{22}N_2O_{17}P_2Na_2$ ; MW: 610.27 g/mol

CAS: 137868-52-1, 2956-16-3

Package: 10 mg, 50 mg, 100 mg

**SN02007 UDP-GlcA.3Na**

Uridine 5'-diphospho-glucuronic acid trisodium salt



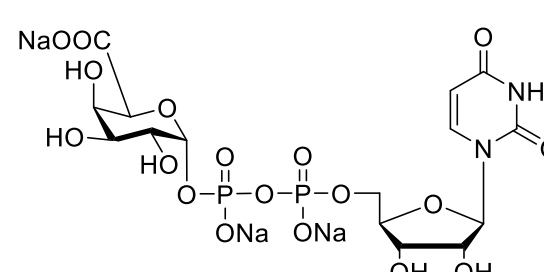
$C_{15}H_{19}N_2O_{18}P_2Na_3$ ; MW: 646.23 g/mol

CAS: 108320-87-2

Package: 10 mg, 50 mg, 100 mg

**SN02008 UDP-GalA.3Na**

Guanosine 5'-diphospho-galuronic acid trisodium salt



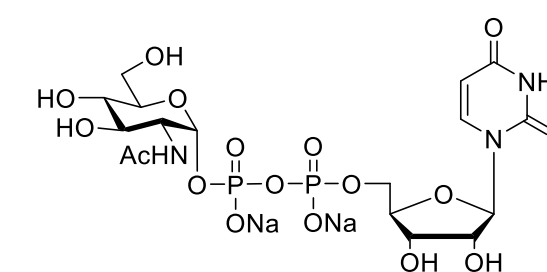
$C_{15}H_{19}N_2O_{18}P_2Na_3$ ; MW: 646.23 g/mol

CAS: 148407-07-2

Package: 10 mg, 50 mg, 100 mg

**SN02009 UDP-GlcNAc.2Na**

Uridine 5'-diphospho-N-acetylglucosamine disodium salt



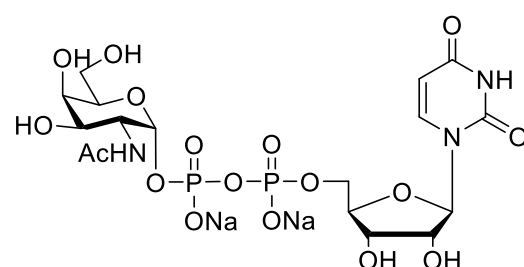
$C_{17}H_{25}N_3O_{17}P_2Na_2$ ; M.W.: 651.32 g/mol

CAS: 91183-98-1

Package: 10 mg, 50 mg, 100 mg

**SN02010 UDP-GalNAc.2Na**

Uridine 5'-diphospho-N-acetylgalactosamine disodium salt



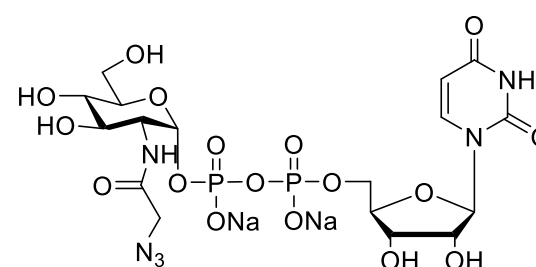
$C_{17}H_{25}N_3O_{17}P_2Na_2$ ; M.W.: 651.32 g/mol

CAS: 108320-87-2

Package: 10 mg, 50 mg, 100 mg

**SN02011 UDP-GlcNAz.2Na**

Uridine 5'-diphospho-N-acetylazidogalactosamine disodium salt



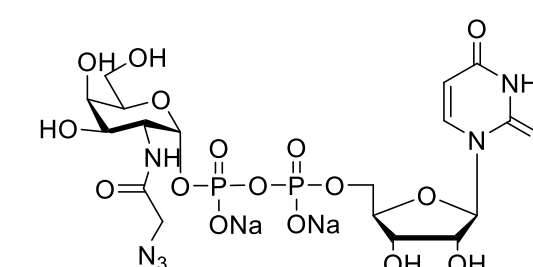
$C_{17}H_{24}N_6O_{17}P_2Na_2$ ; MW: 692.05 g/mol

CAS: n/a

Package: 10 mg, 50 mg, 100 mg

**SN02012 UDP-GalNAz.2Na**

Uridine 5'-diphospho-N-acetylazidogalactosamine disodium salt



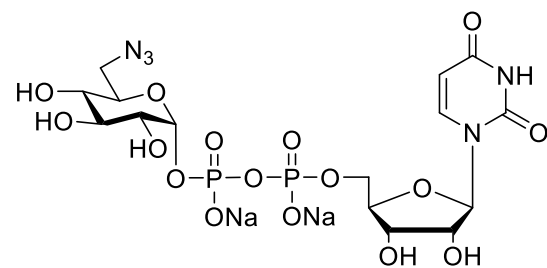
$C_{17}H_{24}N_6O_{17}P_2Na_2$ ; MW: 692.05 g/mol

CAS: n/a

Package: 10 mg, 50 mg, 100 mg

**SN02013 – UDP-6-azido-6-deoxy-D-Glc.2Na**

Uridine 5'-disphospho-6-azido-6-deoxy-D-glucose disodium salt



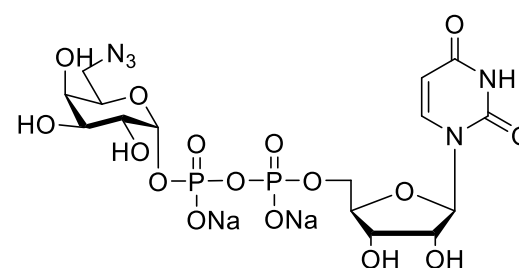
C<sub>15</sub>H<sub>21</sub>N<sub>5</sub>Na<sub>2</sub>O<sub>16</sub>P<sub>2</sub>; M.W.: 635.28 g/mol

CAS: 537039-67-1

Package: 2 mg, 5 mg, 10 mg

**SN02014 – UDP-6-azido-6-deoxy-D-Gal.2Na**

Uridine 5'-disphospho-6-azido-6-deoxy-D-galactose disodium salt



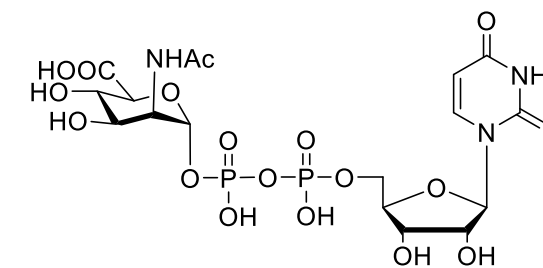
C<sub>15</sub>H<sub>21</sub>N<sub>5</sub>Na<sub>2</sub>O<sub>16</sub>P<sub>2</sub>; M.W.: 635.28 g/mol

CAS: n/a

Package: 2 mg, 5 mg, 10 mg

**SN02015 – UDP-ManNAcA**

Uridine 5'-disphospho-N-acetyl-D-mannosaminuronic acid



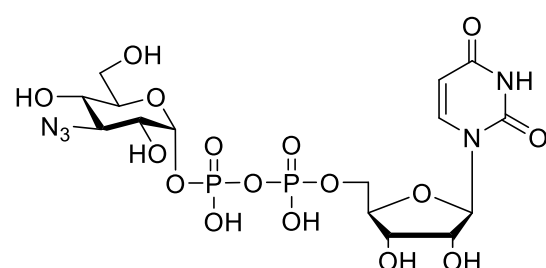
C<sub>17</sub>H<sub>25</sub>N<sub>3</sub>O<sub>18</sub>P<sub>2</sub>; MW: 621.34 g/mol

CAS: n/a

Package: Quote

**SN02016 – UDP-4-azido-4-deoxy-D-Glc**

Uridine 5'-disphospho-4-azido-4-deoxy-D-glucose



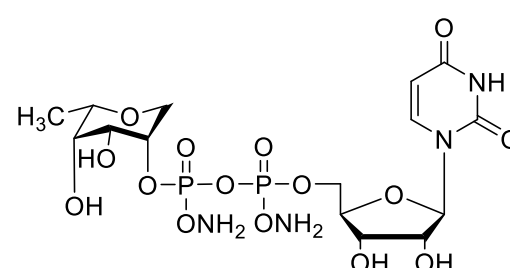
C<sub>15</sub>H<sub>23</sub>N<sub>5</sub>O<sub>16</sub>P<sub>2</sub>; MW: 591.32 g/mol

CAS: n/a

Package: Quote

**SN02017 – UDP-L-Fuc.2NH<sub>2</sub>**

Uridine 5'-disphospho-L-fucose diammonium salt



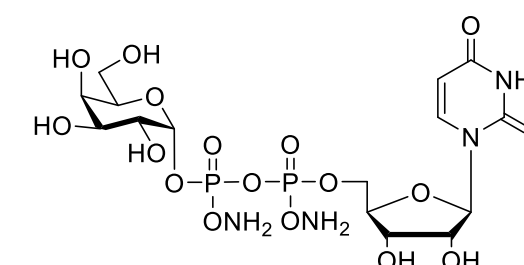
C<sub>15</sub>H<sub>26</sub>N<sub>4</sub>O<sub>15</sub>P<sub>2</sub>; MW: 564.33 g/mol

CAS: n/a

Package: 1 mg, 2 mg, 5 mg

**SN02018 – UDP-L-Gal.2NH<sub>2</sub>**

Uridine 5'-disphospho-L-galactose diammonium salt



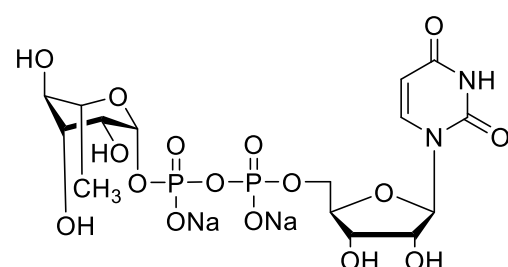
C<sub>15</sub>H<sub>26</sub>N<sub>4</sub>O<sub>17</sub>P<sub>2</sub>; MW: 596.33 g/mol

CAS: n/a

Package: 1 mg, 2 mg, 5 mg

**SN02019 – UDP-α-L-Rha**

Uridine 5'-disphospho-α-L-rhamnose



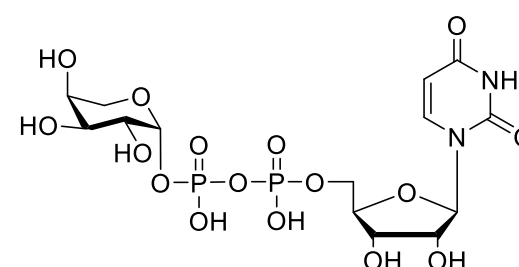
C<sub>15</sub>H<sub>22</sub>N<sub>2</sub>Na<sub>2</sub>O<sub>16</sub>P<sub>2</sub>; MW: 594.27 g/mol

CAS: 1526988-33-9

Package: Quote

**SN02020 – UDP-β-L-Ara**

Uridine 5'-disphospho-β-L-arabinose



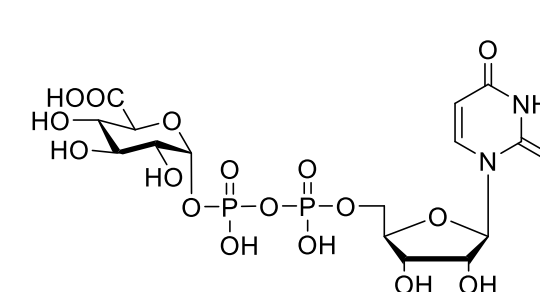
C<sub>14</sub>H<sub>22</sub>N<sub>2</sub>O<sub>16</sub>P<sub>2</sub>; MW: 536.28 g/mol

CAS: n/a

Package: 5 mg, 10 mg, 25 mg

**SN02021 – UDP-GlcA**

Uridine 5'-disphospho-glucuronic acid



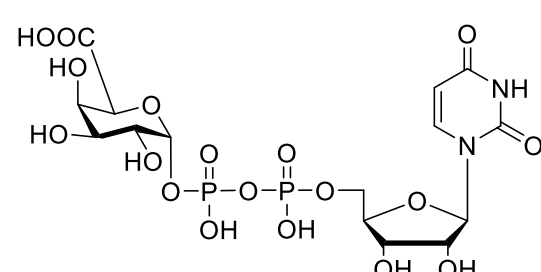
C<sub>15</sub>H<sub>22</sub>N<sub>2</sub>O<sub>18</sub>P<sub>2</sub>; M.W.: 580.28 g/mol

CAS: 2616-64-0

Package: 5 mg, 10 mg, 25 mg

**SN02022 – UDP-GalA**

Uridine 5'-disphospho-galuronic acid



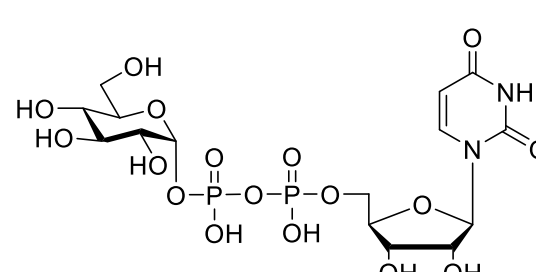
C<sub>15</sub>H<sub>22</sub>N<sub>2</sub>O<sub>18</sub>P<sub>2</sub>; M.W.: 580.28 g/mol

CAS: n/a

Package: Quote

**SN02023 - UDP-Glc**

Uridine 5'-disphospho-glucose



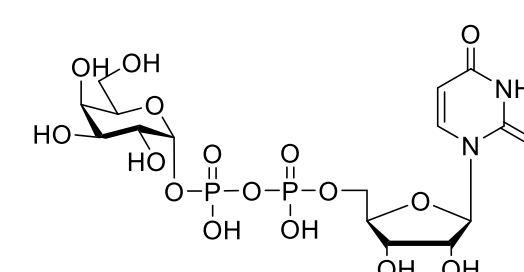
C<sub>15</sub>H<sub>24</sub>N<sub>2</sub>O<sub>17</sub>P<sub>2</sub>; MW: 566.30 g/mol

CAS: 133-89-1

Package: Quote

**SN02024 – UDP-Gal**

Uridine 5'-disphospho-galactose



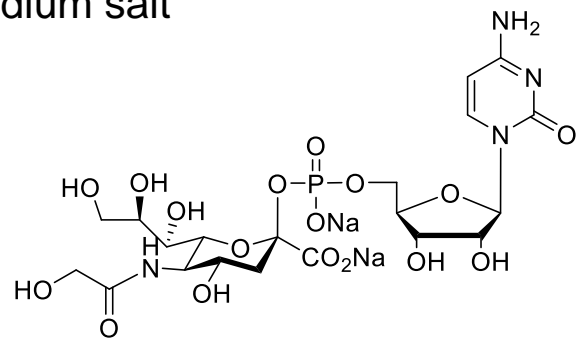
C<sub>15</sub>H<sub>24</sub>N<sub>2</sub>O<sub>17</sub>P<sub>2</sub>; MW: 566.30 g/mol

CAS: 2956-16-3

Package: Quote

**SN02025 – CMP-Neu5Gc.2Na**

Cytidine-5'-monophospho-N-glycolylneuraminic acid disodium salt

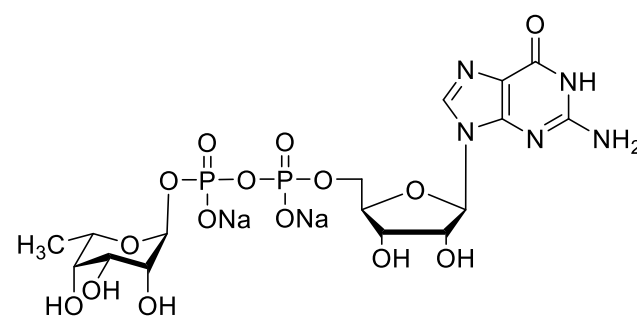
C<sub>20</sub>H<sub>29</sub>N<sub>4</sub>Na<sub>2</sub>O<sub>17</sub>P<sub>2</sub>; M.W.: 674.42 g/mol

CAS: n/a

Package: Fill

**SN02026 – GDP-6-deoxy-a-D-talose**

Guanosine 5'-diphospho-6-deoxy-a-D-talose

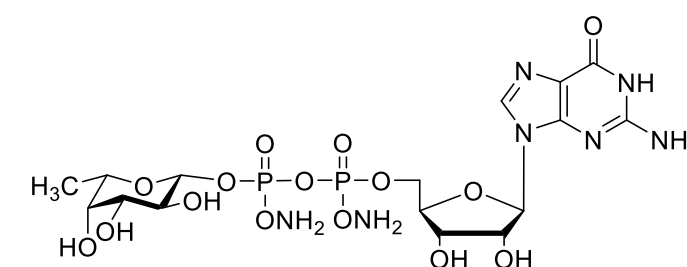
C<sub>16</sub>H<sub>23</sub>N<sub>5</sub>Na<sub>2</sub>O<sub>15</sub>P<sub>2</sub>; M.W.: 633.31 g/mol

CAS: n/a

Package: Quote

**SN02027 – GDP-L-Fuc.2NH<sub>2</sub>**

Guanosine 5'-diphospho-L-fucose diammonium salt

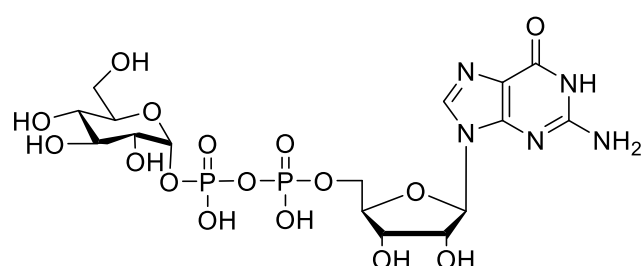
C<sub>16</sub>H<sub>27</sub>N<sub>7</sub>O<sub>15</sub>P<sub>2</sub>; MW: 619.37 g/mol

CAS: n/a

Package: Quote

**SN02028 – GDP-Glc**

Guanosine 5'-diphospho-glucose

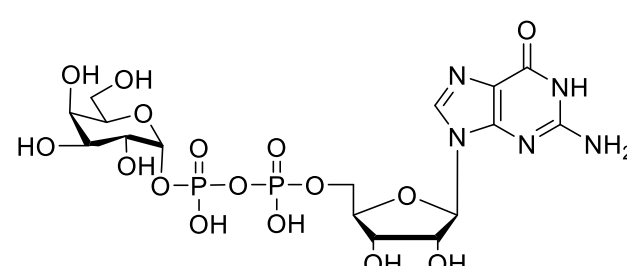
C<sub>16</sub>H<sub>25</sub>N<sub>5</sub>O<sub>16</sub>P<sub>2</sub>; MW: 605.34 g/mol

CAS: 103301-72-0

Package: 10 mg, 25 mg, 50 mg

**SN02029 – GDP-Gal**

Guanosine 5'-diphospho-galactose

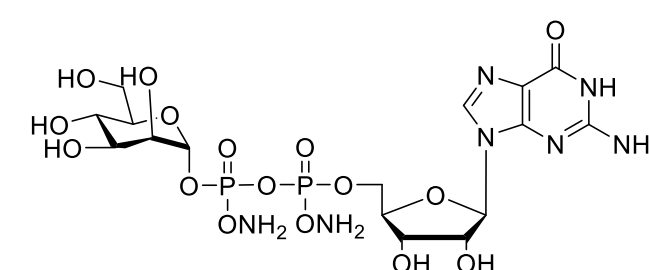
C<sub>16</sub>H<sub>25</sub>N<sub>5</sub>O<sub>16</sub>P<sub>2</sub>; MW: 605.34 g/mol

CAS: n/a

Package: Quote

**SN02030 – GDP-D-Man.2NH<sub>2</sub>**

Guanosine 5'-diphospho-D-mannose diammonium salt

C<sub>16</sub>H<sub>27</sub>N<sub>7</sub>O<sub>16</sub>P<sub>2</sub>; MW: 635.37 g/mol

CAS: n/a

Package: Quote



Rare Sugar Nucleotides		
Catalog #	Sugar Nucleotide	Package
SN02031	UDP-GlcA.xNH3	Quote
SN02032	UDP-GlcUA	Quote
SN02033	UDP-D-glucose disodium salt – Approx 30% content by UV	2 g, 5 g, 10 g
SN02034	UDP-a-D-galactose ammonium salt	5 mg, 10 mg, 20 mg
SN02035	UDP-a-D-galactose disodium salt	50 mg, 100 mg, 250 mg
SN02036	UDP-3-O-(R-3-hydroxymyristoyl)-N-acetyl-D-glucosamine	Quote
SN02037	UDP-2-ketopropyl-a-D-galactose	Quote
SN02038	CMP-Pse	Quote
SN02039	GDP-D-galactose	Quote
SN02040	GDP-L-galactose	Quote
SN02041	TDP-Fuc	Quote
SN02042	TDP-Glc	25 mg, 50 mg, 100 mg
SN02043	dTDP-a-Glc.2Na	25 mg, 50 mg, 100 mg
SN02044	D-TDP-b-L-Rha	1 mg, 2 mg, 5 mg
SN02045	ADPR-pNP	Quote
SN02046	ADPRP	Quote
SN02047	ADP-4-deoxy-D-glucose	Quote
SN02048	ADP-D-glucose disodium salt	25 mg, 50 mg, 100 mg
SN02049	ADP-D-glycerol-b-D-manno-heptose	Quote
SN02050	ADP-L-glycerol-b-D-manno-heptose	Quote



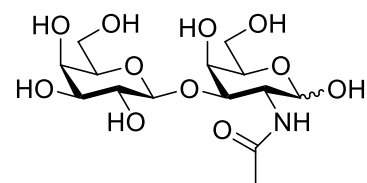
# Oligosaccharides

## Oligosaccharides

A class of saccharides of intermediate length, usually 2-10 residues, distinguished from single monosaccharides and extended polysaccharides. Polysaccharides may be digested into shorter oligosaccharides, while some oligosaccharides are naturally occurring in foods. Oligosaccharides that are not digested by the vertebrate gut can be passed to the colon, and are termed prebiotic if fermented by intestinal microbiota. Oligosaccharides have been researched for diverse roles, including decreasing infection, insulin response, and cancer development risk, or improving fatty acid synthesis, antioxidant activity, and uptake of minerals.

**OS03001 Galacto-N-biose; Gal-β1,3-GalNAc**

2-Acetamido-2-deoxy-3-O-(β-D-galactopyranosyl)-D-galactopyranose

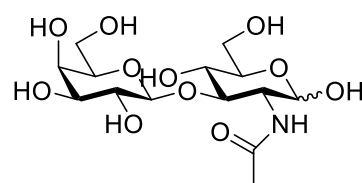
C<sub>14</sub>H<sub>25</sub>NO<sub>11</sub>; MW: 383.35

CAS: 20972-29-6; 3554-90-3

Package: 10 mg, 50 mg, 500 mg

**OS03002 Lacto-N-Biose; Gal-β1,3-GlcNAc**

2-Acetamido-2-deoxy-3-O-(β-D-galactopyranosyl)-D-glucopyranose

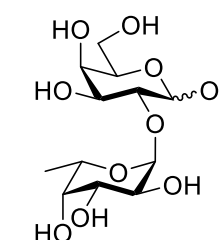
C<sub>14</sub>H<sub>25</sub>NO<sub>11</sub>; MW: 383.35

CAS: 489-52-1; 50787-09-2

Package: 10 mg, 50 mg, 500 mg

**OS03003 Blood group H disaccharide**

Fuc-α1,2-Gal

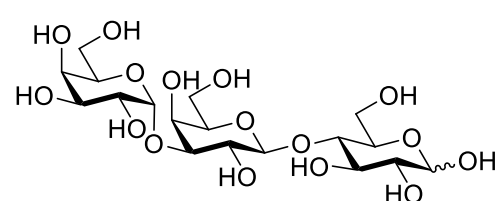
C<sub>12</sub>H<sub>22</sub>O<sub>16</sub>; MW: 326.30

CAS: 1674118-7; 24656-24-4

Package: 5 mg, 25 mg, 100 mg

**OS03004 Isoglobotriose; α-Gal**

Gal-α1,3-Gal-β1,4-Glc

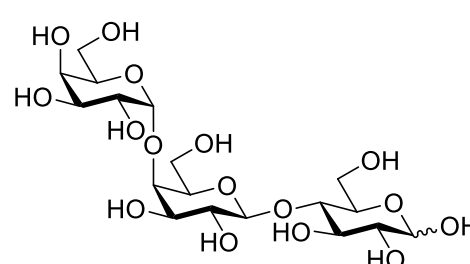
C<sub>18</sub>H<sub>32</sub>O<sub>16</sub>; MW: 504.44

CAS: 41744-59-6

Package: 2 mg, 10 mg, 50 mg

**OS03005 Globotriose**

GD3; pK antigen; Gal-α1,4-Gal-β1,4-Glc

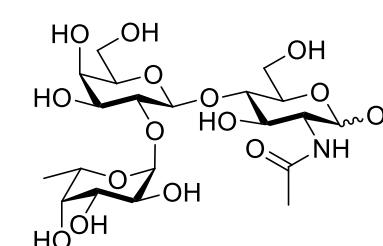
C<sub>18</sub>H<sub>32</sub>O<sub>16</sub>; MW: 504.44

CAS: 66580-68-5

Package: 10 mg, 50 mg, 500 mg

**OS03006 Blood group Type II H-antigen**

Fuc-α1,2-Gal-β1,4-GlcNAc

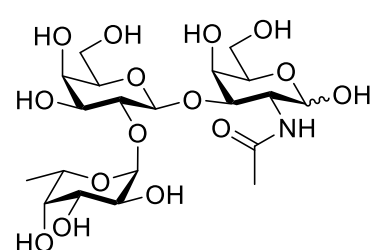
C<sub>20</sub>H<sub>35</sub>NO<sub>15</sub> MW: 529.49

CAS:

Package: 5 mg, 25 mg, 100 mg

**OS03007 Blood group Type III/IV H-antigen**

Fuc-α1,2-Gal-β1,3-GalNAc

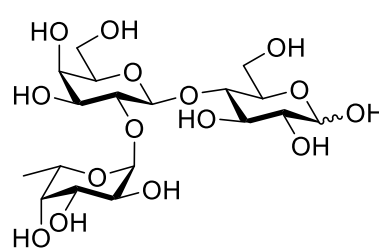
C<sub>20</sub>H<sub>35</sub>NO<sub>15</sub> MW: 529.49

CAS:

Package: 5 mg, 25 mg, 100 mg

**OS03008 Blood group Type V H-antigen**

Fuc-α1,2-Gal-β1,4-Glc

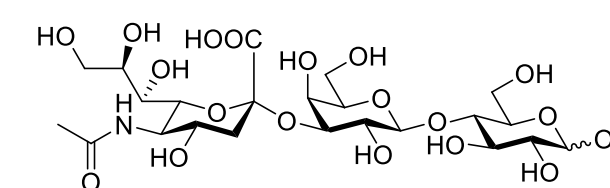
C<sub>18</sub>H<sub>32</sub>NO<sub>15</sub>; MW: 488.44

CAS:

Package: 5 mg, 25 mg, 100 mg

**OS03009 3'-Sialyllactose**

Sia-α2,3-Gal-β1,4-Glc

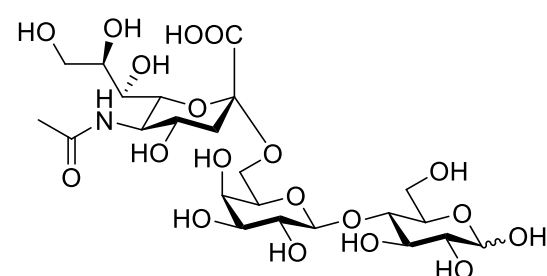
C<sub>23</sub>H<sub>39</sub>NO<sub>19</sub>; MW: 633.55

CAS: 35890-38-1

Package: 5 mg, 25 mg, 100 mg

**OS03010 6'-Sialyllactose**

Sia-α2,6-Gal-β1,4-Glc

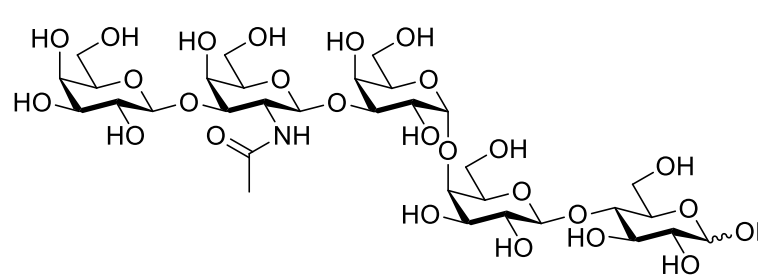
C<sub>23</sub>H<sub>39</sub>NO<sub>19</sub>; MW: 633.55

CAS: 35890-39-2; 56144-12-8

Package: 5 mg, 25 mg, 100 mg

**OS03012 Globo-N-pentaose; Gb5**

Gal-β1,3-GalNAc-β1,3-Gal-α1,4-Gal-β1,4-Glc

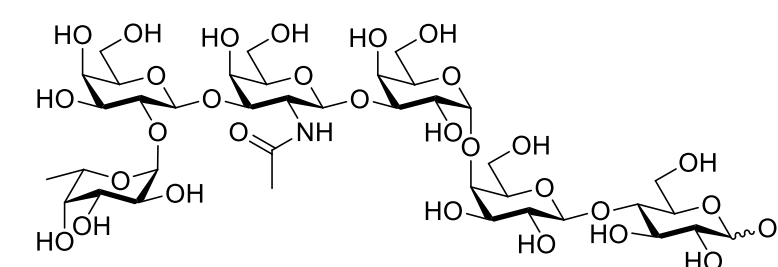
C<sub>32</sub>H<sub>55</sub>NO<sub>26</sub>; MW: 869.77

CAS:

Package: 2 mg, 10 mg, 50 mg

**OS03013 Globo-H**

Fuc-α1,2-Gal-β1,3-GalNAc-β1,3-Gal-α1,4-Gal-β1,4-Glc

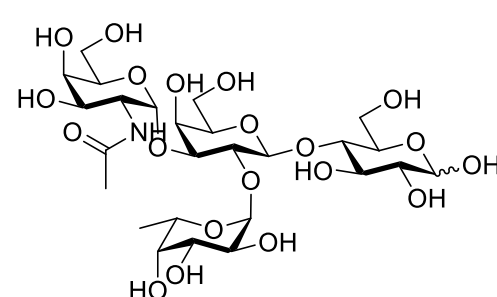
C<sub>38</sub>H<sub>65</sub>NO<sub>30</sub>; MW: 1015.91

CAS:

Package: 2 mg, 10 mg, 50 mg

**OS03014 Blood Group Type V A-antigen**

GalNAc-α1,3-(Fuc-α1,2)-Gal-β1,4-Glc

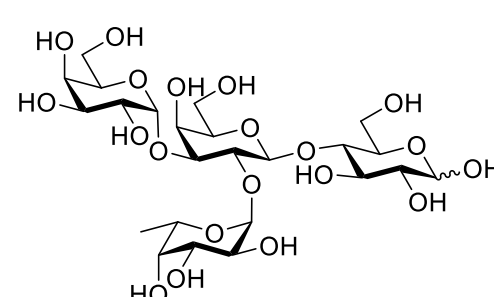
C<sub>26</sub>H<sub>45</sub>N<sub>2</sub>O<sub>20</sub>; MW: 691.63

CAS: 59957-92-5

Package: 2 mg, 10 mg, 50 mg

**OS03015 Blood Group Type V B-antigen**

Gal-α1,3-(Fuc-α1,2)-Gal-β1,4-Glc

C<sub>24</sub>H<sub>40</sub>NO<sub>20</sub>; MW: 650.58

CAS:

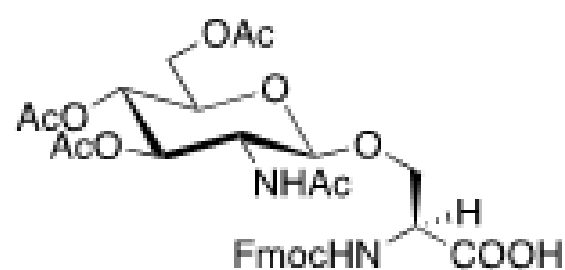
Package: 2 mg, 10 mg, 50 mg



# Glycoamino Acids



## GA20100 GlcNAc-Ser

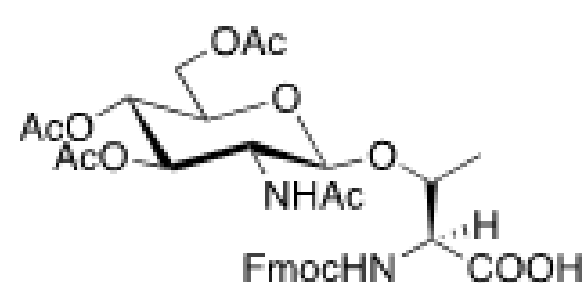


$C_{32}H_{36}N_2O_{13}$ ; MW: 656.64

CAS: 160067-63-0

Package: quote

## GA10105 GlcNAc-Thr

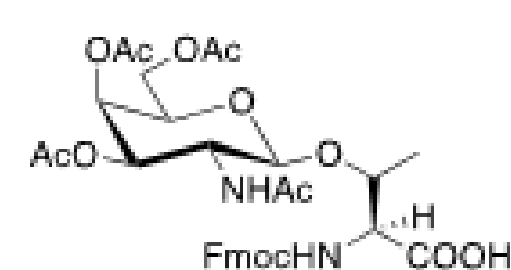


$C_{33}H_{38}N_2O_{13}$ ; MW: 670.67

CAS: 160168-40-1

Package: quote

## GA10205 GalNAc-Thr

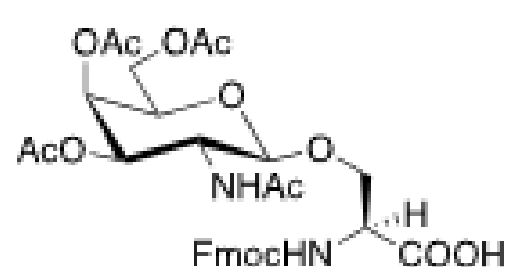


$C_{33}H_{38}N_2O_{13}$ ; MW: 670.67

CAS: 116783-35-8

Package: quote

## GA20200 GalNAc-Ser

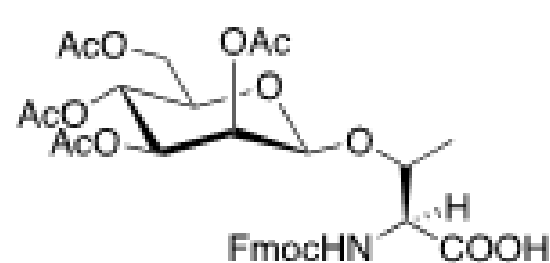


$C_{32}H_{36}N_2O_{13}$ ; MW: 656.64

CAS: 120173-57-1

Package: quote

## GA10305 Man-Thr

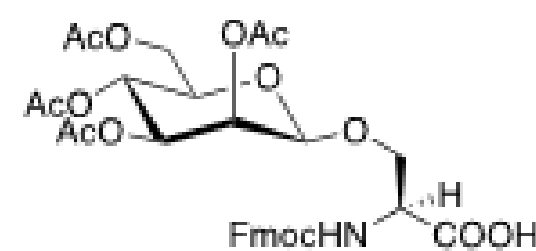


$C_{33}H_{37}NO_{14}$ ; MW: 671.65

CAS: 169219-08-3

Package: quote

## GA20300 Man-Ser

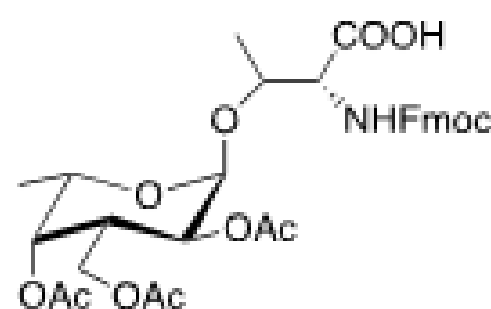


$C_{32}H_{35}NO_{14}$ ; MW: 657.63

CAS: 118358-80-8

Package: quote

## GA10405 Fuc-Thr

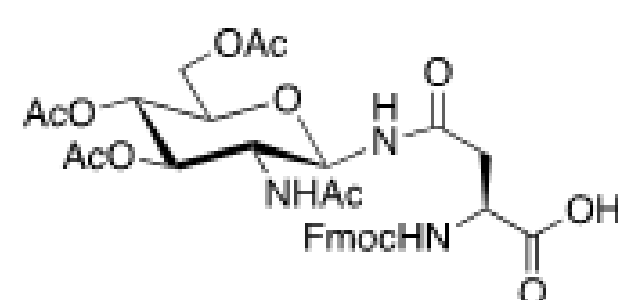


$C_{32}H_{37}NO_{12}$ ; MW: 627.64

CAS:

Package: quote

## GA30110 GlcNAc-Asn



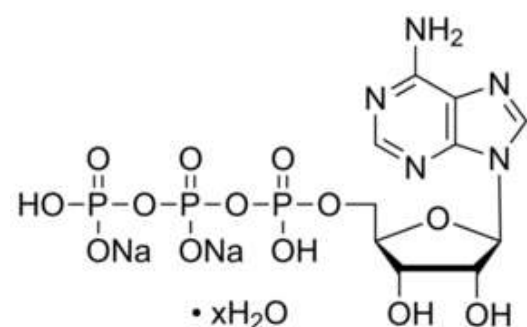
$C_{33}H_{37}N_3O_{13}$ ; MW: 683.67

CAS: 131287-39-3

Package: quote



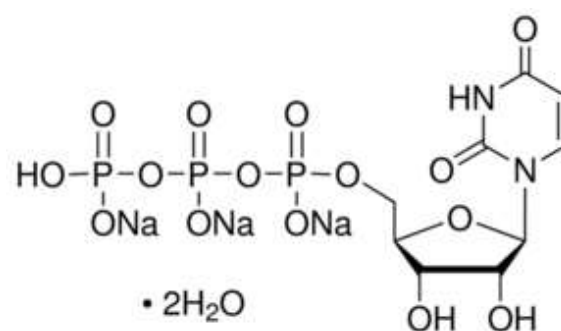
# Glyco-Related Chemicals

**GC03001 Adenosine 5'-triphosphate disodium salt hydrate; ATP**

$C_{10}H_{14}N_5Na_2O_{13}P_3$ ; MW: 551.14

CAS: 34369-07-8

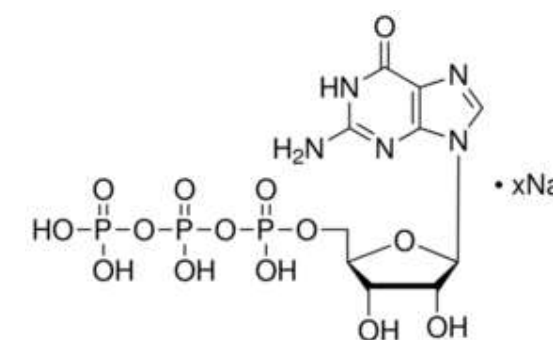
Package: 5 g, 25 g, 50 g

**GC03002 Uridine 5'-triphosphate trisodium salt dihydrate; UTP**

$C_9H_{12}N_2Na_3O_{15}P_3$ ; MW: 586.12

CAS: 116295-90-0

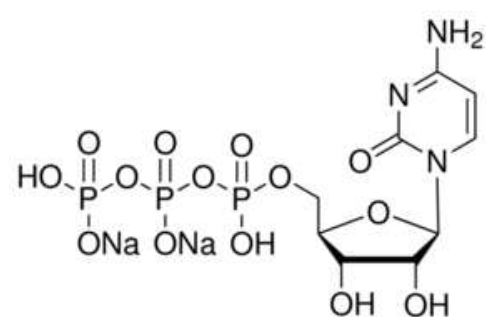
Package: 1 g, 5 g, 10 g

**GC03003 Guanosine 5'-triphosphate sodium salt hydrate; GTP**

$C_{10}H_{16}N_5Na_xO_{14}P_3$ ; MW: 523.18

CAS: 36051-31-7

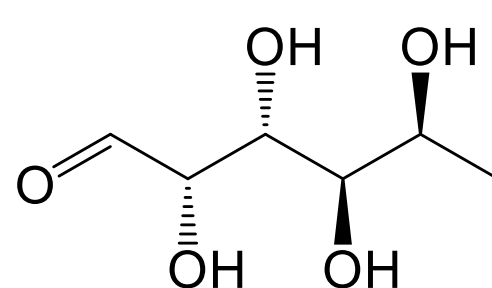
Package: 1 g, 5 g, 10 g

**GC03004 Cytidine 5'-triphosphate disodium salt ; CTP**

$C_9H_{14}N_3Na_2O_{14}P_3$ ; MW: 527.12

CAS: 36051-68-0

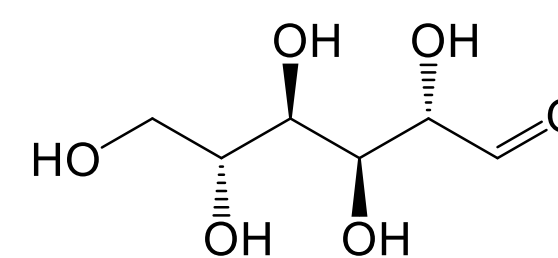
Package: 1 g, 5 g, 10 g

**GC03005 L-fucose**

$C_6H_{12}O_5$ ; MW: 164.16

CAS: 2438-80-4

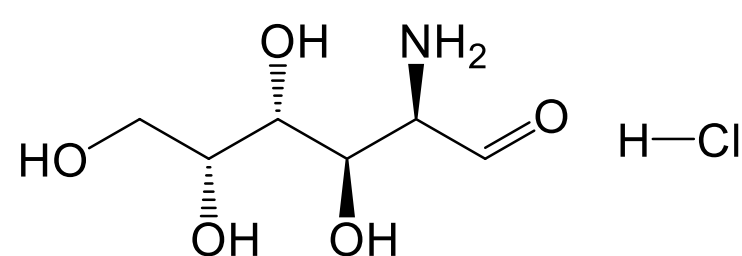
Package: 5 g, 25 g, 50 g

**GC03006 D-mannose**

$C_6H_{12}O_6$ ; MW: 180.16

CAS: 3458-28-4

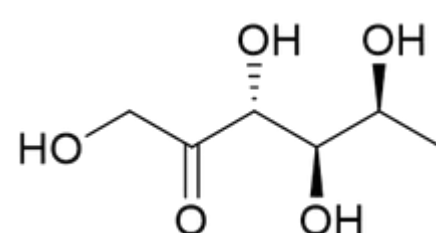
Package: 25 g, 50 g, 100 g

**GC03007 D-galactosamine HCl**

$C_6H_{13}NO_5 \cdot HCl$ ; MW: 215.63

CAS: 1772-03-8

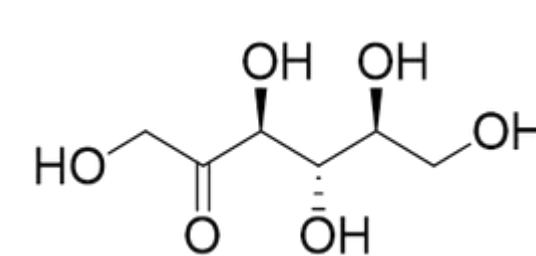
Package: 25 g, 50 g, 100 g

**GC03008 L-fuculose**

$C_6H_{12}O_5$ ; MW: 164.165

CAS: 13074-08-3

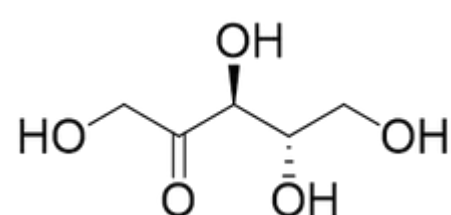
Package: 10 mg, 50 mg, 500 mg

**GC03009 L-psicose**

$C_6H_{12}O_6$  MW: 180.16

CAS: 16354-64-6

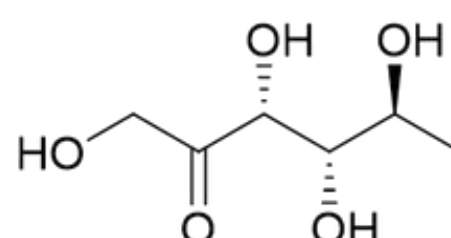
Package: 50 mg, 100mg, 500 mg

**GC03010 L-ribulose**

$C_5H_{10}O_5$  MW: 150.13

CAS: 2042-27-5

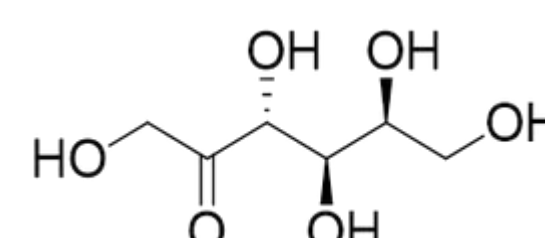
Package: 100 mg, 500 mg, 1000 mg

**GC03011 L-rhamnulose**

$C_5H_{10}O_5$ ; MW: 164.16

CAS: 87-96-7

Package: 10 mg, 50 mg, 100 mg

**GC03012 L-tagatose**

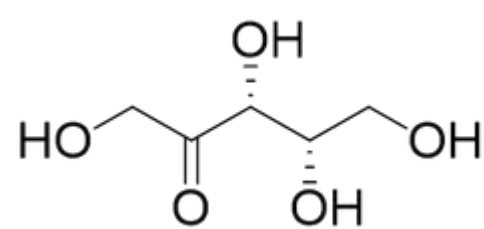
$C_6H_{12}O_6$ ; MW: 180.16

CAS: 17598-82-2

Package: 50 mg, 100 mg, 1000 mg



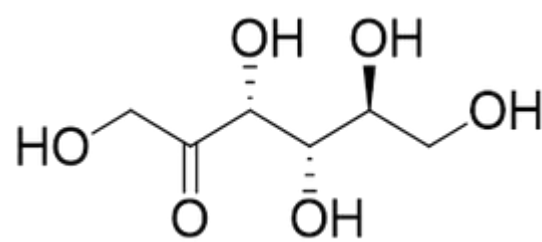
## GC03013 L-xylulose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW:150.13

CAS: 527-50-4

Package: 25 mg, 100 mg, 500 mg

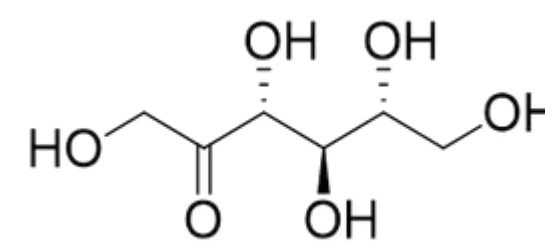
## GC03014 L-fructose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 180.16

CAS: 7776-48-9

Package: 300 mg, 500 mg, 1000 mg

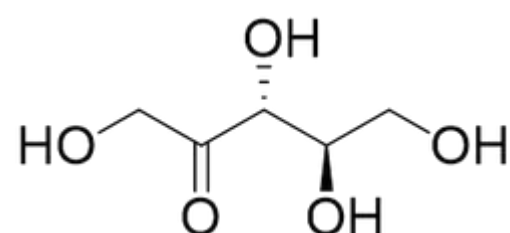
## GC03015 D-psicose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 180.16

CAS: 551-68-8

Package: 100 mg, 500 mg, 1000 mg

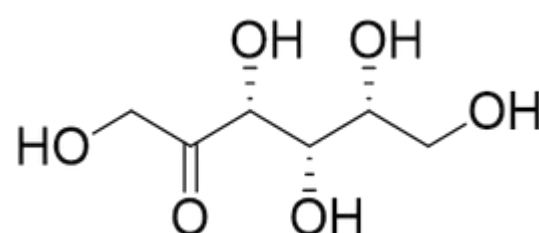
## GC03016 D-ribulose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW: 150.13

CAS: 488-84-6

Package: 100 mg, 250 mg, 500 mg

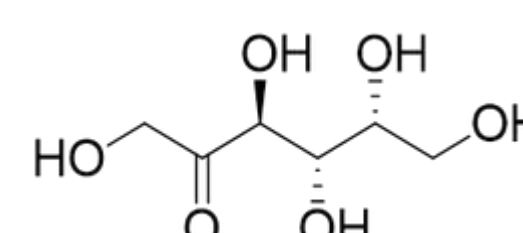
## GC03017 D-sorbose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 180.16

CAS: 3615-56-3

Package: 100 mg, 500 mg, 50 mg

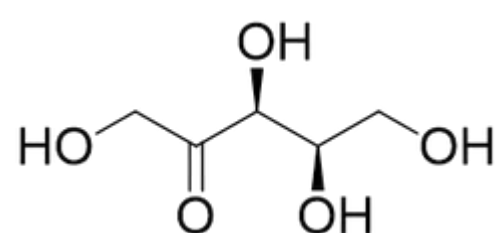
## GC03018 D-tagatose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 180.16

CAS: 87-81-0

Package: 100 mg, 500 mg, 1000 mg

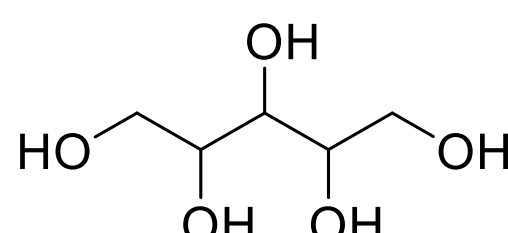
## GC03019 D-xylulose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW: 150.13

CAS: 551-84-8

Package: 100 mg, 250 mg, 1000 mg

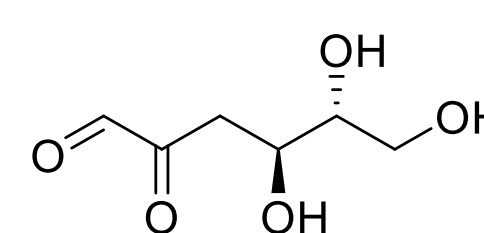
## GC03020 D-arabinitol

C<sub>6</sub>H<sub>12</sub>O<sub>5</sub>; MW: 152.14

CAS: 488-82-4

Package: 10 mg, 50 mg, 500 mg

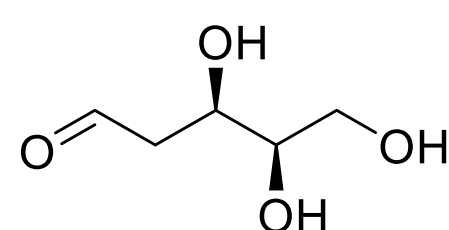
## GC03021 3-deoxy-D-glucosone

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> MW: 180.16

CAS: 4084-47-9

Package: 50 mg, 100mg, 500 mg

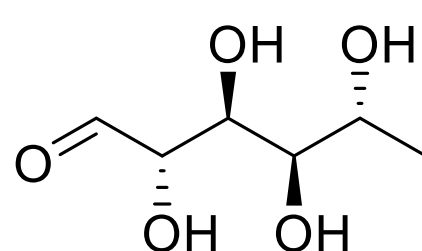
## GC03022 2-deoxy-D-xylose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub> MW: 134.13

CAS: 5284-18-4

Package: 100 mg, 500 mg, 1000 mg

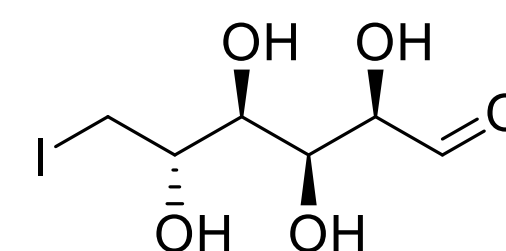
## GC03023 D-rhamnose

C<sub>6</sub>H<sub>12</sub>O<sub>5</sub>; MW: 164.16

CAS: 634-74-2

Package: 10 mg, 50 mg, 100 mg

## GC03024 6-iodo-6-deoxy-D-glucose

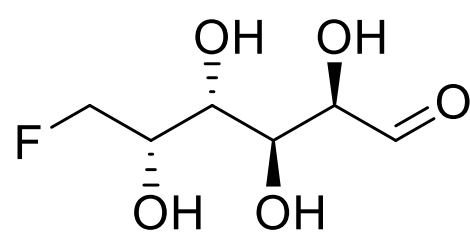
C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 180.16

CAS: 6304-86-5

Package: 50 mg, 100 mg, 1000 mg



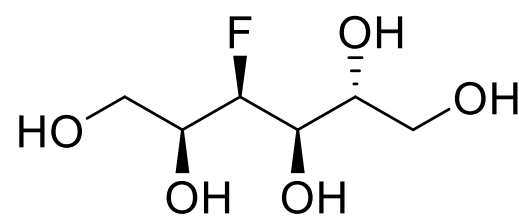
## GC03025 6-fluoro-6-deoxy-D-galactose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW:182.15

CAS: 4536-07-6

Package: 25 mg, 100 mg, 500 mg

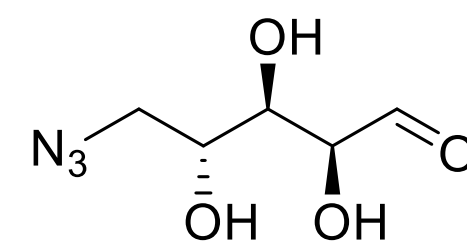
## GC03026 3-fluoro-3-deoxy-D-glucitol

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 184.16

CAS: 34339-82-7

Package: 300 mg, 500 mg, 1000 mg

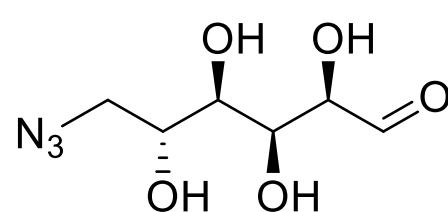
## GC03027 5-azido-5-deoxy-D-arabinose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 175.14

CAS: 161418-69-5

Package: 100 mg, 500 mg, 1000 mg

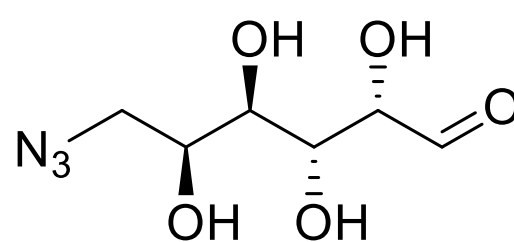
## GC03028 6-azido-6-deoxy-D-glucose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW: 205.17

CAS: 20847-05-6

Package: 100 mg, 250 mg, 500 mg

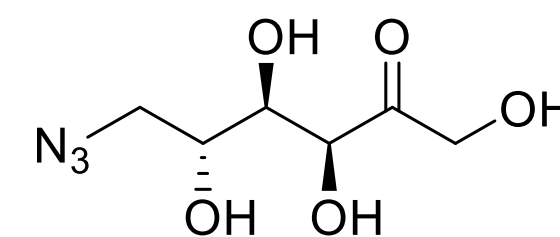
## GC03029 6-azido-6-deoxy-L-galactose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 205.17

CAS: 70932-63-7

Package: 100 mg, 500 mg, 50 mg

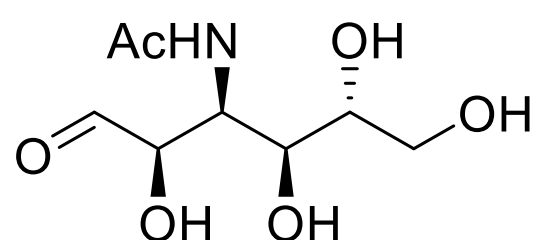
## GC03030 6-azido-6-deoxy-D-fructose

C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>; MW: 205.17

CAS: 115827-10-6

Package: 100 mg, 500 mg, 1000 mg

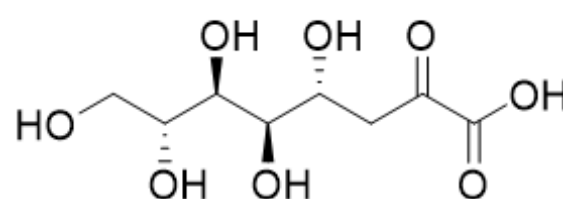
## GC03031 3-acetylamino-3-deoxy-D-glucose

C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>; MW: 221.21

CAS: 606-01-9

Package: 100 mg, 250 mg, 1000 mg

## GC03032 KDO; 3-Deoxy-D-manno-oct-2-ulosonic acid

C<sub>8</sub>H<sub>14</sub>O<sub>8</sub>; MW: 238.19

CAS: 10149-14-1

Package: 100 mg, 500 mg, 1000 mg

# N-Glycans, Mucopolysaccharides, HMO's, Glycolipids, Tandem Epitopes, and F-series

## N-Glycans

Asparagine (N)-linked glycan synthesis begins on the ER membrane and ends in the Golgi apparatus. Maturation of the glycan and attachment to a protein occurs in the ER and is critical for protein folding, quality control and sorting. Additional organism-specific modifications occur in the Golgi, resulting in a variety of final glycan structures. N-glycans decorate the crystallizable region (Fc) of antibodies, and have been shown to modulate protein interactions in morphogenesis and stress signaling pathways. N-glycans are also important for self-recognition, which microorganisms exploit by appropriating host glycans to evade detection.

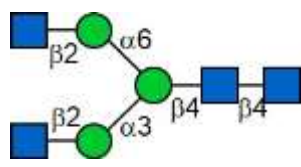
## Glycosphingolipids (GSLs)

A class of glycolipids represented by one or more glycosyl residues bound to a ceramide structure by a  $\beta$ -glycosidic linkage. The hydrophobic ceramide can serve as a membrane anchor while exposing hydrophilic glycans on cell surfaces. They are found in bacteria, fungi, plants and animals, and serve roles in cell-to-cell recognition and communication. Examples include galactocerebroside (i.e. cerebroside or GalCer) commonly found in brain tissue, and more complex globotriaosylceramides such as the Pk blood group antigen implicated in HIV susceptibility.

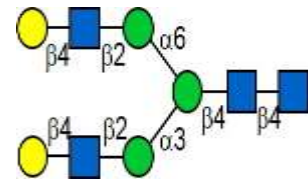
## Glycosaminoglycans (GAGs)

Linear, negatively charged polysaccharide molecules that consist of repeating disaccharide units. Individual monosaccharides may be sulfated, and include N-acetylhexosamine, uronic acid, and/or galactose. Most GAGs are bound to serine residues of proteins, forming proteoglycans via a conserved tetrasaccharide linkage of xylose-galactose-galactose-glucuronic acid. Hyaluronic acid is an exception, and this GAG is not covalently bound to core proteins or sulfated. GAGs mediate protein interactions, such as growth factors, cell adhesion molecules, and cytokines.

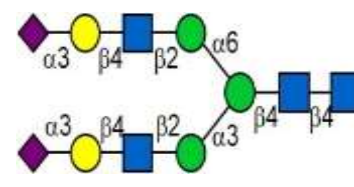
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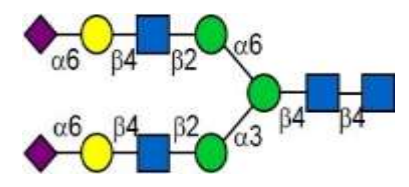
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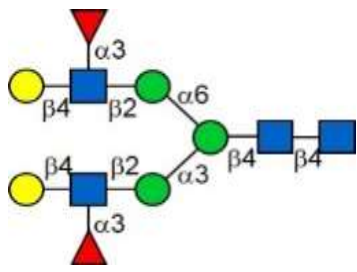
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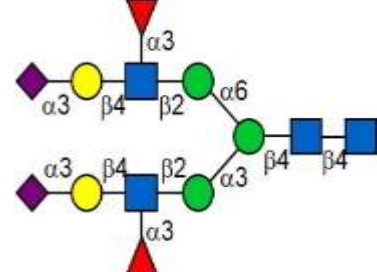
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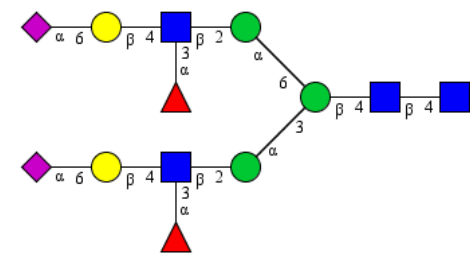
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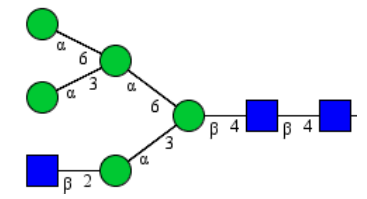
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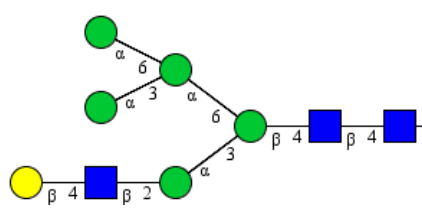
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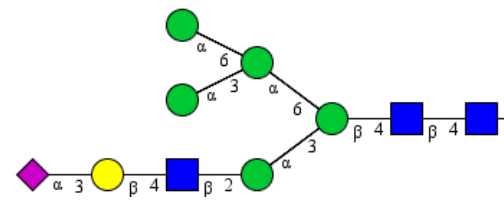
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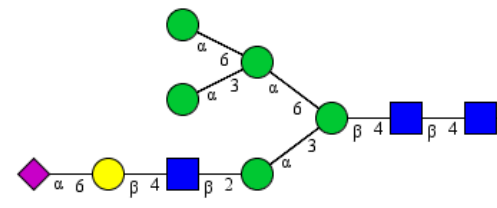
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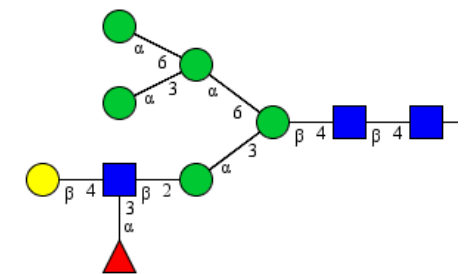
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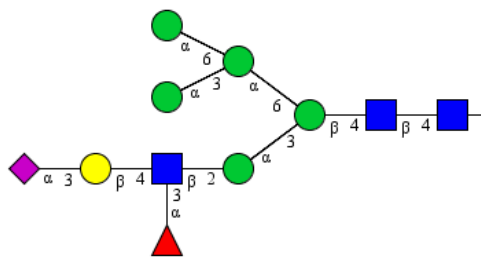
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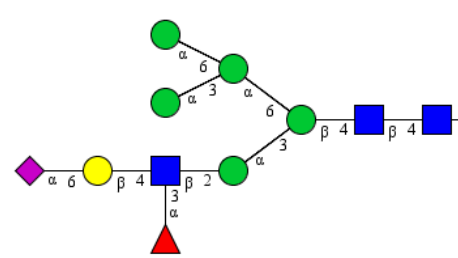
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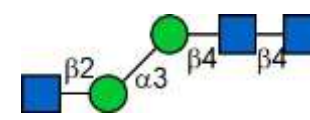
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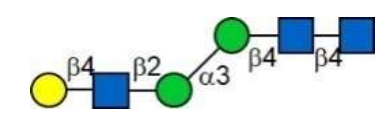
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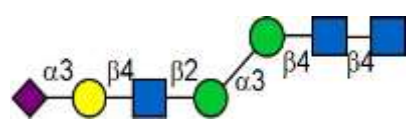
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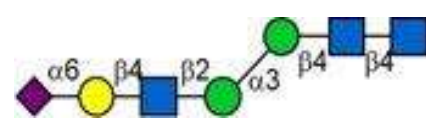
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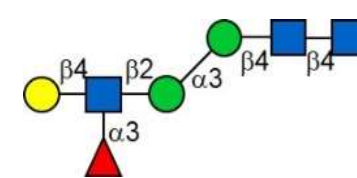
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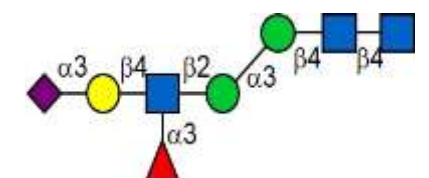
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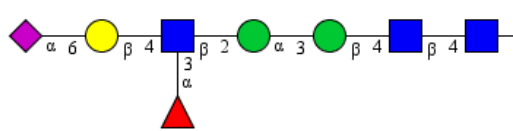
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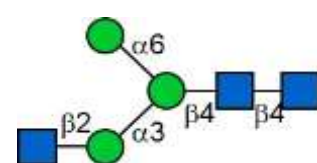
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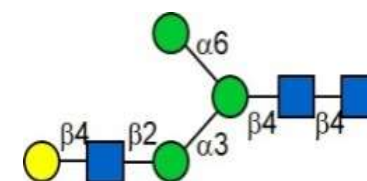
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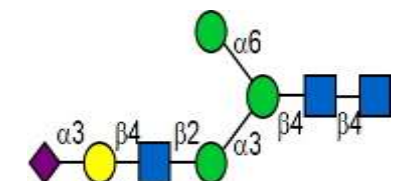
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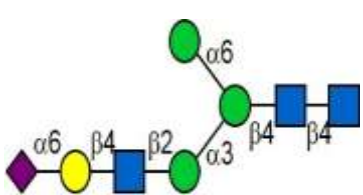
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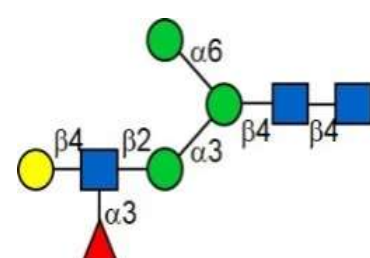
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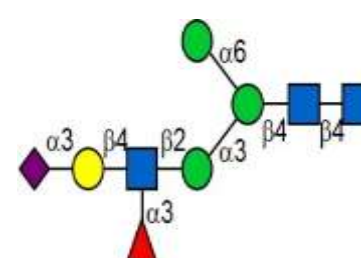
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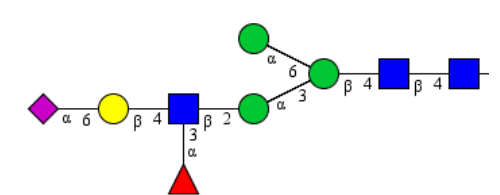
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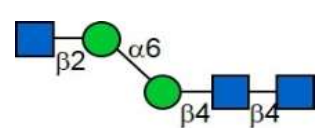
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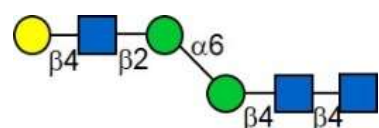
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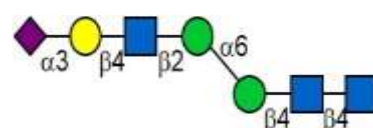
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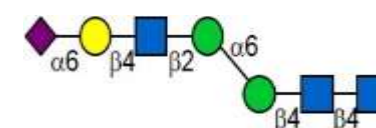
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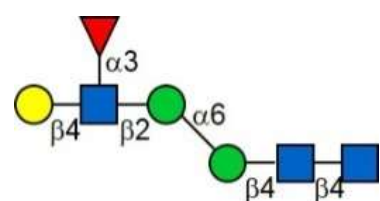
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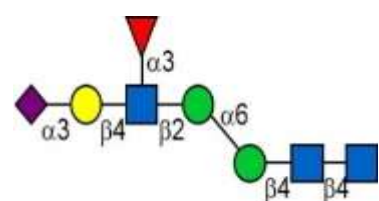
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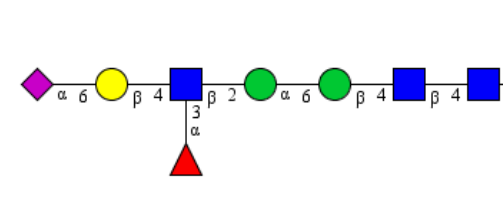
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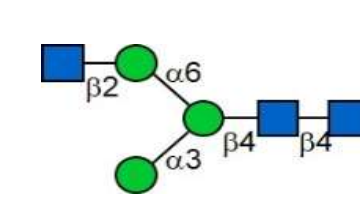
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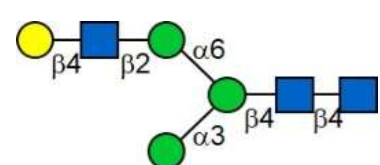
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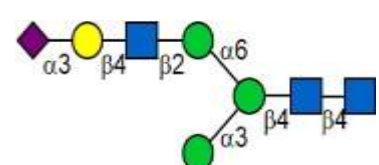
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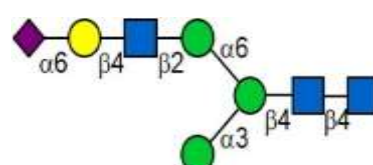
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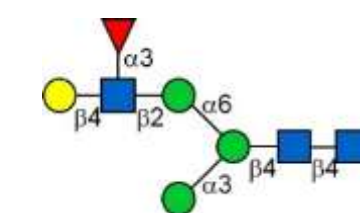
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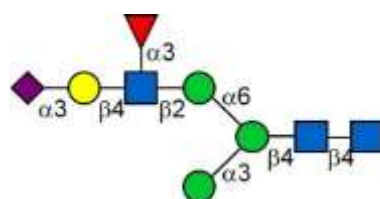
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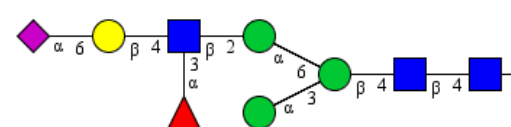
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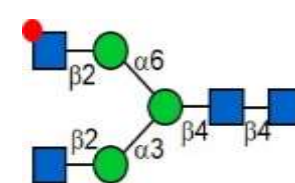
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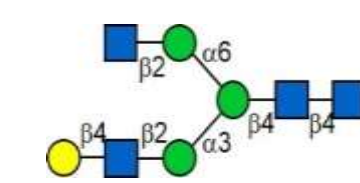
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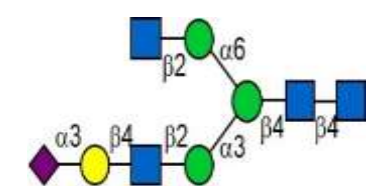
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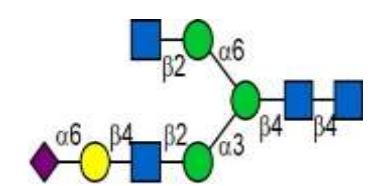
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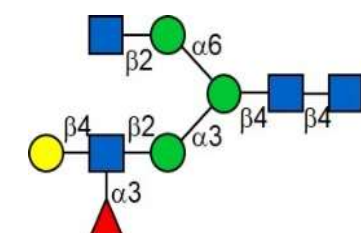
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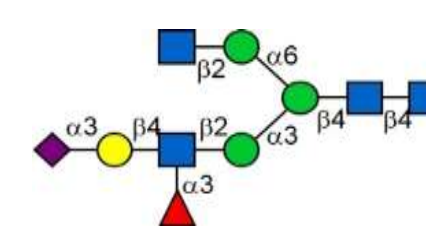
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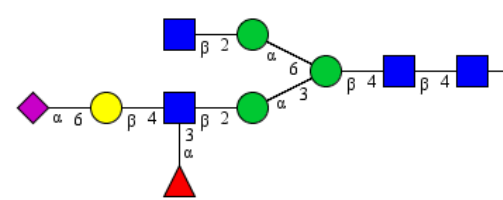
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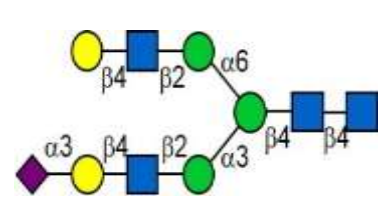
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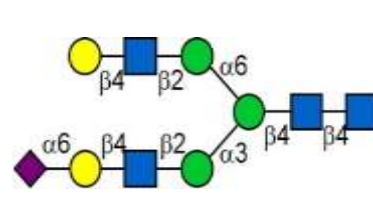
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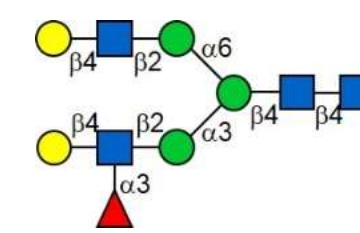
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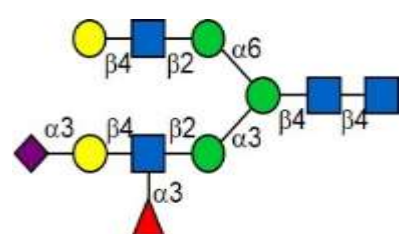
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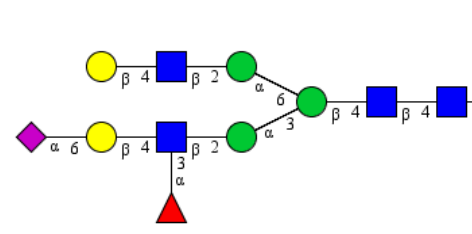
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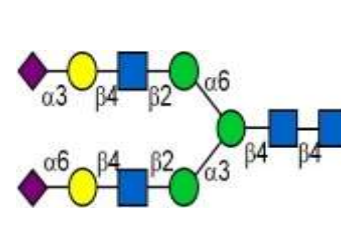
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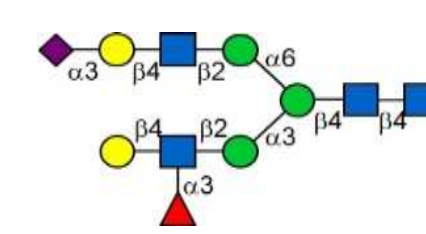
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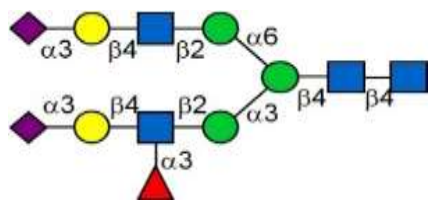
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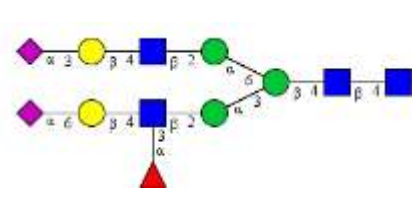
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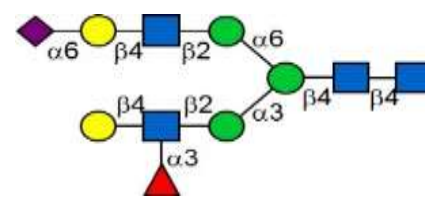
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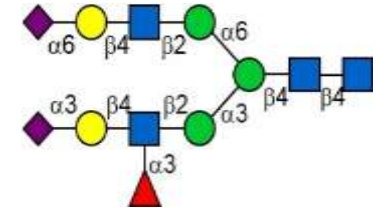
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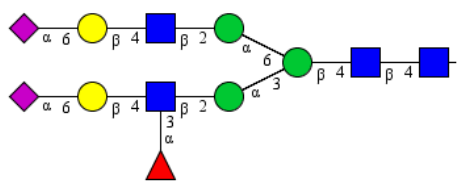
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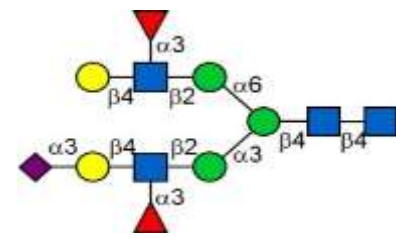
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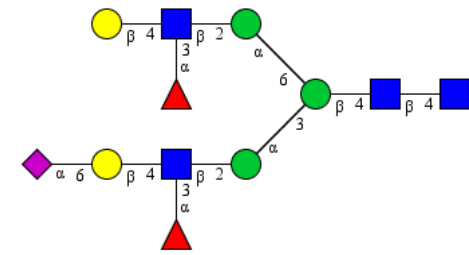
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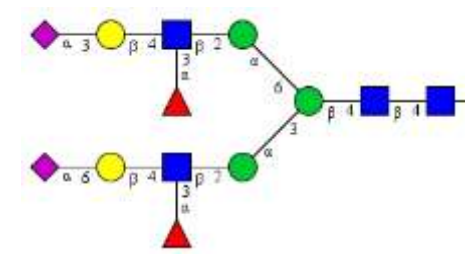
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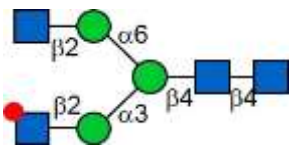
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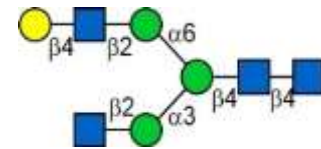
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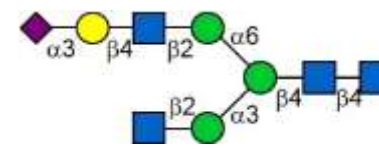
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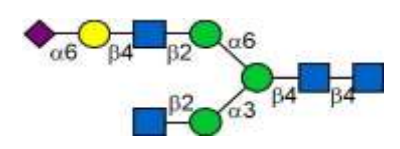
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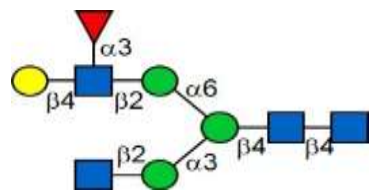
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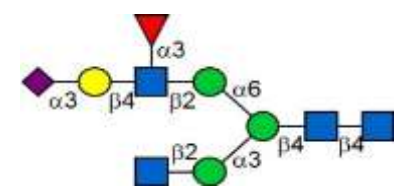
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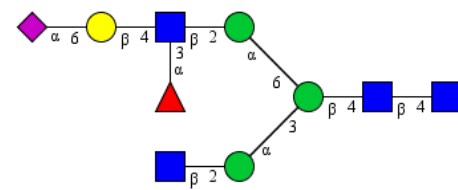
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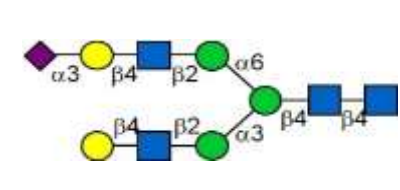
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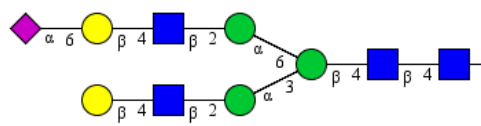
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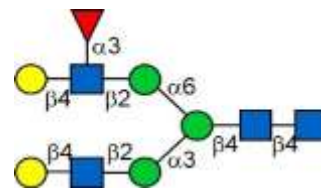
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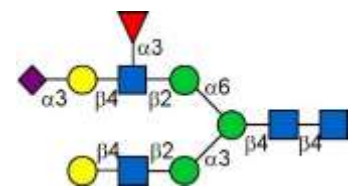
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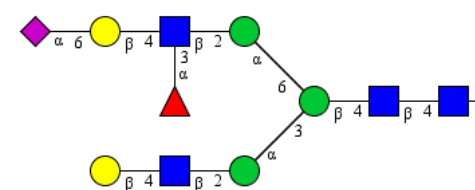
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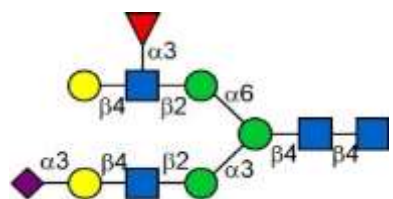
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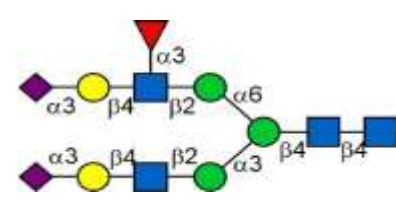
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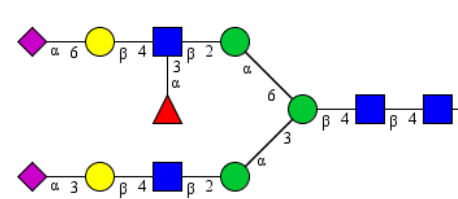
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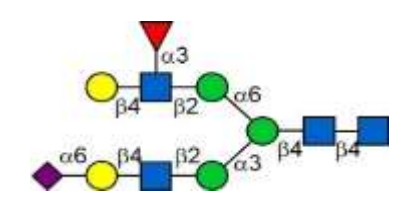
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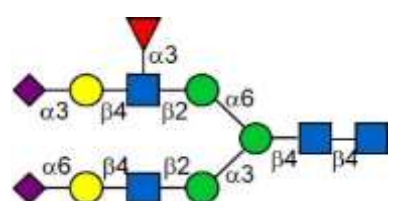
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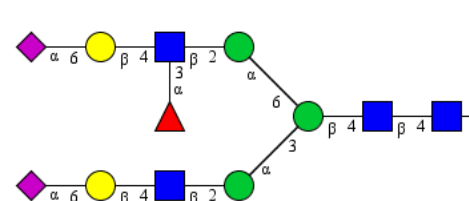
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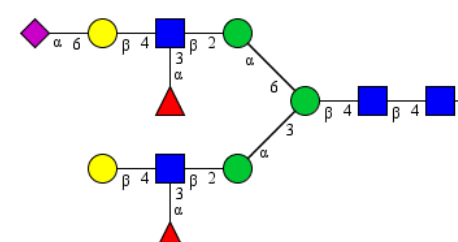
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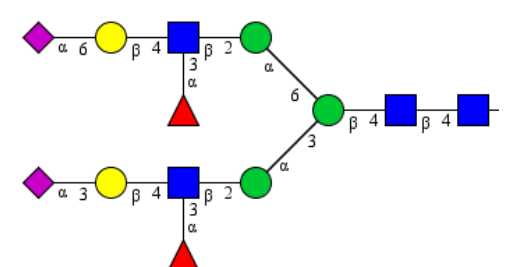
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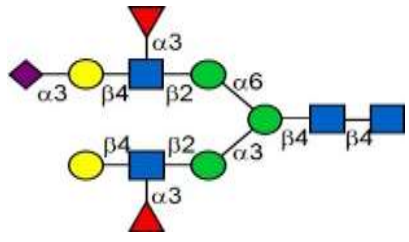
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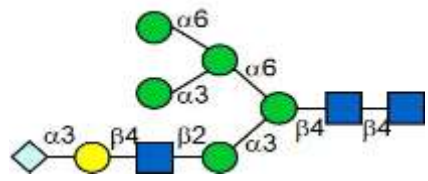




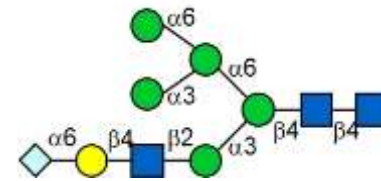
N255



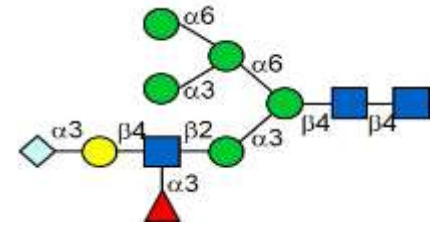
N012G



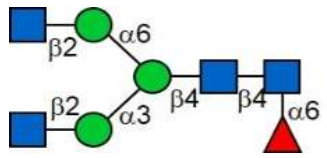
N013G



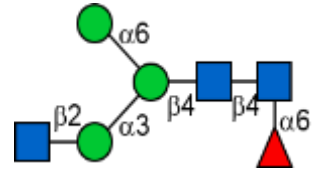
N015G



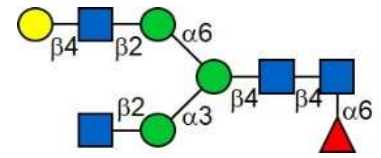
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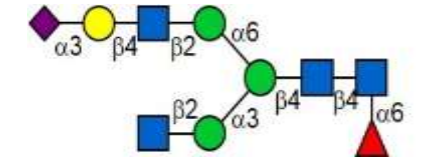
N6030



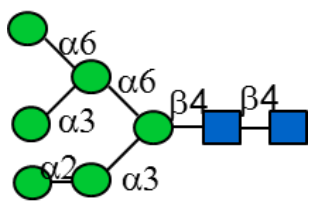
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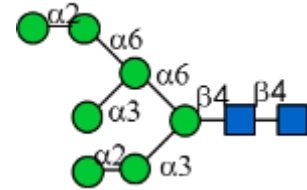
N6112



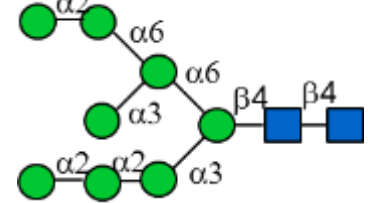
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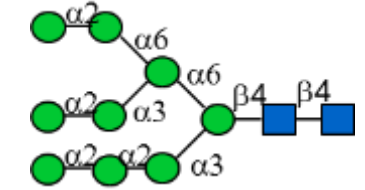
M7



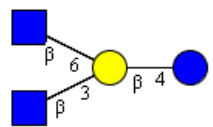
M8



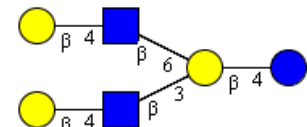
M9



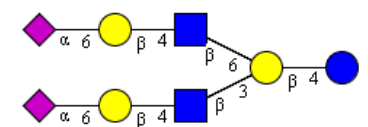
HMO1



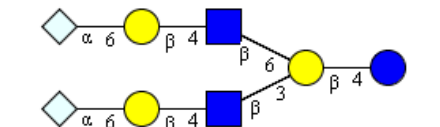
HMO2



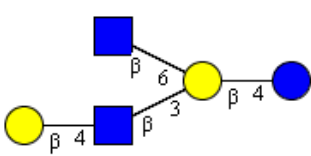
HMO3



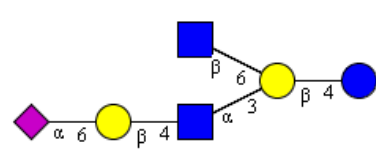
HMO4



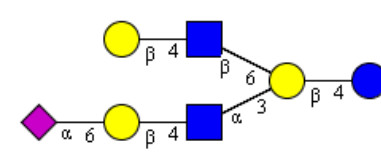
HMO5



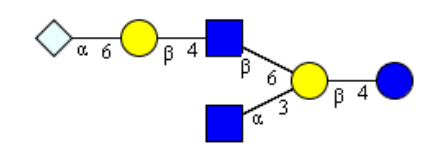
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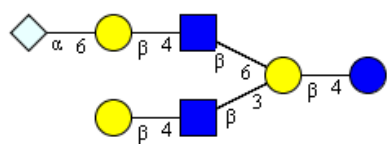
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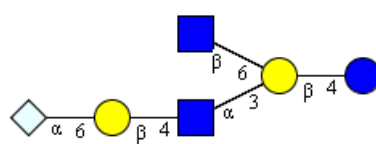
HMO8



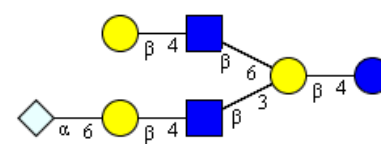
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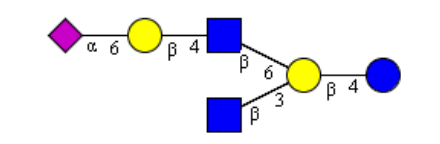
HMO10



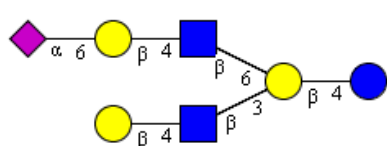
HMO11



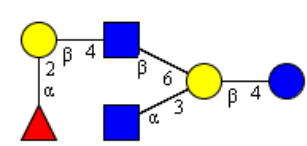
HMO12



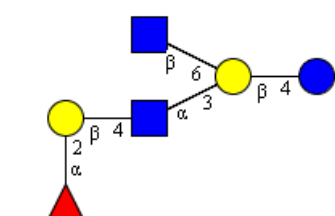
HMO13



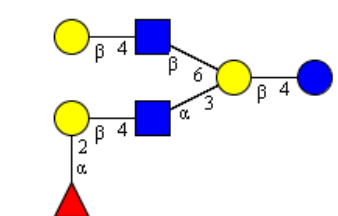
HMO14



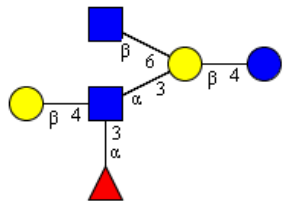
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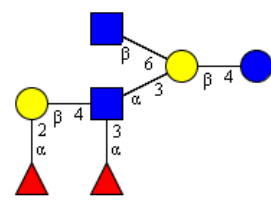
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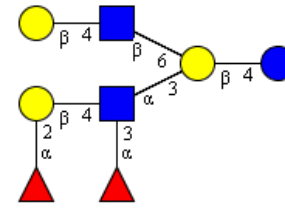
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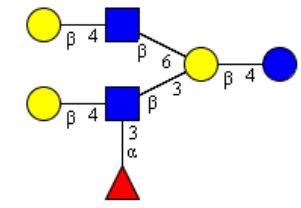
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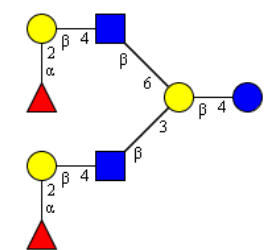
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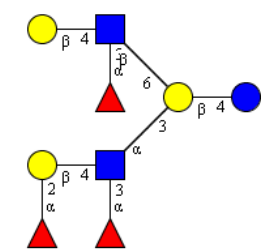
HMO20



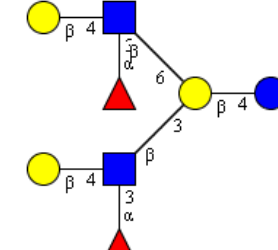
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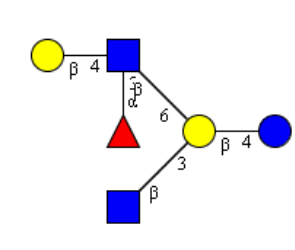
HMO22



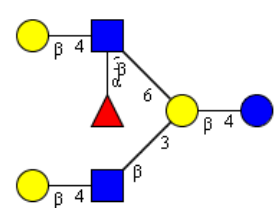
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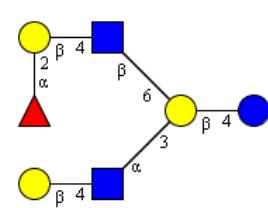
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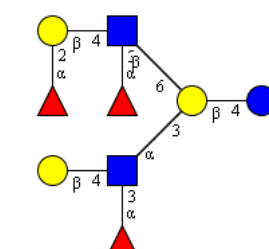
HMO25



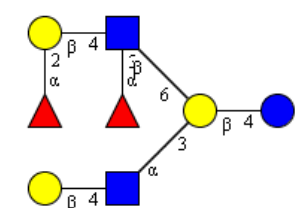
HMO26



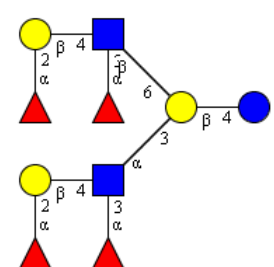
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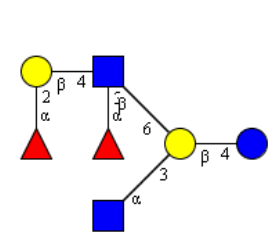
HMO28



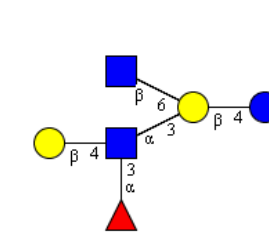
HMO29



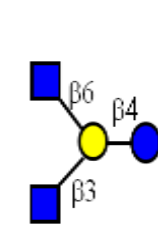
HMO30



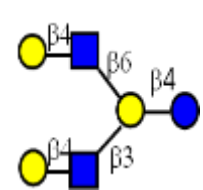
HMO31



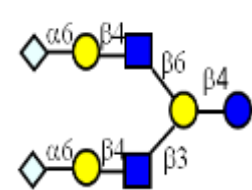
H0100



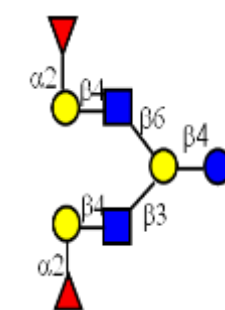
H0101



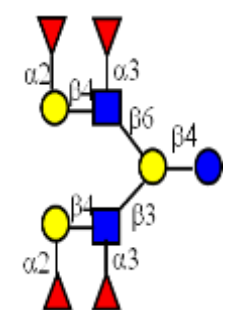
H0103



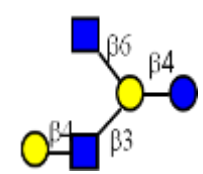
H0105



H0106



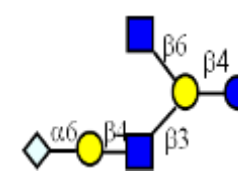
H0200



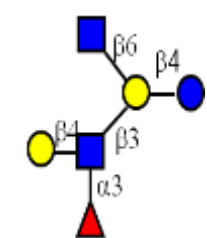
H0201



H0202



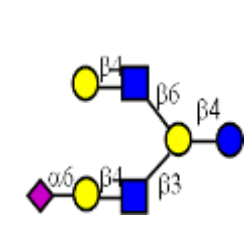
H0203



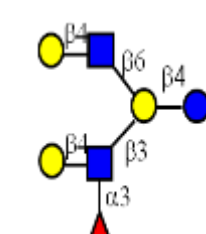
H0204



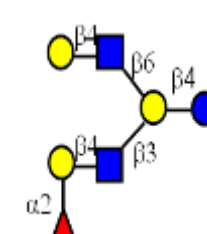
H0205



H0207



H0208

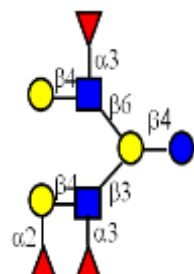




H0209



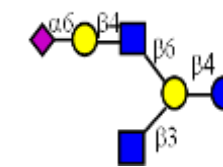
H0210



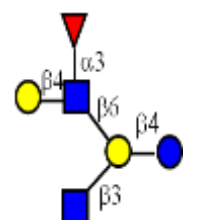
H0300



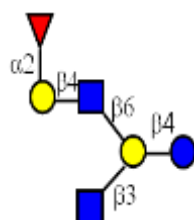
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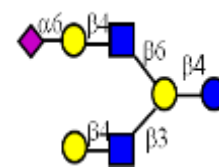
H0303



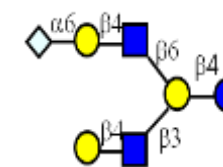
H0304



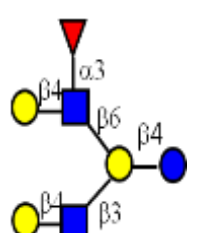
H0305



H0306



H0307



H0400



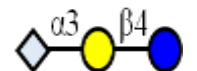
H0402



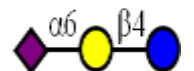
H0403



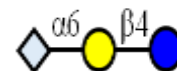
H0404



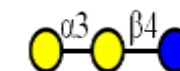
H0405



H0406



H0407



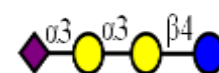
H0408



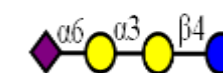
H0409



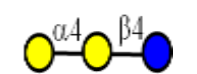
H0410



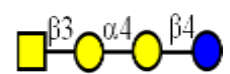
H0411



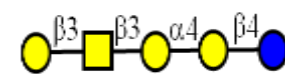
H0500



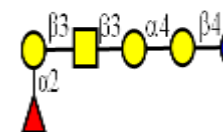
H0503



H0504



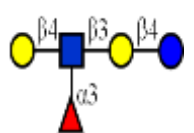
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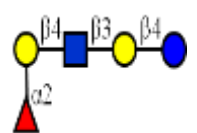
H0600



H0601



H0602

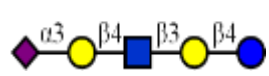


H0603





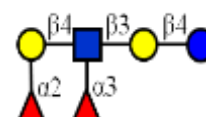
H0604



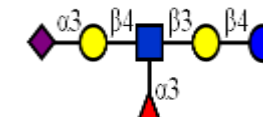
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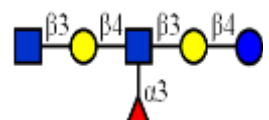
H0608



H0609



H0610



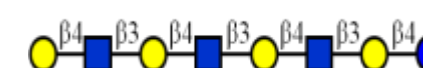
H0700



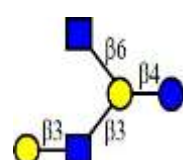
H0701



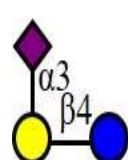
H0800



H0900



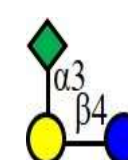
L1001



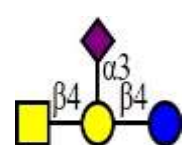
L1002



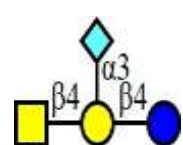
L1003



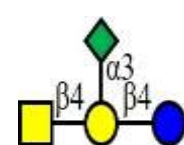
L1011



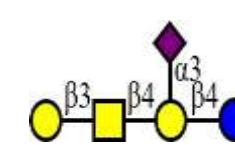
L1012



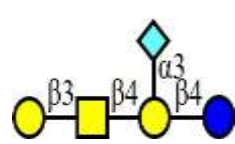
L1013



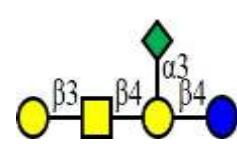
L1021



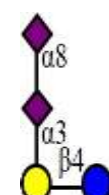
L1022



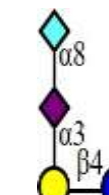
L1023



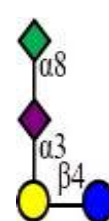
L1201



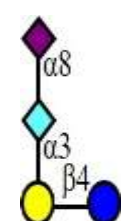
L1202



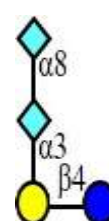
L1203



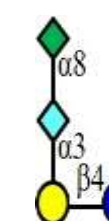
L1204



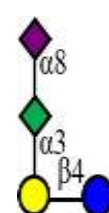
L1205



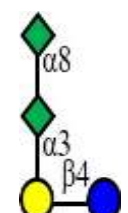
L1206



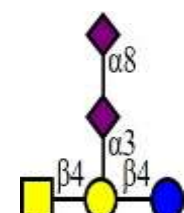
L1207



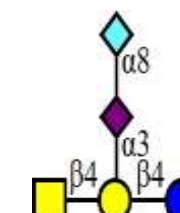
L1209



L1211

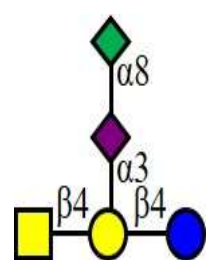


L1212

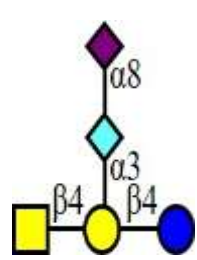




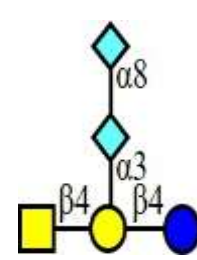
L1213



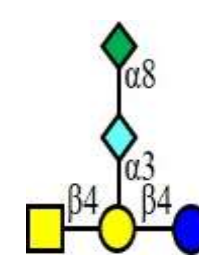
L1214



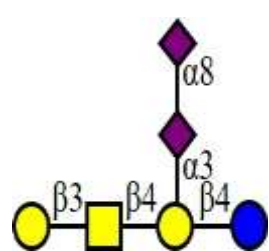
L1215



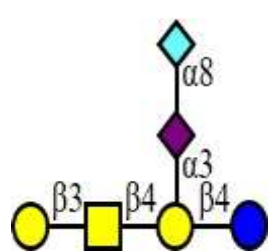
L1216



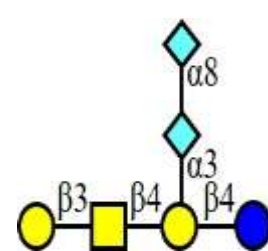
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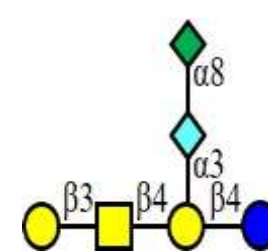
L1222



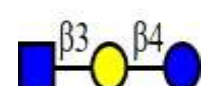
L1225



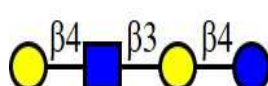
L1226



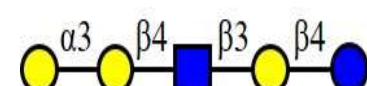
L2000



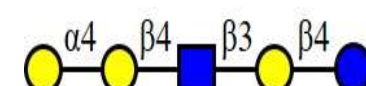
L2100



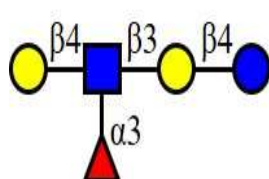
L2101



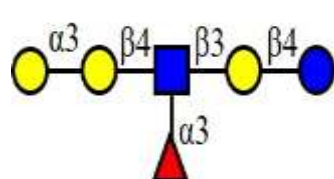
L2102



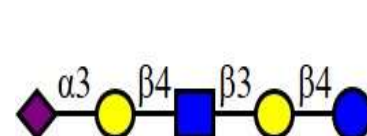
L2103



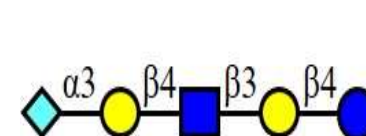
L2104



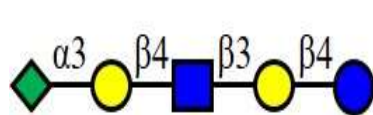
L2111



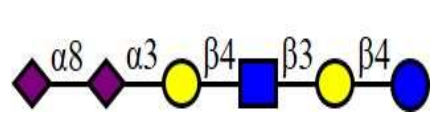
L2112



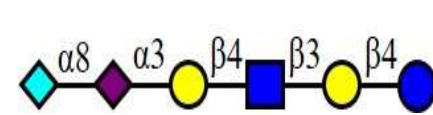
L2113



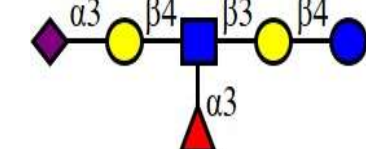
L2121



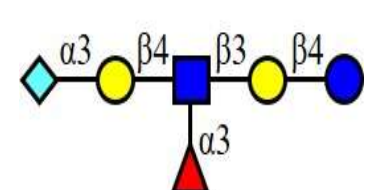
L2122



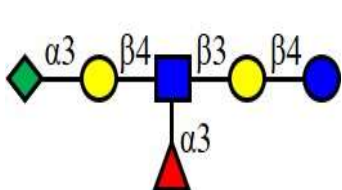
L2131



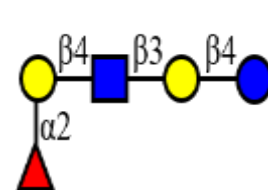
L2132



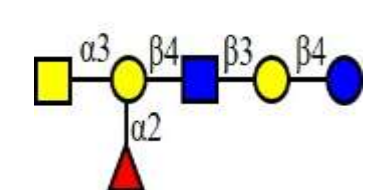
L2133



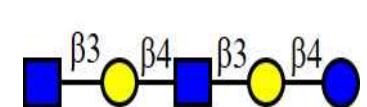
L2191



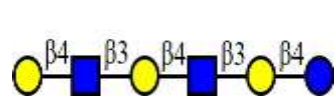
L2192



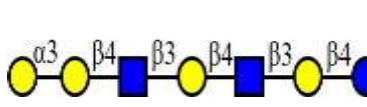
L2200



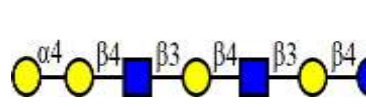
L2300



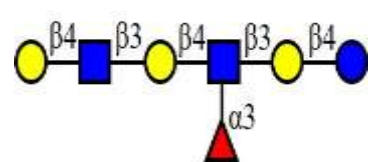
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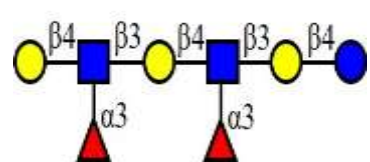
L2302



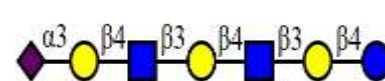
L2303



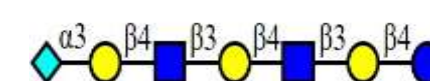
L2304



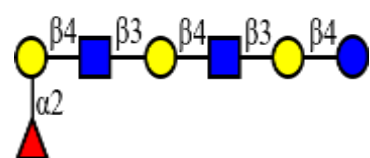
L2311



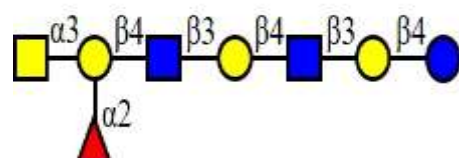
L2312



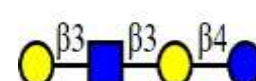
L2391



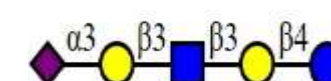
L2392



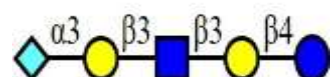
L2900



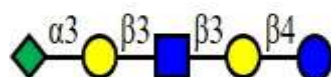
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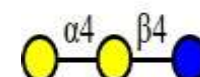
L2912



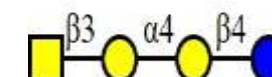
L2913



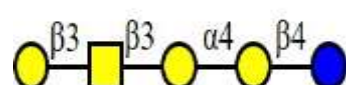
L3100



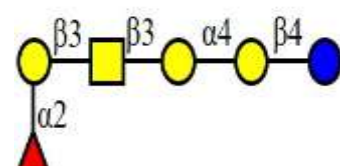
L3101



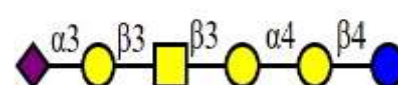
L3102



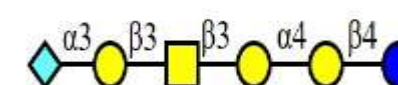
L3103



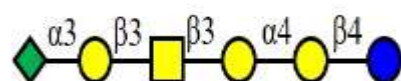
L3111



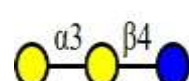
L3112



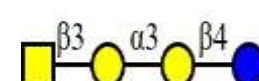
L3113



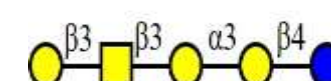
L3200



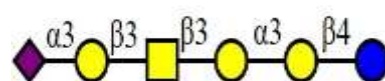
L3201



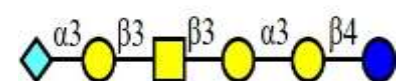
L3202



L3211



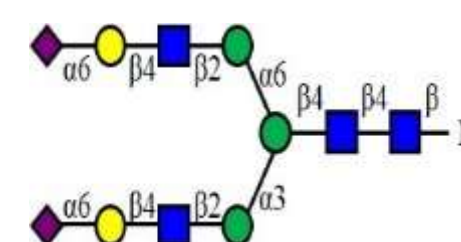
L3212



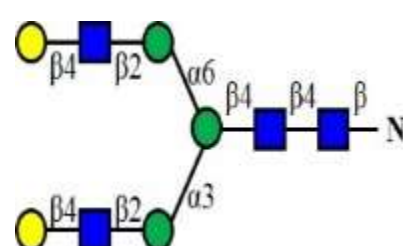
L3213



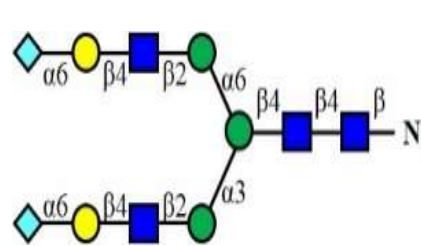
TE001



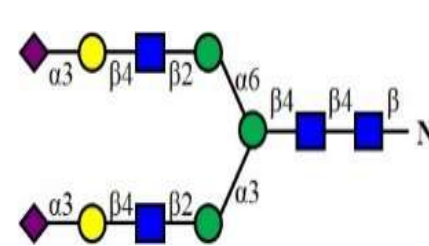
TE002



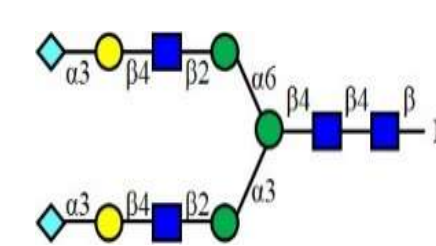
TE003



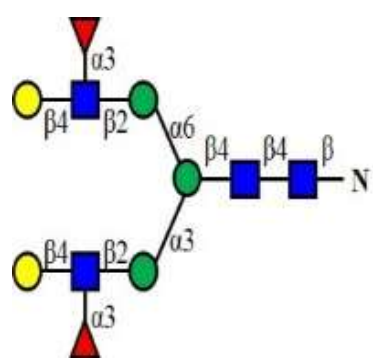
TE004



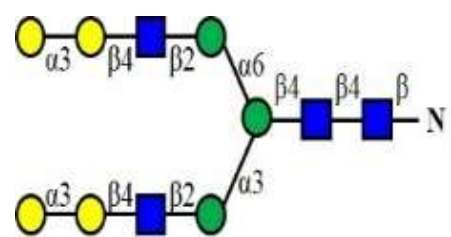
TE005



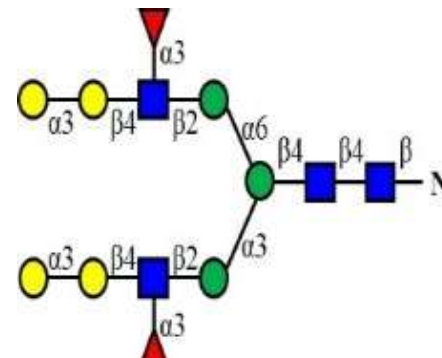
TE006



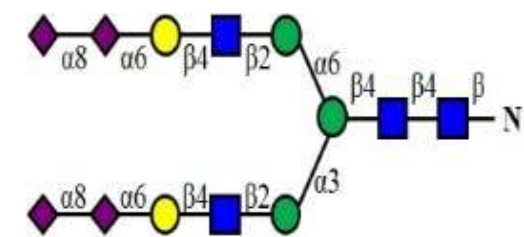
TE007



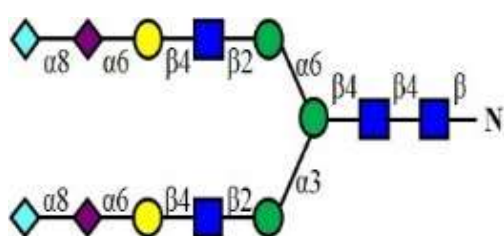
TE008



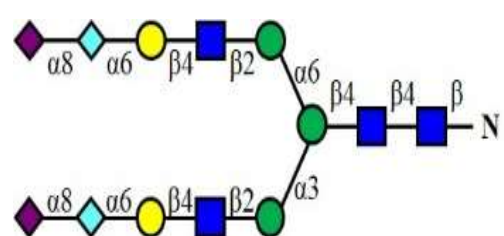
TE009



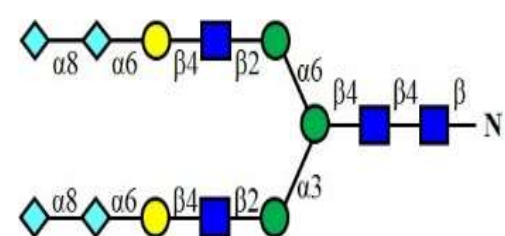
TE010



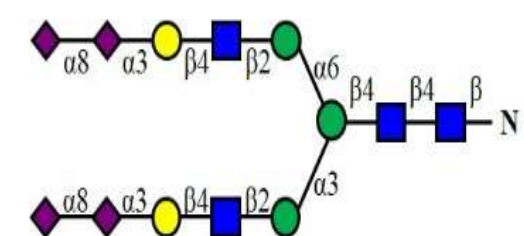
TE011



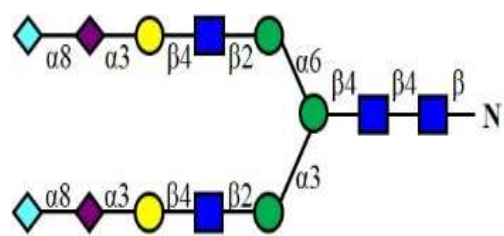
TE012



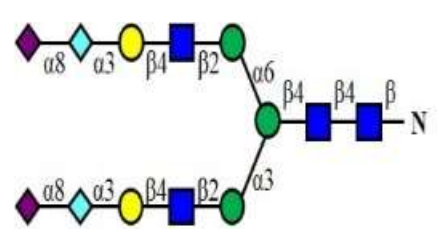
TE013



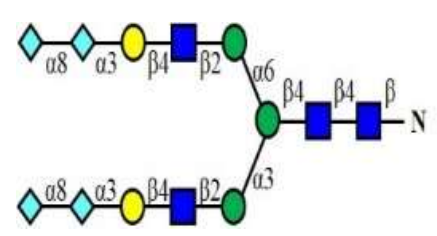
TE014



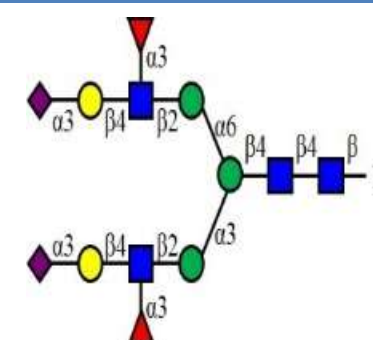
TE015



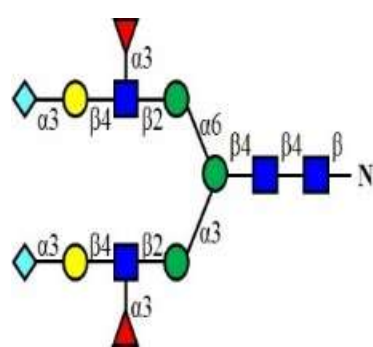
TE016



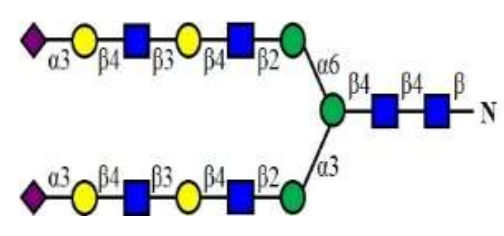
TE017



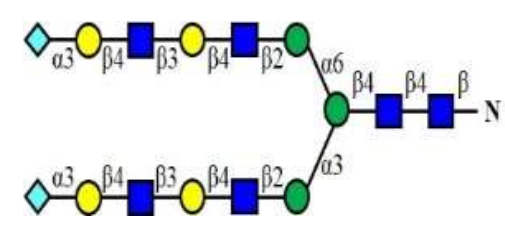
TE018



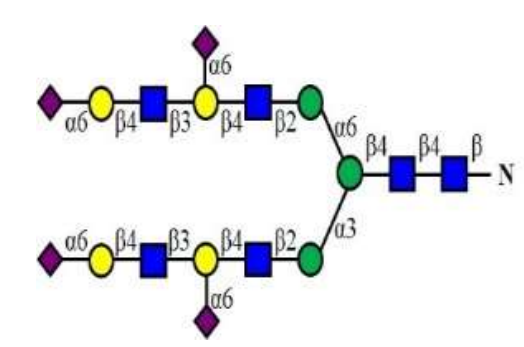
TE019



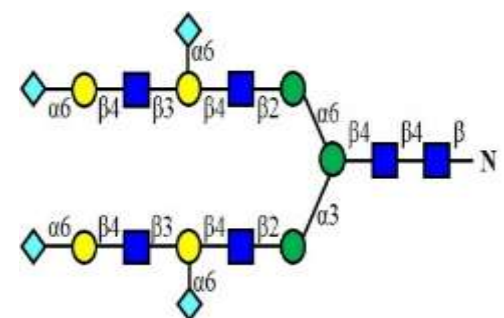
TE020



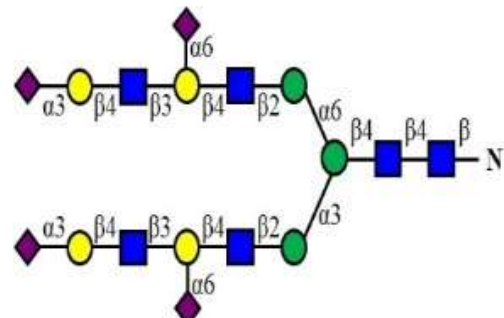
TE021



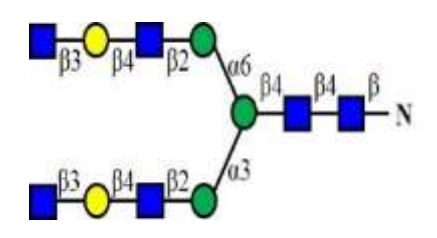
TE022



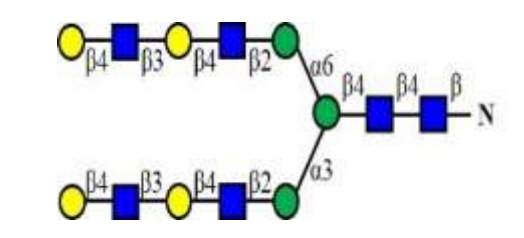
TE023



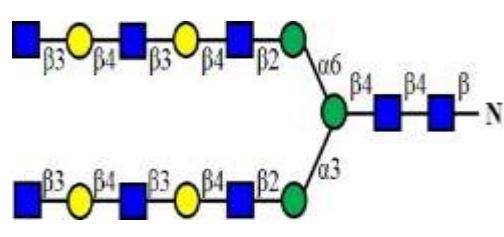
TE024



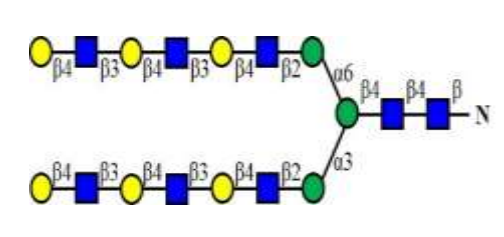
TE025



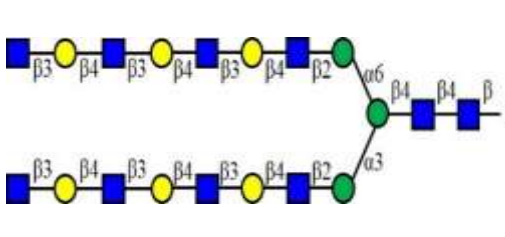
TE026



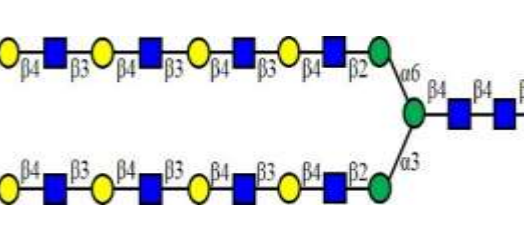
TE027



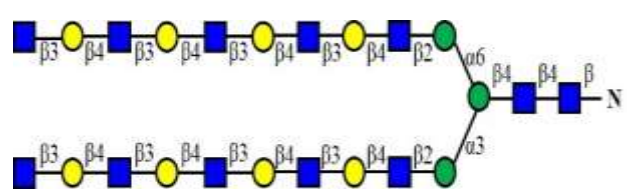
TE028



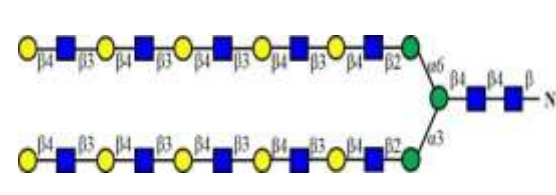
TE029



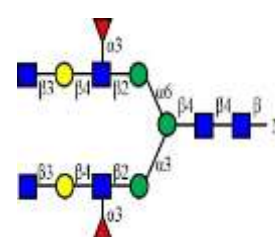
TE030



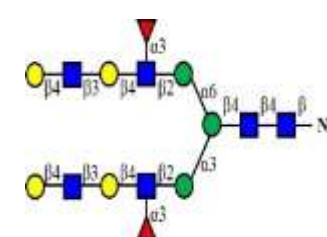
TE031



TE032

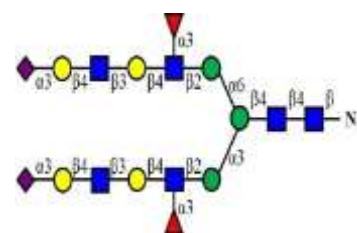


TE033

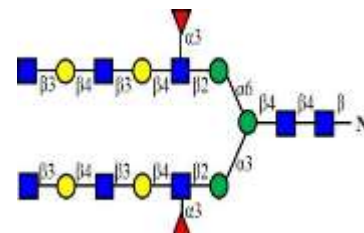




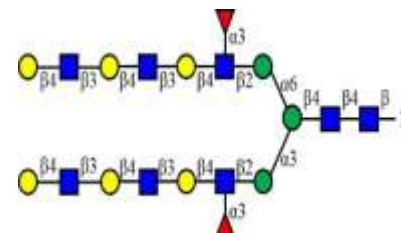
TE034



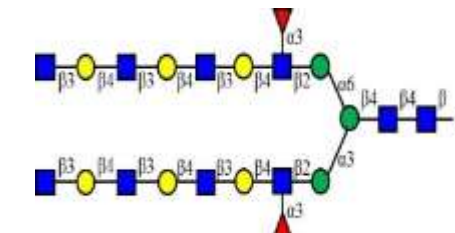
TE035



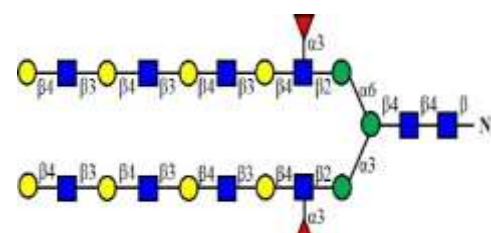
TE036



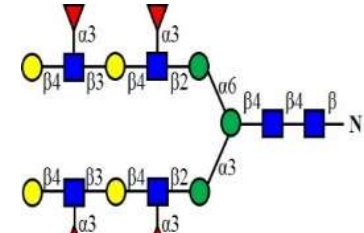
TE037



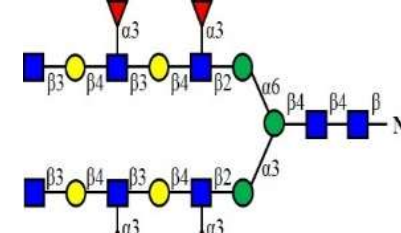
TE038



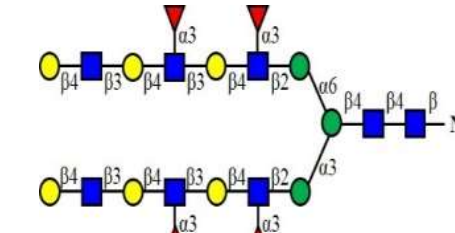
TE039



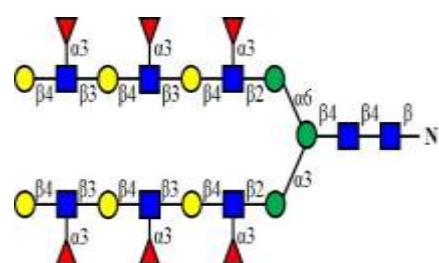
TE040



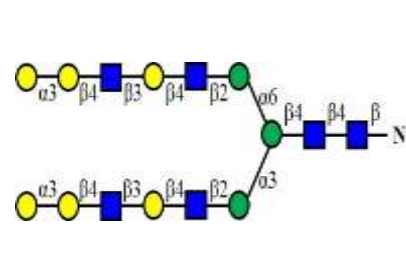
TE041



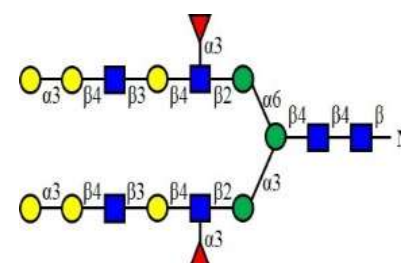
TE042



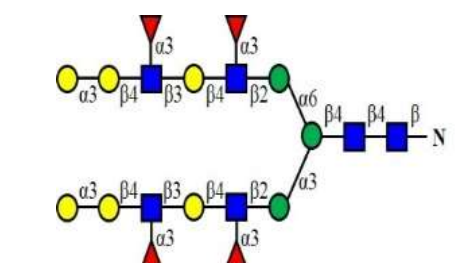
TE043



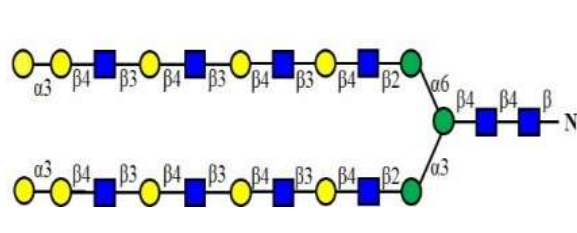
TE044



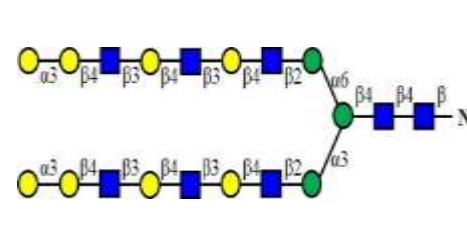
TE045



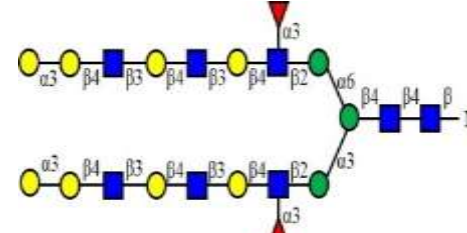
TE046



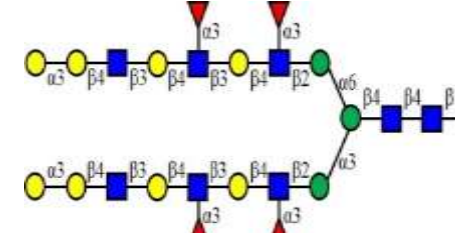
TE047



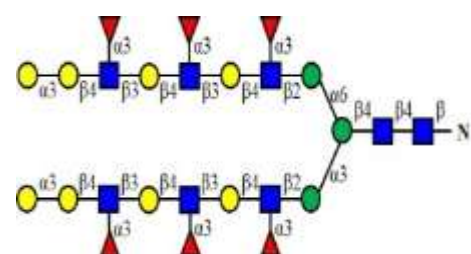
TE048



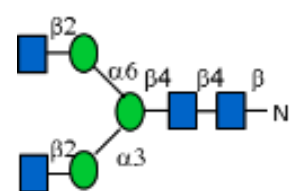
TE049



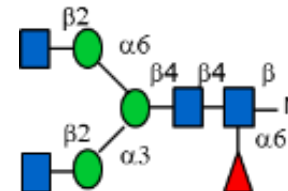
TE050



TE051



TE052



TE053



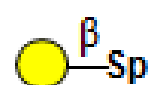




F01  $\beta$ -Glc-Sp



F02  $\beta$ -Gal-Sp



F03  $\alpha$ -Man-Sp



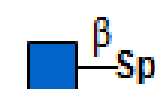
F04  $\alpha$ -L-Fuc-Sp



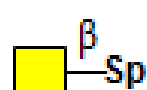
F05  $\alpha$ -L-Rham-Sp



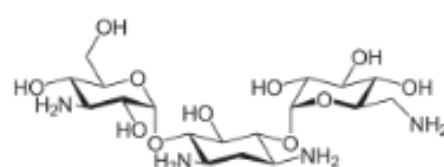
F06  $\beta$ -GlcNAc-Sp



F07  $\beta$ -GalNAc-Sp



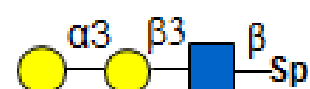
F08 Tobramycin



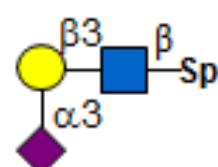
F09 Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



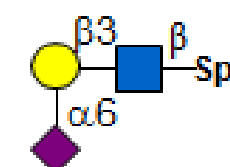
F10 Gal- $\alpha$ 1,3-Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



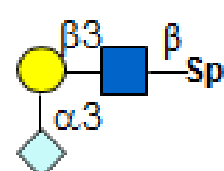
F11 Neu5Ac- $\alpha$ 2,3-Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



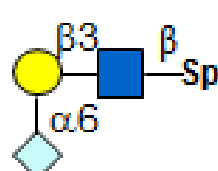
F12 Neu5Ac- $\alpha$ 2,6-Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



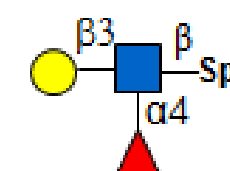
F13 Neu5Gc- $\alpha$ 2,3-Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



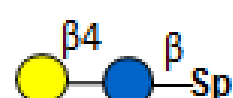
F14 Neu5Gc- $\alpha$ 2,6-Gal- $\beta$ 1,3-GlcNAc- $\beta$ -Sp



F15 Gal- $\beta$ 1,3-(Fuc- $\alpha$ 1,4)-GlcNAc- $\beta$ -Sp



F16 Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



F17 Gal- $\alpha$ 1,3-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



F18 Gal- $\alpha$ 1,4-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



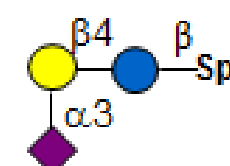
F19 GlcNAc- $\beta$ 1,3-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



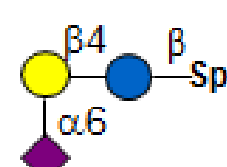
F20 GalNAc- $\beta$ 1,3-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



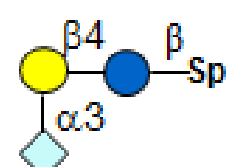
F21 Neu5Ac- $\alpha$ 2,3-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



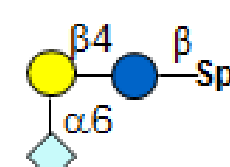
F22 Neu5Ac- $\alpha$ 2,6-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp



F23 Neu5Gc- $\alpha$ 2,3-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp

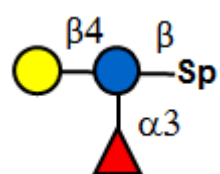


F24 Neu5Ac- $\alpha$ 2,6-Gal- $\beta$ 1,4-Glc- $\beta$ -Sp

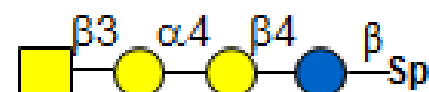




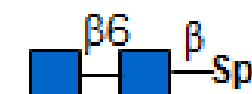
F25 Gal-β1,4-(Fuc-α1,3)-Glc-β-Sp



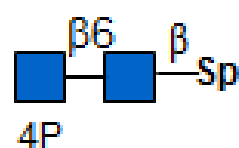
F26 GalNAc-β1,3-Gal-α1,4-Gal-β1,4-Glc-β-Sp



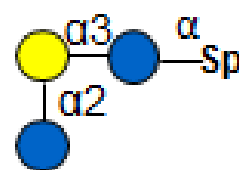
F27 GlcNAc-β1,6-GlcNAc-β-Sp



F28 4-P-GlcNAc-β1,6-GlcNAc-β-Sp



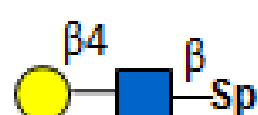
F29 Glc-α1,2-Gal-α1,3-Glc-α-Sp



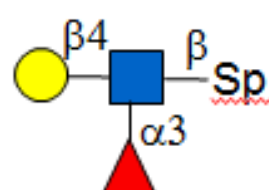
F30 Gal-β1,3-GalNAc-α-Sp



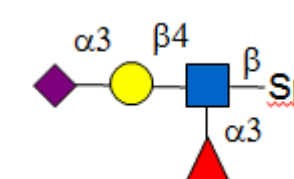
F31 Gal-β1,4-GlcNAc-β-Sp



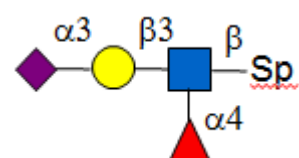
F32 Gal-β1,4-(Fuc-α1,3)-GlcNAc-β-Sp



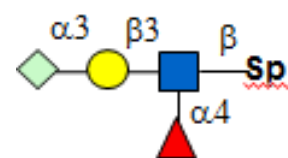
F33 Neu5Ac-α2,3-Gal-β1,3-(Fuc-α1,4)-GlcNAc-β-Sp



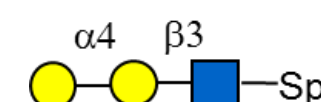
F34 Neu5Ac-α2,3-Gal-β1,3-(Fuc-α1,4)-GlcNAc-β-Sp



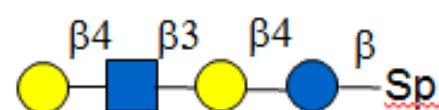
F35 Neu5Gc-α2,3-Gal-β1,3-(Fuc-α1,4)-GlcNAc-β-Sp



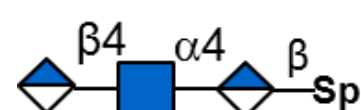
F36 Gal-α1,4-Gal-β1,3-GlcNAc-β-Sp



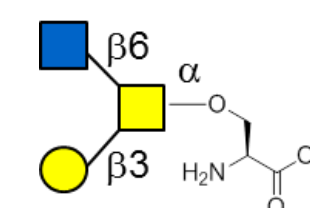
F37 Gal-β1,4-GlcNAc-β1,3-Gal-β1,4-Glc-β-Sp



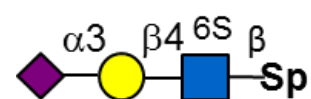
F38 GlcA-β1,4-GlcNAc-α1,4-GlcA-β-Sp



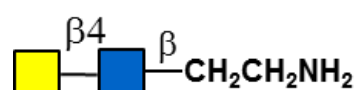
F39 GlcNAc-β1,6-(Gal-β1,3)-GalNAc-α-O-Ser



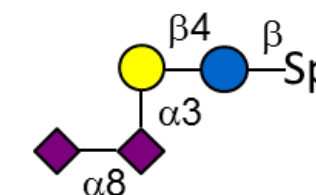
F40 Neu5Ac-α2,3-Gal-β1,4-(6S) GlcNA-Sp



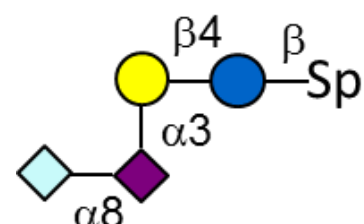
F41 GalNAc-β1,4-GlcNAc-β-CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>



F42 Neu5Ac-α2,8-Neu5Ac-α2,3-Gal β1,4-Glc-β-Sp



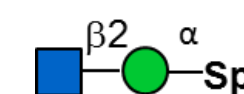
F43 Neu5Gc-α2,8-Neu5Ac-α2,3-Gal β1,4-Glc-β-Sp



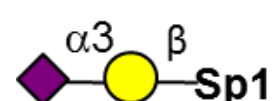
F44 GalNAc-α1,3-(Fuc-α1,2)-Gal-β1,4-Glc-β-Sp1



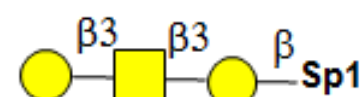
F45 GlcNAc-β1,2-Man-α-Sp



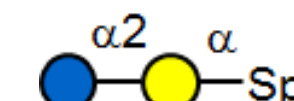
F46 Neu5Ac-α2,3-Gal-β-Sp1



F47 Gal-β1,3-GalNAc-β1,3-Gal-β-Sp1

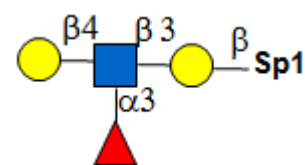


F48 Glc-α1,2-Gal-α-Sp





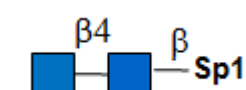
F49 Gal-β1,4-(Fuc-α1,3)-GlcNAc-β1,3-Gal-β-Sp1



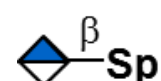
F50 Neu5Ac-α2,3-Gal-β1,4-(Fuc-α1,3)-Glc-β-Sp1



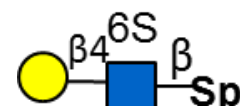
F51 GlcNAc-β1,4-GlcNAc-β-Sp1



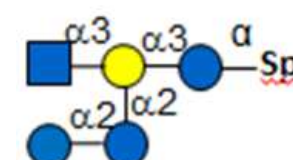
F52 D-GlcA-Sp



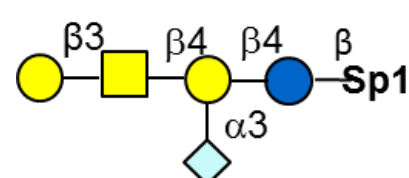
F53 Gal-β1,4-(6S) GINAc-β-Sp



F54 GINAc-α1,3-(Glc-α1,2-Glc-α1,2)Gal-α1,3-Glc-α-Sp



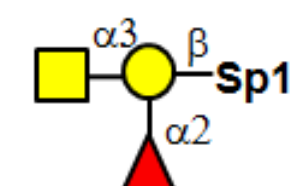
F55 Gal β1,3-GalNAc-β1,4-(Neu5Gc-α2,3)-Gal β1,4-Glc-β-Sp1



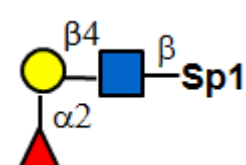
F56 Sisomicin sulfate



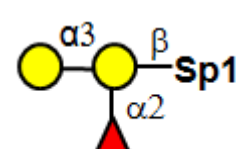
F57 GalNAc-α1,3-(Fuc-α1,2)-Gal-β-Sp 1



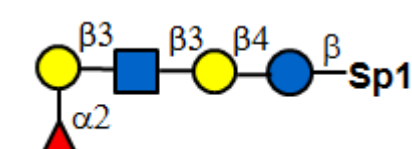
F58 Fuc-α1,2-Gal-β1,4-GlcNAc-β-Sp1



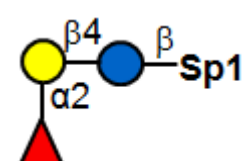
F59 Gal-α1,3-(Fuc-α1,2)-Gal-β-Sp 1



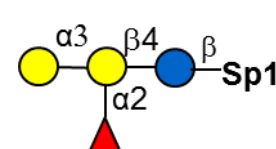
F60 Fuc-α1,2-Gal-β1,3-GlcNAc-β1,3-Gal-β1,4-Glc-β-Sp



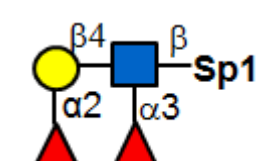
F61 Fuc-α1,2-Gal-β1,4-Glc-β-Sp1



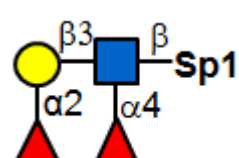
F62 Gal-α1,3-(Fuc-α1,2)-Gal-β1,4-Glc-β-Sp 1



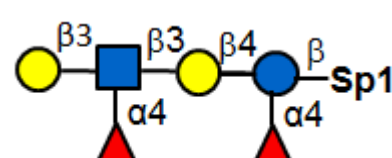
F63 (Fuc-α1,2)-Gal-β1,4-(Fuc-α1,3)-GlcNAc-β-Sp1



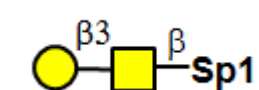
F64 (Fuc-α1,2)-Gal-β1,3-(Fuc-α1,4)-GlcNAc-β-Sp1



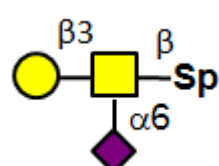
F65 Gal-β1,3-(Fuc-α1,4)-GlcNAc-β1,3-Gal-β1,4-(Fuc-α1,4)-Glc-β-Sp1



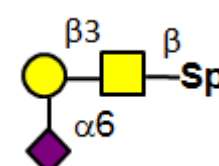
F66 Gal-β1,3-GalNAc-β-Sp 1



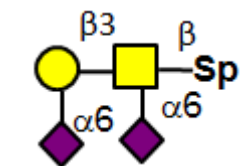
F67 Gal-β1,3-(Neu5Ac-α2,6)-GalNAc-β-Sp



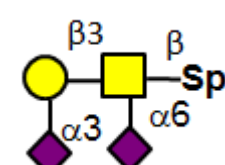
F68 Neu5Ac-α2,6-Gal β1,3-GalNAc-β-Sp



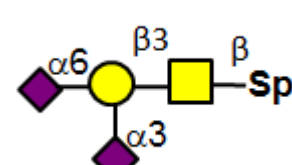
F69 Neu5Ac-α2,6-Gal β1,3-(Neu5Ac-α2,6)-GalNAc-β-Sp



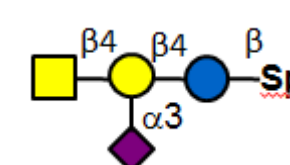
F70 Neu5Ac-α2,3-Gal β1,3-(Neu5Ac-α2,6)-GalNAc-β-Sp



F71 Neu5Ac-α2,6-(Neu5Ac-α-2,3)-Gal β1,3-GalNAc-β-Sp

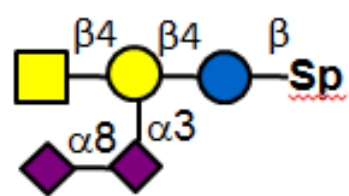


F72 GalNAc-β1,4-(Neu5Ac-α2,3)-Gal β1,4-Glc-β-Sp





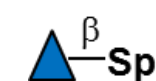
F73 GalNAc-β1,4-(Neu5Ac-α2,8-Neu5Ac-α2,3)-Gal β-1,4-Glc-β-Sp



F74 Gal-α1,4-Gal β1,4-GlcNAc-β-Sp1



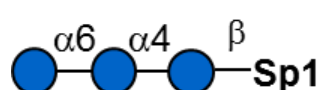
F75 D-Rhamnose-sp



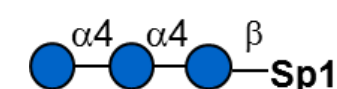
F76 Glc-α1,4-Glc-β-Sp1



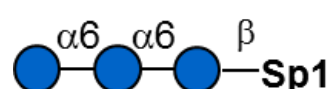
F77 Glc-α1,6-Glc-α1,4-Glc-β-Sp1



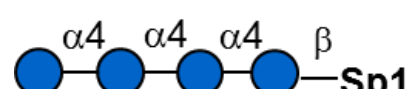
F78 Maltotriose



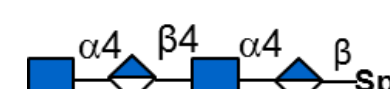
F79 Glc-α1,6-Glc-α1,6-Glc-β-Sp1



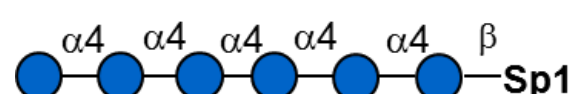
F80 Maltotetraose-β-Sp1



F81 GlcNAc-α1,4-GlcA-β-1,4-GlcNAc-α1,4-GlcA-β-SP



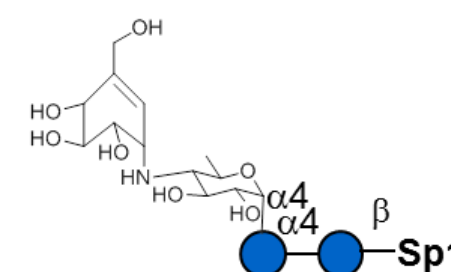
F82 Maltohexaose-β-Sp1



F83 Maltoheptaose-β-Sp1



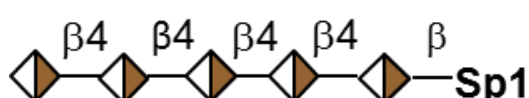
F84 Acarbose-β-Sp1



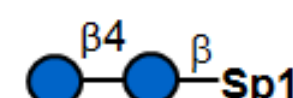
F85 D-pentamannuronic acid-β-Sp1



F86 L-pentagaluronic acid-β-Sp1



F87 D-cellose-β-Sp1



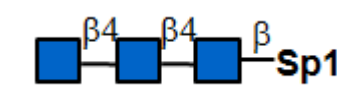
F88 Gal-α1,3-Gal-β-Sp1



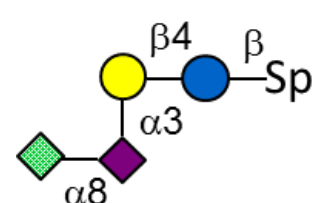
F89 β1,4-Xylotetraose



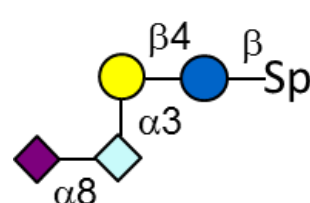
F90 Chitin-trisaccharide



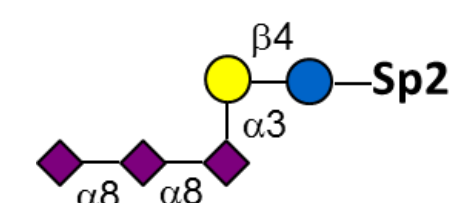
F91 KDN-α2,8-Neu5Ac-α2,3-Gal β1,4-Glc-β-Sp



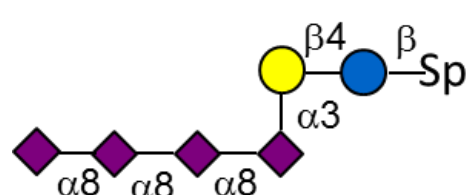
F92 Neu5Ac-α2,8-Neu5Gc-α2,3-Gal β1,4-Glc-β-Sp



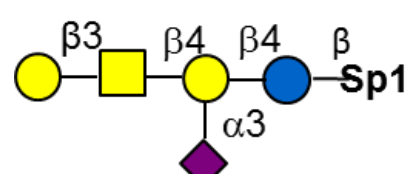
F93 α2,8-Neu5Ac-α2,8-Neu5Ac-α2,8-Neu5Ac-α2,3-Gal-β1,4-Glc-Sp2



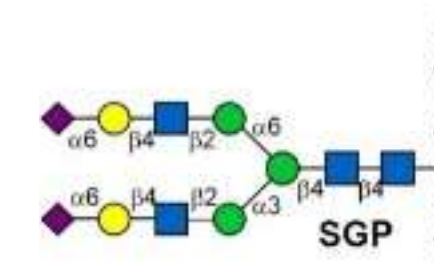
F94 Neu5Ac-α2,8-Neu5Ac-α2,8-Neu5Ac-α2,8-Neu5Ac-α2,3-Gal β1,4-Glc-β-Sp



F95 Gal β1,3-GalNAc-β1,4-(Neu5Ac-α2,3)-Gal β1,4-Glc-β-Sp1



F96 SGP



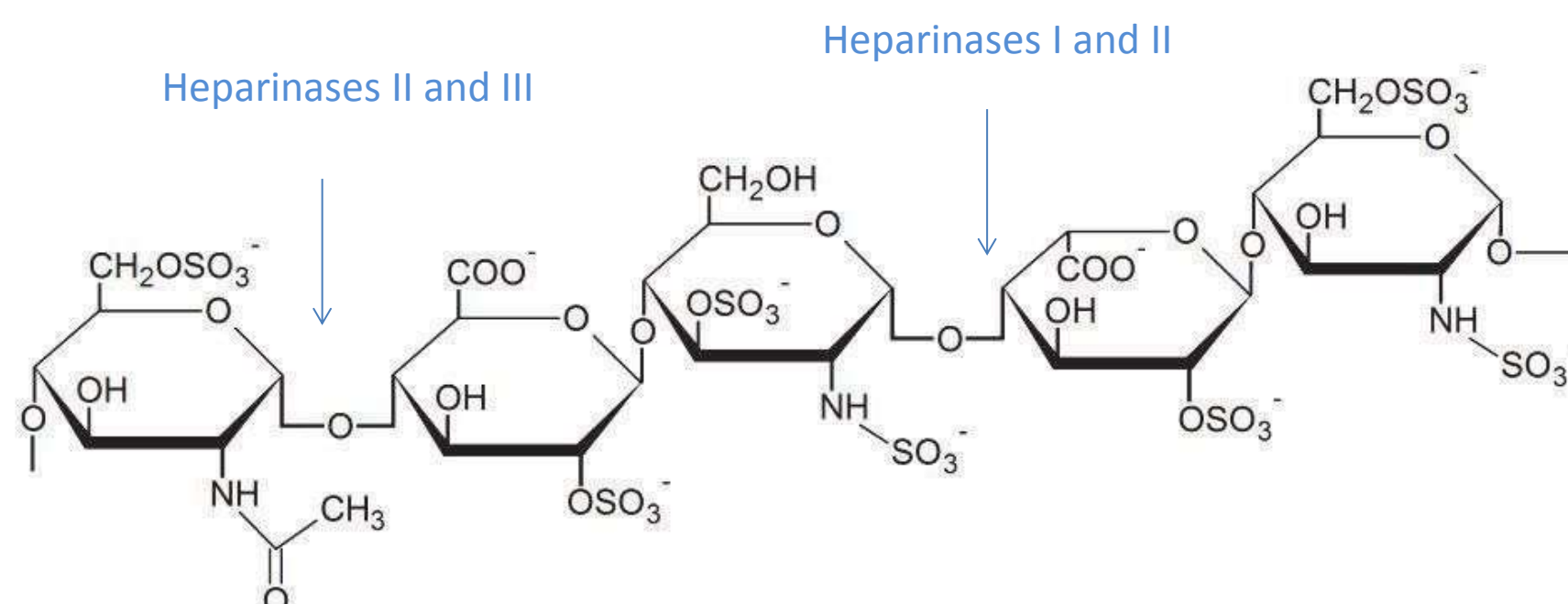
# Special Products and Services

## Glycan Arrays

Microarray technology has expanded the possibilities of glycoscience discovery by maximizing the scale of analysis while minimizing the scale of the carbohydrate material needed. Glycans are printed to a surface, such as functionalized glass, membrane or gold, in a structured grid or array that enables tracking of the glycan identity. Treatment and analysis of the entire array allows high-throughput comparative analysis for lectin binding studies, viral screening, and other diverse applications. Glycans identified by this approach can then be compared structurally and investigated further.

## Heparinase; Heparin lyase

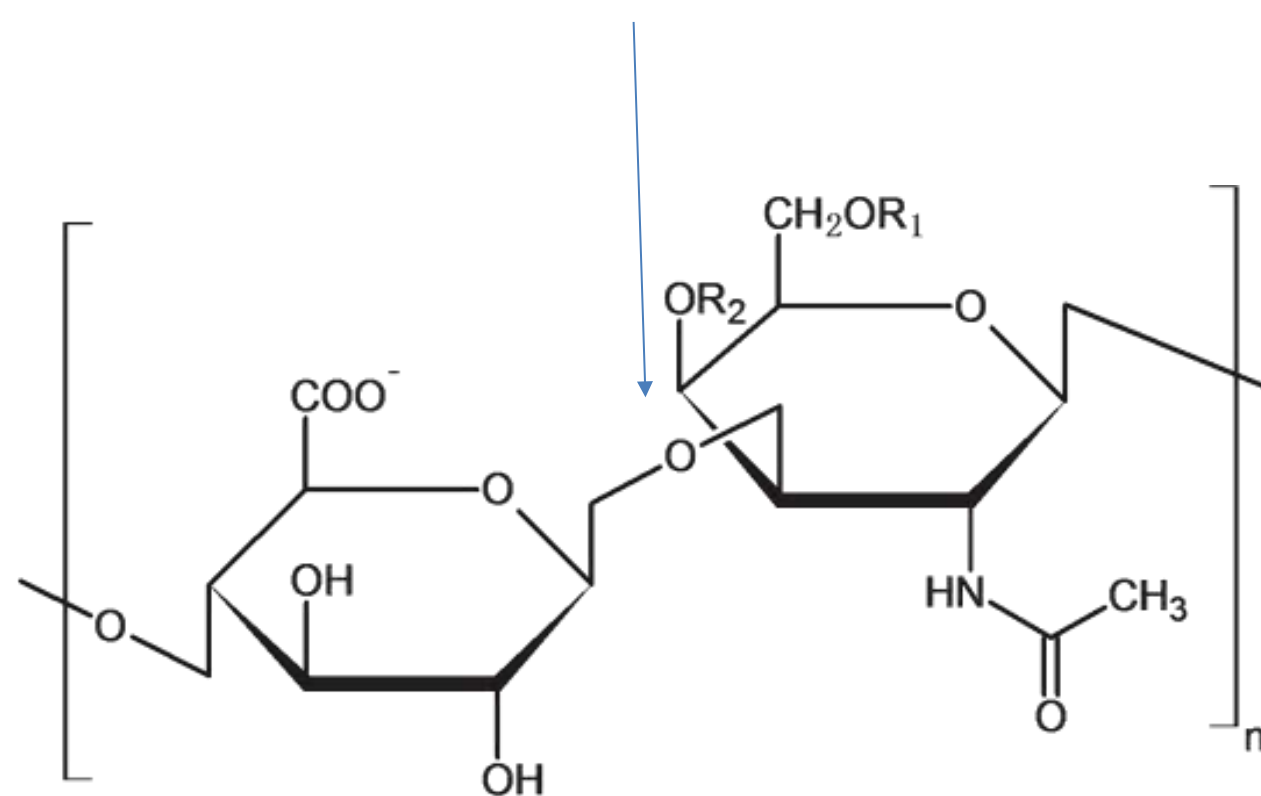
*E. coli* Recombinant Heparinase from *Flavobacterium heparinum*.



Enzyme/product	Catalog #	EC#	CAS #	Description	Size
Heparinase I	AG00-2519	4.2.2.7	9025-39-2	Heparinase I from <i>Flavobacterium heparinum</i> ; Substrates: Heparin and Heparan sulfate (ratio approx. 3:1)	1 IU
Heparinase II	AG00-6512		149371-12-0	Heparinase II from <i>Flavobacterium heparinum</i> ; Substrates: Heparin and Heparan sulfate	1 IU
Heparinase III	AG00-8891	4.2.2.8	37290-86-1	Heparinase II from <i>Flavobacterium heparinum</i> ; Substrates: Heparan sulfate	1 IU
S-2238	AG00-0101	4.2.2.7	113711-77-6	Chromogenic Substrate for Thrombin	10 mg
S-2765	AG00-0102		115388-96-0	Chromogenic Substrate for Factor Xa	10 mg
S-2222	AG00-0103	4.2.2.8	-	Chromogenic Substrate for Factor Xa	25mg
Activated Factor X (FXa)	AG00-0121			Activated Factor X (FXa), from Bovine Plasma	2.5 IU
Alpha thrombin (FIIa)	AG00-0122			Alpha-Thrombin (FIIa), from Bovine Plasma	50 IU
Human Thrombin (FIIa)	EZ006K			Human Thrombin(FIIa) from Human Plasma	6X10 NIE( MOQ )
Antithrombin (AT)	AG00-0131			Antithrombin (AT), from Bovine Plasma	10 IU
Human Antithrombin (AT)	AG00-0132			Human Antithrombin(AT) from Human Plasma	10 IU

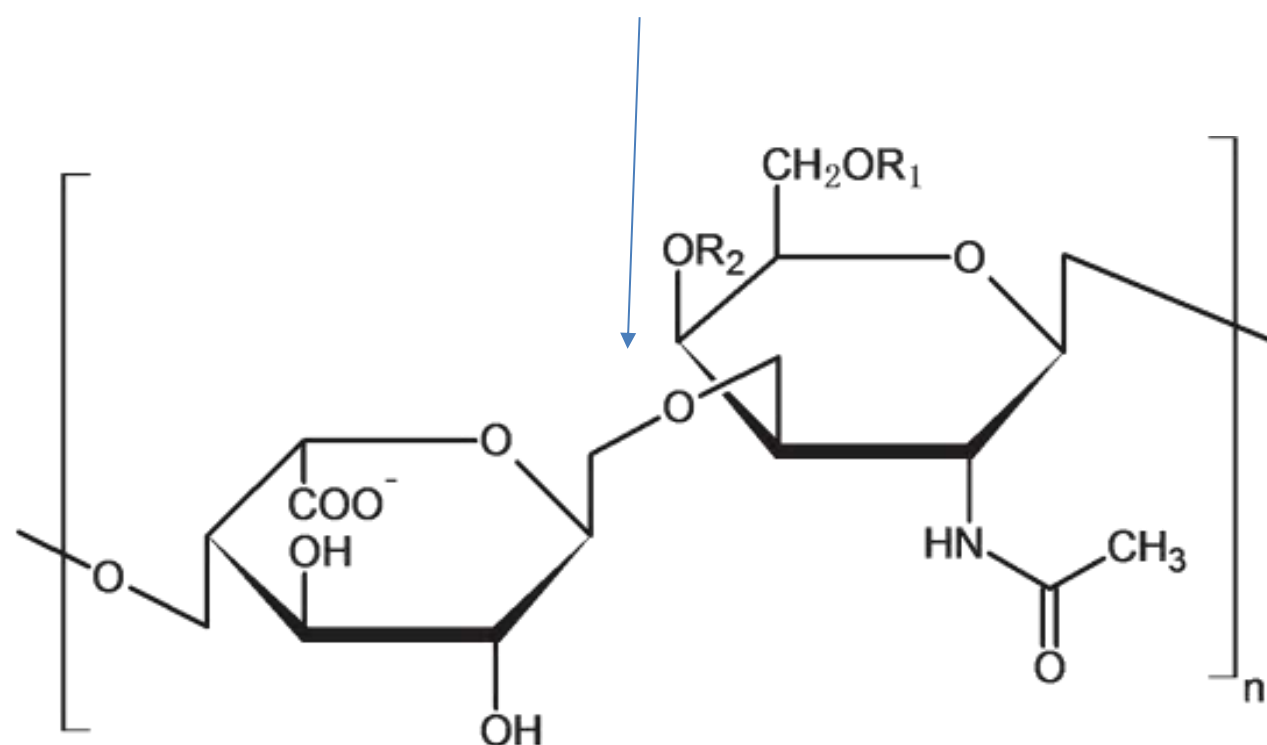
**Chondroitinases; Chondroitin Lyase**

Chondroitinase AC



Chondroitin sulfate A & C  
 R1 = H or SO<sub>3</sub><sup>-</sup>  
 R2 = H or SO<sub>3</sub><sup>-</sup>

Chondroitinase B



Dermatan sulfate (Chondroitin sulfate B)  
 R1 = H  
 R2 = SO<sub>3</sub><sup>-</sup>

Enzyme/product	Catalog #	EC#	CAS #	Description	Size
Chondroitinase AC	AG00-2780	4.2.2.5	9047-57-8	Chondroitinase AC, from <i>Flavobacterium heparinum</i> ; Substrates: Chondroitin sulfate A, chondroitin sulfate C, chondroitin and hyaluronic acid	5 IU
Chondroitinase B	AG00-8058	4.22.19	52227-83-5	Chondroitinase B, from <i>Flavobacterium heparinum</i> ; Substrate: Dermatan sulfate (chondroitin sulfate B)	5 IU



## Heparin Unsaturated Disaccharides

Catalog #	Description	Size
AG00-0401	Heparin Unsaturated Disaccharide $\Delta$ I-S, Sodium Salt, 98%	1 mg, 5 mg, 25 mg
AG00-0402	Heparin Unsaturated Disaccharide $\Delta$ II-S, Sodium Salt, 98%	0.5 mg, 1 mg, 5 mg
AG00-0403	Heparin Unsaturated Disaccharide $\Delta$ III-S, Sodium Salt, 98%	1 mg, 2 mg, 5 mg
AG00-0404	Heparin Unsaturated Disaccharide $\Delta$ IV-S, Sodium Salt, 98%	1 mg, 2 mg
AG00-0405	Heparin Unsaturated Disaccharide $\Delta$ I-A, Sodium Salt, 98%	1 mg, 2 mg, 5 mg
AG00-0406	Heparin Unsaturated Disaccharide $\Delta$ II-A, Sodium Salt, 98%	1 mg, 5 mg
AG00-0407	Heparin Unsaturated Disaccharide $\Delta$ III-A, Sodium Salt, 98%	1 mg, 5 mg
AG00-0408	Heparin Unsaturated Disaccharide $\Delta$ IV-A, Sodium Salt, 98%	0.5 mg, 1 mg
AG00-0409	Heparin Unsaturated Disaccharide $\Delta$ I-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0410	Heparin Unsaturated Disaccharide $\Delta$ II-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0411	Heparin Unsaturated Disaccharide $\Delta$ III-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0412	Heparin Unsaturated Disaccharide $\Delta$ IV-H, Sodium Salt, 98%	1 mg, 2 mg
AG00-0413	Heparin Unsaturated Disaccharide $\Delta$ I-P, Sodium Salt, 98%	1 mg, 2 mg

## Heparin Analogs

Catalog #	Description	Size
AG00-9905	Heparan Sulfate (HS), Sodium Salt, 95%	25 mg
AG00-9320	Dermatan Sulfate (DS), Sodium Salt, 95%	50 mg
AG00-9620	Oversulfated Chondroitin Sulfate (OSCS), Sodium Salt, 95%	100 mg





## Chondroitin Unsaturated Disaccharides

Catalog #	Description	Size
AG00-0421	Chondroitin Unsaturated Disaccharide $\Delta$ Di-0S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0422	Chondroitin Unsaturated Disaccharide $\Delta$ Di-4S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0423	Chondroitin Unsaturated Disaccharide $\Delta$ Di-6S, Sodium Salt, 98%	5 mg, 10 mg
AG00-0424	Chondroitin Unsaturated Disaccharide $\Delta$ Di-diSE, Sodium Salt, 98%	1 mg, 5 mg
AG00-0425	Chondroitin Unsaturated Disaccharide $\Delta$ Di-diSD, Sodium Salt, 98%	1 mg, 5 mg
AG00-0426	Chondroitin Unsaturated Disaccharide $\Delta$ Di-diSB, Sodium Salt, 98%	1 mg, 5 mg
AG00-0427	Chondroitin Unsaturated Disaccharide $\Delta$ Di-triS, Sodium Salt, 98%	1 mg, 5 mg
AG00-0428	Chondroitin Unsaturated Disaccharide $\Delta$ Di-UA2S, Sodium Salt, 98%	1 mg, 5 mg
AG00-0431	Chondroitin Disaccharide Di-4S, Sodium Salt, 98%	1 mg, 2 mg
AG00-0432	Chondroitin Disaccharide Di-4S, Sodium Salt, 98%	1 mg, 2 mg

## Hyaluronic Acid Unsaturated Disaccharides

Catalog #	Description	Size
AG00-0429	Hyaluronic Acid Unsaturated Disaccharide $\Delta$ DiHA, Sodium Salt, 98%	2 mg, 5 mg

# Index



## Index

Glycoenzymes		Sugar Nucleotides	
EN01001	$\alpha$ 2,6-sialyltransferase (Pd26ST)	SN02001	CMP-Neu5Ac.2Na
EN01002	$\alpha$ 2,3-sialyltransferase (PmST1)	SN02002	GDP-L-Fuc.2Na
EN01003	$\alpha$ 2,3/8-sialyltransferase (CstII)	SN02003	GDP-D-Man.2Na
EN01004	$\alpha$ 1,3-galactosaminyltransferase (BgtA)	SN02004	UDP-Xyl.2Na
EN01005	$\beta$ 1,4-galactosyltransferase (LgtB)	SN02005	UDP-Glc.2Na
EN01006	$\alpha$ 1,4-galactosyltransferase (LgtC)	SN02006	UDP-Gal.2Na
EN01007	$\alpha$ 1,3-galactosyltransferase ( $\alpha$ 1,3GalT)	SN02007	UDP-GlcA.3Na
EN01008	Sialic acid aldolase (NPL)	SN02008	UDP-GalA.3Na
EN01009	CMP-sialic acid synthetase (NmCSS)	SN02009	UDP-GlcNAc.2Na
EN01010	L-fucokinase/GDP-fucose pyrophosphorylase (FKP)	SN02010	UDP-GalNAc.2Na
EN01011	<i>N</i> -acetylhexoamine kinase (NahK)	SN02011	UDP-GlcNAz.2Na
EN01013	Galactokinase (BiGalK)	SN02012	UDP-GalNAz.2Na
EN01014	UDP-GlcNAc 4-epimerase (WbgU)	SN02013	UDP-6-azido-6-deoxy-D-Glc.2Na
EN01015	UDP-Glc 4-epimerase (GalE)	SN02014	UDP-6-azido-6-deoxy-D-Gal.2Na
EN01016	Glycopeptidase (PNGaseF)	SN02015	UDP-4-azido-4-deoxy-D-Glc
EN01017	Endo- $\beta$ <i>N</i> -acetylglucoaminidase A (Endo-A)	SN02016	UDP-ManNAcA
EN01018	Inorganic pyrophosphatase (PmPPA)	SN02017	UDP-L-Fuc.2NH <sub>3</sub>
EN01019	UDP-Sugar pyrophorylase (BIUSP)	SN02018	UDP-L-Gal.2NH <sub>3</sub>
EN01020	$\alpha$ 1,3-fucosyltransferase ( $\alpha$ 1,3FucT)	SN02019	UDP-a-L-Rha
EN01021	UDP-Glc dehydrogenase (UDPDH)	SN02020	UDP- $\beta$ -L-Ara
EN01022	<i>N</i> -acetylglucoasmine-1-P uridyltransferase (AGX1)	SN02021	UDP-GlcA
EN01023	$\alpha$ 1,2-fucosyltransferase ( $\alpha$ 1,2FucT)	SN02022	UDP-GalA
EN01024	$\alpha$ 1,3/4-fucosyltransferase ( $\alpha$ 1,3/4FucT)	SN02023	UDP-Glc
EN01025	Hyaluronan synthase (PmHAS)	SN02024	UDP-Gal
EN01026	Chondroitin synthase (PmCS)	SN02025	CMP-Neu5Gc.2Na
EN01027	Heparosan synthase 2 (PmHS2)	SN02026	GDP-6-deoxy-a-D-talose
EN01028	L-fuculose aldolase (FucA)	SN02027	GDP-L-Fuc.2NH <sub>3</sub>
EN01029	$\beta$ 1,3-galactosyltransferase (CgtB)	SN02028	GDP-Glc
EN01030	$\beta$ 1,3- <i>N</i> -acetylhexaminyltransferase (LgtA)	SN02029	GDP-Gal
EN01031	$\beta$ 1,3- <i>N</i> -acetylgalactosaminyltransferase (LgtD)	SN02030	GDP-D-Man.2NH <sub>3</sub>
EN01032	$\alpha$ 1,3- <i>N</i> -acetylgalactosaminyltransferase (Pm1138)	SN02031	UDP-GlcA.xNH <sub>3</sub>
EN01033	Fructose 1,6-biphosphate aldolase (SMALDO)	SN02032	UDP-GlcUA
EN01035	GDP-mannose pyrophosphorylase (ManC)	SN02033	UDP-D-glucose disodium salt – Approx 30% content by UV
EN01037	D-mannose isomerase	SN02034	UDP-a-D-galactose ammonium salt
EN01038	L-rhamnose isomerase (RhaA)	SN02035	UDP-a-D-galactose disodium salt
EN01039	L-rhamnulose kinase (RhaB)	SN02036	UDP-3-O-(R-3-hydroxymyristoyl)- <i>N</i> -acetyl-D-glucosamine
EN01040	L-fucose isomerase (FucI)	SN02037	UDP-2-ketopropyl-a-D-galactose
EN01041	L-fucose kinase (FucK)	SN02038	CMP-Pse
EN01042	D-xylose isomerase (XylA)	SN02039	GDP-D-galactose
EN01043	L-arabinose isomerase (AraA)	SN02040	GDP-L-galactose
EN01044	D-ribulose kinase (AraB)	SN02041	TDP-Fuc
EN01045	L-xyulose kinase (LyxK)	SN02042	TDP-Glc
EN01046	Fructose kinase (FruK)	SN02043	dTDP-a-Glc.2Na
EN01049	$\beta$ 1,4- <i>N</i> -acetylgalactosaminyltransferase (CgtA)	SN02044	D-TDP-b-L-Rha
		SN02045	ADPR-pNP
		SN02046	ADPRP
		SN02047	ADP-4-deoxy-D-glucose
		SN02048	ADP-D-glucose disodium salt
		SN02049	ADP-D-glycerol-b-D-manno-heptose
		SN02050	ADP-L-glycerol-b-D-manno-heptose

Please feel free to contact us at [sales@chemilyus.com](mailto:sales@chemilyus.com) for more details.





<b>Oligosaccharides</b>	
OS03001	Galacto-N-biose; Gal-β1,3-GalNAc
OS03002	Lacto-N-Biose; Gal-β1,3-GlcNAc
OS03003	Blood group H disaccharide
OS03004	Isoglobotriose; α-Gal
OS03005	Globotrinose
OS03006	Blood group Type II H-antigen
OS03007	Blood group Type III/IV H-antigen
OS03008	Blood group TYPE V H-antigen
OS03009	3'-Sialyllactose
OS03010	6'-Sialyllactose
OS03012	Globo-N-pentaose; Gb5
OS03013	Globo-H
OS03014	Blood Group Type V A-antigen
OS03015	Blood Group Type V B-antigen
<b>Glycoamino Acids</b>	
GA20100	GlcNAc-Ser
GA10105	GlcNAc-Thr
GA10205	GalNAc-Thr
GA20200	GalNAc-Ser
GA10305	Man-Thr
GA20300	Man-Ser
GA10405	Fuc-Thr
GA30110	GlcNAc-Asn
<b>Glyco-Related Chemicals</b>	
GC03001	Adenosine 5'-triphosphate disodium salt hydrate (ATP)
GC03002	Uridine 5'-triphosphate trisodium salt dihydrate (UTP)
GC03003	Guanosine 5'-triphosphate sodium salt hydrate (GTP)
GC03004	Cytidine 5'-triphosphate disodium salt (CTP)
GC03005	L-fucose
GC03006	D-mannose
GC03007	D-galactosamine HCl
GC03008	L-fuculose
GC03009	L-psicose
GC03010	L-ribulose
GC03011	L-rhamnulose
GC03012	L-tagatose
GC03013	L-xylulose
GC03014	L-fructose
GC03015	D-psicose
GC03016	D-ribulose
GC03017	D-sorbose
GC03018	D-tagatose
GC03019	D-xylulose
GC03020	D-arabinitol
GC03021	3-deoxy-D-glucosone
GC03022	2-deoxy-D-xylose
GC03023	D-rhamnose
GC03024	6-iodo-6-deoxy-D-glucose
GC03025	6-fluoro-6-deoxy-D-galactose
GC03026	3-fluoro-3-deoxy-D-glucitol
GC03027	5-azido-5-deoxy-D-arabinose
GC03028	6-azido-6-deoxy-D-glucose
GC03029	6-azido-6-deoxy-L-galactose
GC03030	6-azido-6-deoxy-D-fructose
GC03031	3-acetylamino-3-deoxy-D-glucose
<b>N-Glycans</b>	
<b>Mucopolysaccharides</b>	
<b>Human Milk Oligosaccharides</b>	
<b>Glycolipid Glycans</b>	
<b>Tandem Epitopes</b>	
<b>F-series</b>	

<b>Special Products</b>	
AG00-2519	Heparinase I
AG00-6512	Heparinase II
AG00-8891	Heparinase III
AG00-0101	S-2238
AG00-0102	S-2765
AG00-0103	S-2222
AG00-0121	Activated factor X (Fxa)
AG00-0122	Alpha thrombin (FIIa)
EZ006K	Human thrombin (FIIa)
AG00-0131	Antithrombin (AT)
AG00-0132	Human antithrombin (AT)
AG00-2780	Chondroitinase AC
AG00-8058	Chondroitinase B
AG00-0401	Heparin Unsaturated Disaccharide ΔI-S
AG00-0402	Heparin Unsaturated Disaccharide ΔII-S
AG00-0403	Heparin Unsaturated Disaccharide ΔIII-S
AG00-0404	Heparin Unsaturated Disaccharide ΔIV-S
AG00-0405	Heparin Unsaturated Disaccharide ΔI-A
AG00-0406	Heparin Unsaturated Disaccharide ΔII-A
AG00-0407	Heparin Unsaturated Disaccharide ΔIII-A
AG00-0408	Heparin Unsaturated Disaccharide ΔIV-A
AG00-0409	Heparin Unsaturated Disaccharide ΔI-H
AG00-0410	Heparin Unsaturated Disaccharide ΔII-H
AG00-0411	Heparin Unsaturated Disaccharide ΔIII-H
AG00-0412	Heparin Unsaturated Disaccharide ΔIV-H
AG00-0413	Heparin Unsaturated Disaccharide ΔI-P
AG00-9905	Heparan Sulfate (HS)
AG00-9320	Dermatan Sulfate (DS)
AG00-9620	Oversulfated Chondroitin Sulfate (OSCS)
AG00-0421	Chondroitin Unsaturated Disaccharide ΔDi-OS
AG00-0422	Chondroitin Unsaturated Disaccharide ΔDi-4S
AG00-0423	Chondroitin Unsaturated Disaccharide ΔDi-6S
AG00-0424	Chondroitin Unsaturated Disaccharide ΔDi-diSE
AG00-0425	Chondroitin Unsaturated Disaccharide ΔDi-diSD
AG00-0426	Chondroitin Unsaturated Disaccharide ΔDi-diSB
AG00-0427	Chondroitin Unsaturated Disaccharide ΔDi-triS
AG00-0428	Chondroitin Unsaturated Disaccharide ΔDi-UA2S
AG00-0430	Chondroitin Disaccharide Di-4S
AG00-0431	Chondroitin Disaccharide Di-4S
AG00-0432	Chondroitin Disaccharide Di-4S
AG00-0429	Hyaluronic Acid Unsaturated Disaccharide ΔDiHA
<b>Services</b>	
	Protein identification (Protein ID)
	Global proteomic profiling
	Global profiling of N-linked glycosylation sites
	Global glycomic profiling
	Glycoprotein analysis

Please feel free to contact us at [sales@chemilyus.com](mailto:sales@chemilyus.com) for more details.



# Sales Terms and Conditions



## Sales Terms & Conditions

These conditions apply to all sales of goods and services by Chemily, LLC (The Seller) to any Purchaser (The Buyer) of any nationality. In placing its order with The Seller, The Buyer has accepted all of the general terms & conditions of sale as described herein, notwithstanding any proposed change in terms contained in its own purchasing documents agreed upon by The Seller.

**Ordering.** We will only accept orders from companies, universities and colleges, research institutes, hospitals, and/or government agencies. We cannot supply retailers, wholesalers, brokers, or individuals. The Buyer agrees that the Products sold and delivered to The Buyer hereunder are to be used solely for Buyer's proper use and are not to be resold or used by customer for any other purpose or in any other manner whatsoever. The Buyer's orders are thereafter subject to our written confirmation of the order, and, prior to such acceptance, may be refused or canceled by The Seller and/or The Buyer for any reason, including our inability to supply, or if The Buyer could not be identified.

Orders may be placed by email, website, or mail. Orders should be accompanied by a delivery and invoicing address, a Purchase Order Number, and a confirmation of the acceptance of the price of products, delivery cost, and our present Terms and Conditions. Chemily, LLC validates the order by sending written confirmation of the order. Order through email at [sales@chemilyus.com](mailto:sales@chemilyus.com). Order through website at [www.chemilyglycoscience.com](http://www.chemilyglycoscience.com). Order through mail to the following address: Chemily Glycoscience 58 Edgewood Ave NE, Floor 1 Atlanta, GA 30303.

**Products.** Our products are supplied solely for research purposes and for use in the laboratory by experienced and qualified personnel. They are not intended for human consumption; in particular, they are not for nutritional, drug use, or human experimentation. They are not intended for resale. Any other use must be approved and confirmed in writing by Chemily, LLC.

All our products should be handled by qualified personnel only; trained in laboratory procedures, and familiar with potential hazards. Information is not available on the possible hazards of many compounds. The absence of a warning must not be interpreted as indication of safety. The ultimate responsibility for the proper handling of any product lies with the user.

**Prices.** All prices are listed in United States dollars. Duty, applicable taxes, and shipping fees are appropriated upon confirmation of the order. Products and prices are correct at the time of printing and order on the website, but are subject to change without notice. The prices payable for the goods shall be those contained in The Seller's price list current at the time of dispatch, or confirmed on request by The Seller. Quotations are valid for 30 days from the date on the quotation. Prices for orders placed after this period must be re-confirmed by The Seller. We overcharge transportation cost and any applicable taxes to the customer.

**Payment.** Payments can be made by check or wire transfer. Chemily, LLC will invoice you for the product(s) purchased by your company and all charges are binding when we confirm your order. Unless we have agreed otherwise in writing, you will pay us within 30 days from our invoice issue date. You will make all payments in U.S. Dollars.

Check: Checks are to be made payable to Chemily, LLC and mailed to Chemily Glycoscience 58 Edgewood Ave NE, Floor 1 Atlanta, GA 30303 USA.

Wire transfer: To pay via wire transfer, please request "Payment Instructions" through [sales@chemilyus.com](mailto:sales@chemilyus.com).

**Data Sheets.** All orders dispatched will be accompanied by certificates of analysis or specifications. The data sheets are made on the base of our best knowledge and The Seller shall have no liability for any deviation from this. To complete the data sheet in accordance with regulations, The Buyer shall provide assistance to The Seller in connection with the collection of information in connection with the Products complete and delivered on first request.

**Shipping.** Delivery dates mentioned in any quotation, acknowledgement of order, or elsewhere are approximate only and not of any contractual effect, and The Seller shall not be under any liability to The Buyer in respect of any failure to deliver on any particular date(s). In case of inability of The Seller to deliver the products on planned delivery dates, The Buyer will be informed. Small packages will be sent by FedEx Express Saver. Larger packages will be sent by FedEx Express Ground. The Buyer shall meet the overcharge for shipping requested by The Seller. Whenever authorizations concerning import, exchange transactions, or other formalities are required for the importation of our Products into the country of destination, or for the payment thereof, the obtaining of such authorizations and compliance therewith within the applicable time period is coordinated with The Buyer and managed by The Seller. **Partial shipment:** A partial shipment of Products in stock can be requested at any time after confirmation of the order. An invoice will be processed for each partial shipment. Shipping fees will be invoiced for each additional shipment requested.

**Storage.** Our products are mainly sold as freeze dried. Most products are stable for some years at -20°C, provided they are not opened.

**Variation.** The Seller shall be determined to have fulfilled its contractual obligations in respect of any delivery though the quantity may be up to 10 % more or less than the quantity specified in the contract and in such event The Buyer shall pay for the actual quantity delivered.

**Availability.** Some products require lengthy re-make periods and sometimes are derived from raw materials which have uncertain or intermittent availability. They may therefore be unavailable for considerable periods of time. The Buyer cannot drive any right from any delay, which is no longer than two months (one month in case of prepayment). Thereafter, The Buyer's rights are limited to cancellation of the undelivered part of the order, prepayments are refunded.

**Distribution.** Some products could be delivered by local distributors. In this case The Seller is bound by the contract drawn between The Seller and distributor.

**Warranty.** In case of proven default in a product or delivery, The Seller's responsibility cannot exceed the replacement of the delivered product by a conform one. The Seller shall not in any event be liable for any lost, damage, delay, costs, diminished profits, revenues, or opportunities; or any other incidental, special, indirect, or consequential damages of any kind or nature whatsoever arising from the contract supported by The Buyer. The Buyer must notify The Seller within 30 days after the Products have been received or such Products shall be deemed to have been accepted. Any return of product is subject to prior agreement between The Buyer and The Seller. Any product return without such agreement will be kept in custody and will not give rise to any reimbursement. All costs and expenses connected to such return will be charged to The Buyer.

**Intellectual Property.** The Buyer shall not use The Seller's Intellectual Property Rights in a manner that disparages the other party or its products or services, blurs, dilutes, or otherwise diminishes The Seller's trade names, trademarks, service marks, or other intellectual property, or portrays The Seller or its products or services in a false, competitively adverse or poor light. The buyer shall comply with The Seller's requests as to the use of The Seller's Property Rights and will avoid any action that diminishes the value of such marks. Without limiting the foregoing, The Buyer shall not, without written permission from The Seller use any of The Seller's brand names, keywords, or derivations of either of the above for any purpose.

**Governing Law.** This contract shall be governed in all respects by the United States federal and Georgia state laws, and the parties hereby submit to the jurisdiction of the United States courts.

**Derogation.** Any derogation to these terms and conditions are specified in writing in correspondence signed by Chemily, LLC.

These Sales Terms & Conditions are subject to change without notice.



