Avanti Research

Complex Glycosphingolipids

Synthetic standards for cell signaling, neurobiology, biomarker discovery, and more!

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SMART SCIENCE TO IMPROVE LIVES™

Complex glycosphingolipids

synthetic standards for cell signaling, neurobiology, biomarker discovery, and more!

Biological roles and research applications.

Complex glycosphingolipids are functional architects of cell behavior. These amphipathic lipids shape the outer leaflet of the plasma membrane, helping form lipid rafts that anchor receptors and signaling complexes. Their carbohydrate-rich headgroups, which often contain sialic acid residues, enable critical interactions in immune surveillance, cell adhesion, and signal transduction.

Glycosphingolipid imbalances are implicated in Alzheimer's, Parkinson's, certain cancers, and inherited metabolic syndromes. Their role in blood group antigen expression, especially globosides, places them at the center of transfusion science and hematological diagnostics. Altered glycosphingolipid signatures are emerging as diagnostic biomarkers for conditions ranging from glioblastoma to systemic lupus erythematosus.

Precision tools for decoding cellular complexity.

Complex glycosphingolipids are key compounds in decoding how cells communicate, differentiate, and react to disease in membrane biology, immunology, and neurological research. Avanti Research™ offers a curated collection of synthetic glycosphingolipids engineered with absolute structural fidelity and more than 97% purity.

From gangliosides to globosides, each compound is meticulously synthesized to empower advanced investigations into cell signaling, neurodegenerative disease mechanisms, and biomarker discovery. Our fully synthetic approach ensures batch-to-batch reproducibility, which makes these tools indispensable for researchers navigating the molecular landscape of cancer biology, inflammation, and membrane dynamics.

All Avanti Research™ glycosphingolipids undergo strict QC, delivering more than **97% purity** with structural verification detailed in our technical documentation. Unlike glycolipids extracted from natural sources, which can vary depending on source material and isolation method, our compounds are **fully synthetic**—ensuring **consistent performance** across experiments and scales. Each batch is validated by **advanced analytical techniques,** documented with **Certificates of Analysis (CoA)** and **MSDS documentation**, giving you confidence in every vial.

Whether you're mapping **glycan interactions**, building a **diagnostic panel**, or advancing **biomarker discovery**, these synthetic lipids provide unmatched control and reproducibility. To further support your research, we offer:

- Flexible packaging in ***research-ready vials***
- Isotopically labeled variants for ***LC-MS workflows***
- Custom synthesis of specific ***ceramide or sugar variants*** for bespoke projects

No matter your research needs, you can trust our materials to deliver clarity, consistency, and confidence.

Synthetic gangliosides, cerebrosides, and globosides: tailored molecules for targeted discovery.

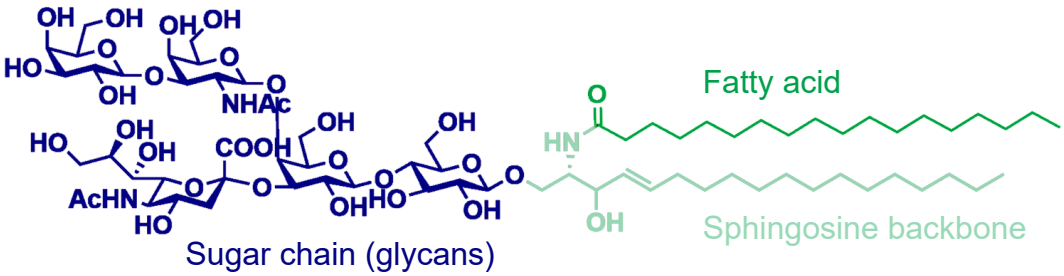
Cerebrosides are single-sugar glycosphingolipids such as glucosyl and galactosyl sphingolipids. They are abundant in neural tissues and commonly studied in the context of myelin structure and membrane biology. Their simplicity makes them useful models for exploring how glycosphingolipids influence membrane stability and neurological processes.

Gangliosides, such as GM3, GM2, GM1, GD2, GD3, GT3, are complex, sialylated glycosphingolipids that regulate cell signaling in the nervous system. They play essential roles in neuronal development, repair, and communication. Because of their altered expression in cancer, they are also central to tumor immunology and immune recognition studies.

Globosides, such as Gb3, Gb4, Forssman, Globo-A/B/H, are non-sialylated glycosphingolipids with multiple sugar residues that contribute to blood group antigen systems. Many pathogens exploit globosides as cell-surface binding targets, making them important in infectious disease research. They are also linked to oncogenesis, where changes in glycosylation support tumor progression.

Isotopically labeled glycosphingolipids, such as C18:0-d7 gangliosides, provide stable internal standards for quantitative LC-MS lipidomics. Their incorporation improves accuracy by correcting for variability in sample preparation and matrix effects. These tools are widely used in biomarker discovery and validation, where sensitivity and reproducibility are essential.

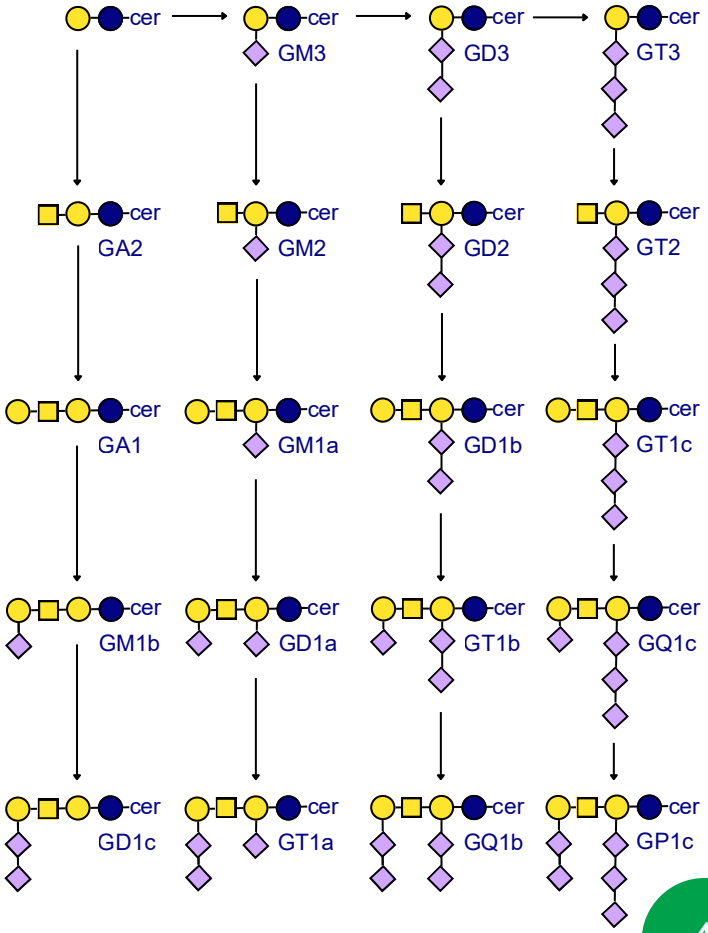
Anatomy of a complex glycosphingolipid



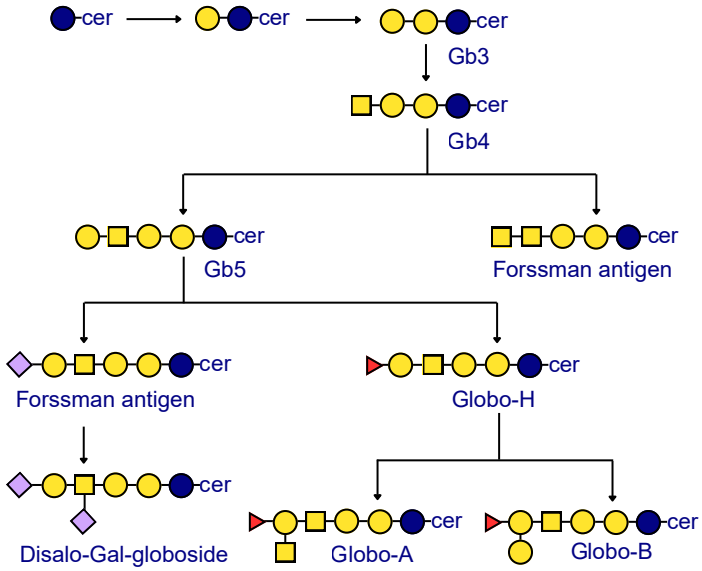
Glycan symbol nomenclature

Shape	Generic	Blue	Yellow	Purple	Light Blue	Red
Filled Circle	Hexose	Glc	Gal	All	Tal	
Filled Square	HexNAc	GlcNAc	GalNAc	AllNAc	TalNAc	
Filled Triangle	Deoxyhexose	Qui			6dTal	Fuc
Filled Diamond	3-deoxy-nonolusonic acids			Neu5Ac	Neu5Gc	Sia

Ganglioside series

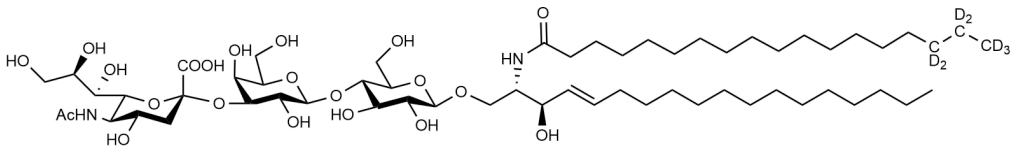


Globoside series



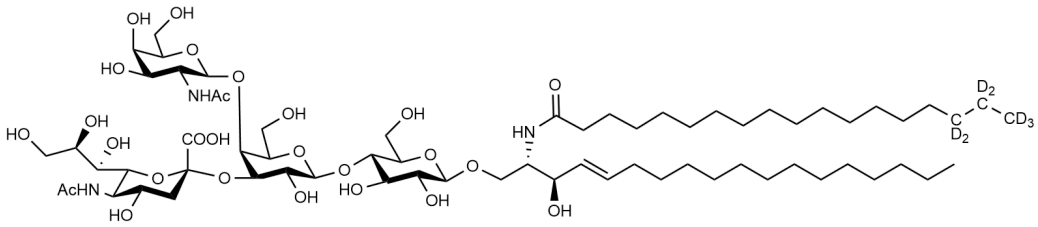
Stable Isotope-Labeled Glycolipids

GM3 Cer-D7 (d18:1/18:0-D7)



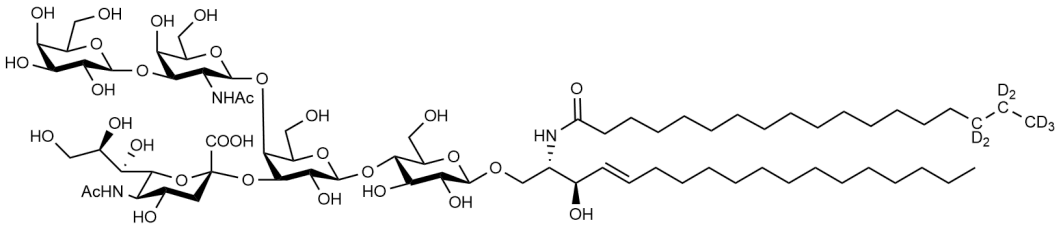
Product Code: A86122
Legacy Code: 860122
Molecular Weight: 1188.55
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GM2 Cer-D7 (d18:1/18:0-D7)



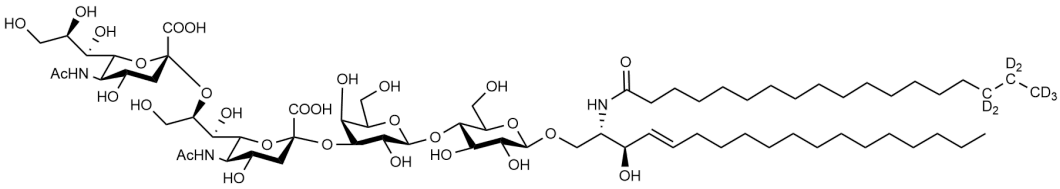
Product Code: A86121
Legacy Code: 860121
Molecular Weight: 1391.74
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GM1 Cer-D7 (d18:1/18:0-D7)



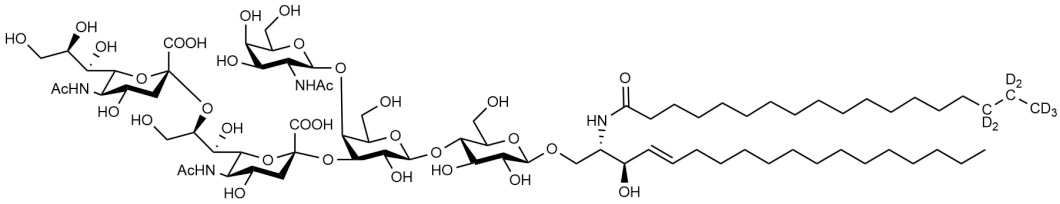
Product Code: A86120
Legacy Code: 860120
Molecular Weight: 1553.88
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GD3 Cer-D7 (d18:1/18:0-D7)



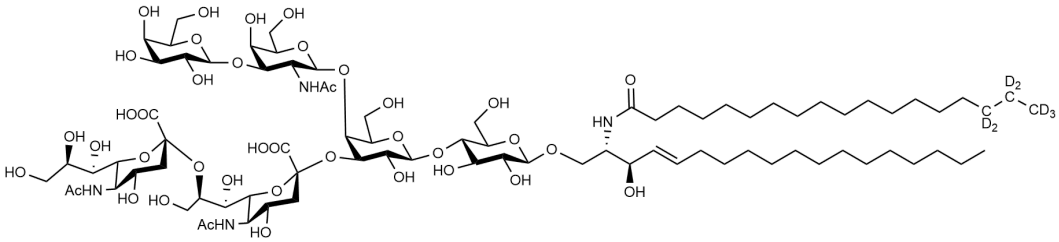
Product Code: A86123
Legacy Code: 860123
Molecular Weight: 1479.80
Purity: >97%
Package Size: 100 µg
Physical State: Methanol Soln.

GD2 Cer-D7 (d18:1/18:0-D7)



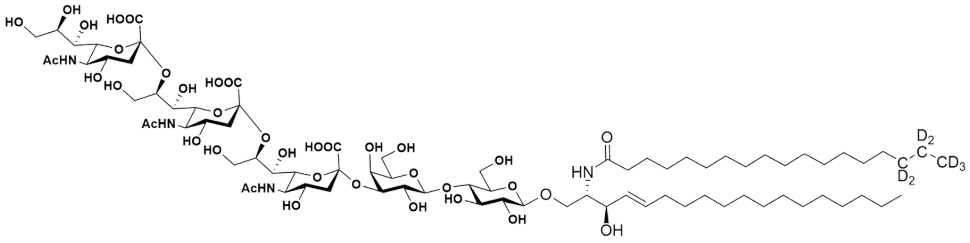
Product Code: A86124
Legacy Code: 860124
Molecular Weight: 1683.00
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GD1b Cer-D7 (d18:1/18:0-D7)



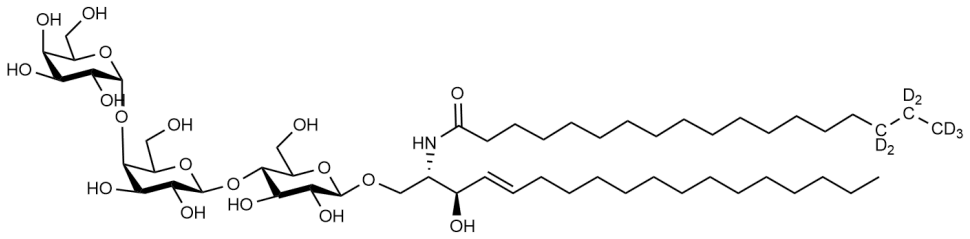
Product Code: A86125
Legacy Code: 860125
Molecular Weight: 1845.14
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GT3 Cer-D7 (d18:1/18:0-D7)



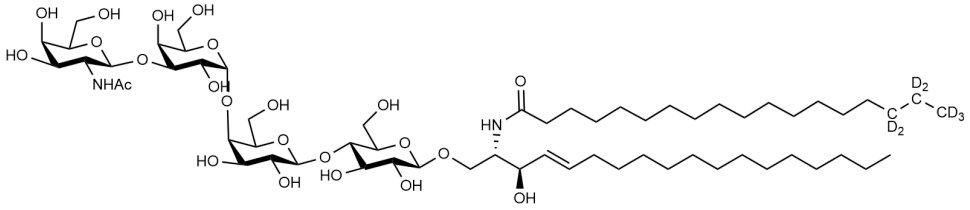
Product Code: A86126
Legacy Code: 860126
Molecular Weight: 1771.06
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GB3 Cer-D7 (d18:1/18:0-D7)



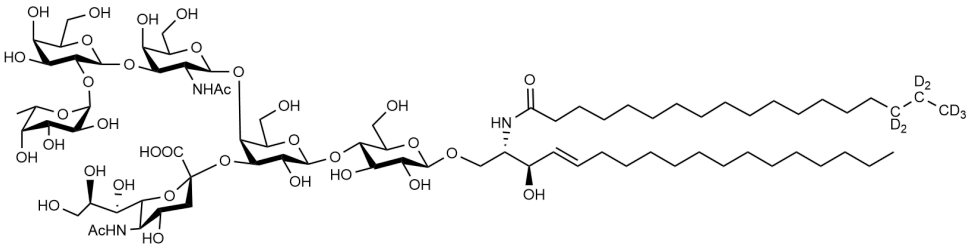
Product Code: A86127
Legacy Code: 860127
Molecular Weight: 1059.43
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

GB4 Cer-D7 (d18:1/18:0-D7)

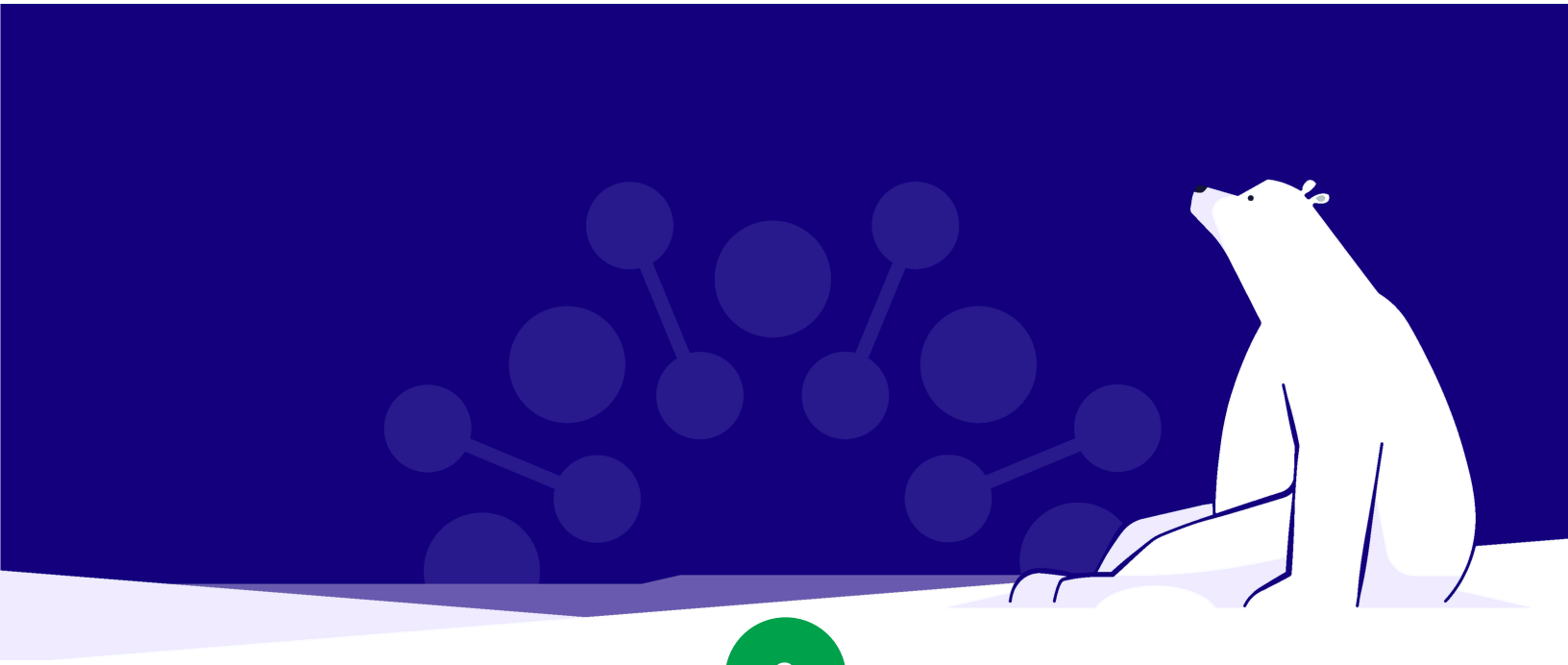


Product Code: A86128
Legacy Code: 860128
Molecular Weight: 1262.63
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.

Fuc-GM1 Cer-D7 (d18:1/18:0-D7)

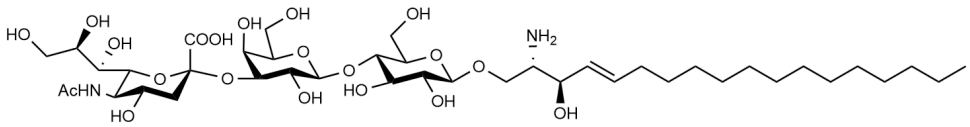


Product Code: A86129
Legacy Code: 860129
Molecular Weight: 1700.03
Purity: >97%
Package Size: 100 µg
Physical State: Methanol soln.



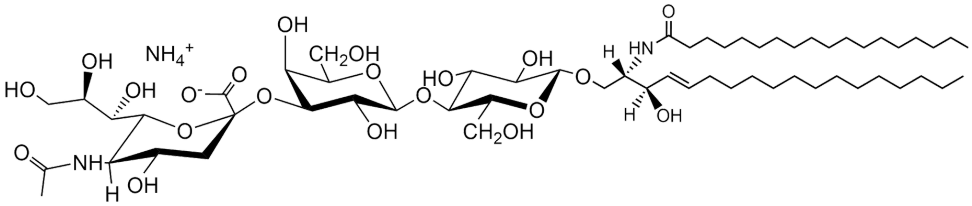
GM3 Derivatives

GM3 Sphingosine (d18:1)



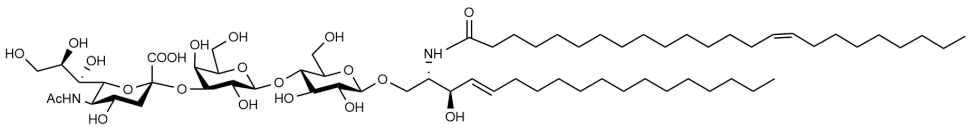
Product Code: A86132
Legacy Code: 860132
Molecular Weight: 915.04
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GM3 Cer (d18:1/18:0)



Product Code: A86074
Legacy Code: 860074
Molecular Weight: 1198.52
Purity: >99%
Package Size: 100 µg
Physical State: Methanol soln.

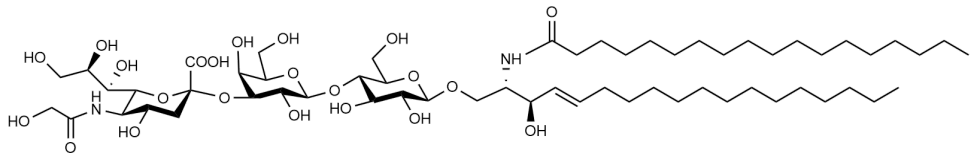
GM3 Cer (d18:1/24:1)



Product Code: A86168
Legacy Code: 860168
Molecular Weight: 1263.65
Purity: >97%
Package Size: 1 mg
Physical State: Powder

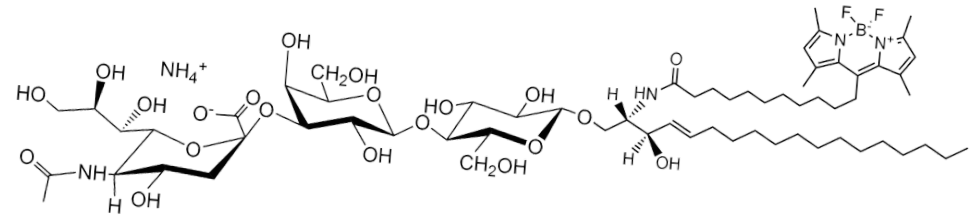
GM3 Derivatives - Modified

GM3(Neu5Gc) Cer (d18:1/18:0)



Product Code: A86156
Legacy Code: 860156
Molecular Weight: 1197.51
Purity: >97%
Package Size: 1 mg
Physical State: Powder

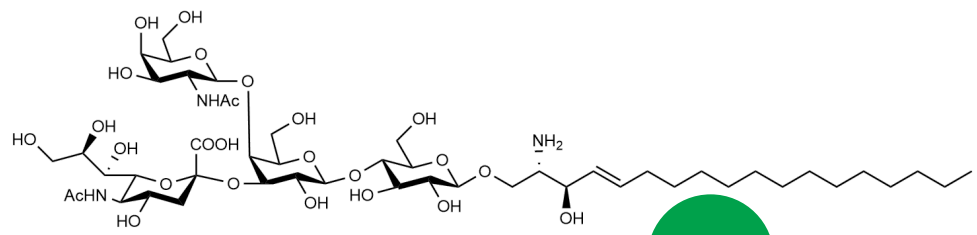
TopFluor™ GM3 Cer (d18:1/11:0-TF)



Product Code: A81258
Legacy Code: 810258
Molecular Weight: 1346.40
Purity: >99%
Package Size: 100 µg
Physical State: Ethanol soln.

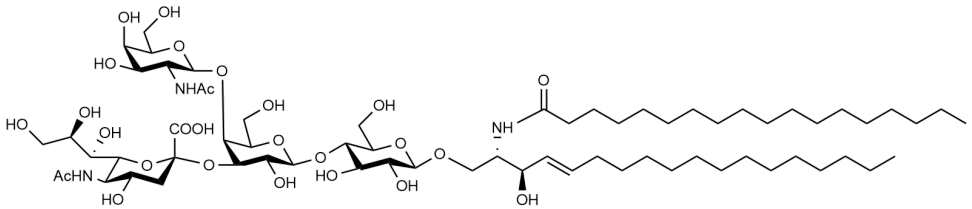
GM2 Derivatives

GM2 Sphingosine (d18:1)



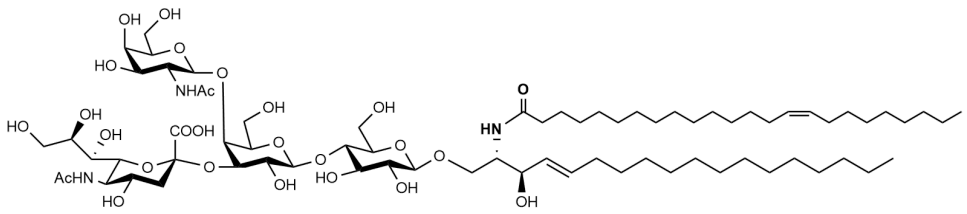
Product Code: A86131
Legacy Code: 860131
Molecular Weight: 1118.23
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GM2 Cer (d18:1/18:0)



Product Code: A86140
Legacy Code: 860140
Molecular Weight: 1384.70
Purity: >97%
Package Size: 1 mg
Physical State: Powder

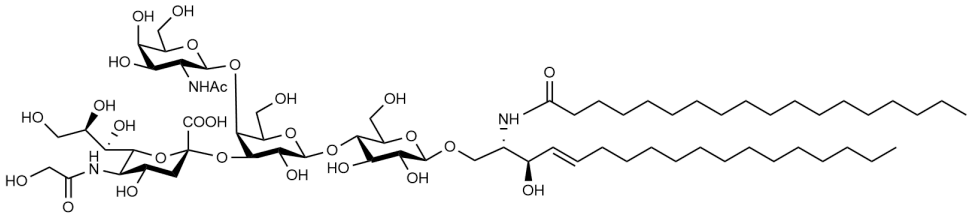
GM2 Cer (d18:1/24:1)



Product Code: A86141
Legacy Code: 860141
Molecular Weight: 1466.85
Purity: >97%
Package Size: 1 mg
Physical State: Powder

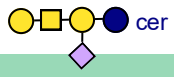
GM2 Derivatives - Glycan Modified

GM2(Neu5Gc) Cer (d18:1/18:0)

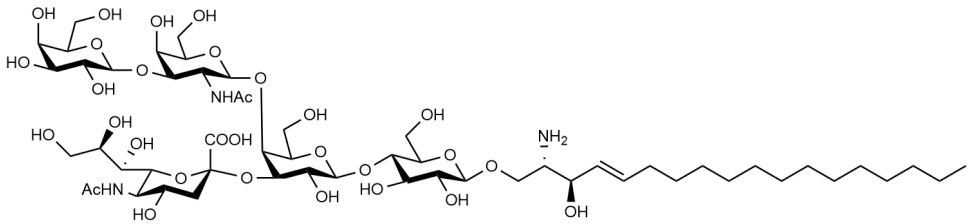


Product Code: A86157
Legacy Code: 860157
Molecular Weight: 1400.70
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GM1 Derivatives

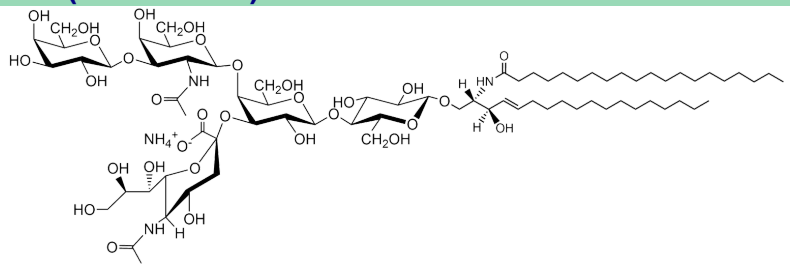


GM1 Sphingosine (d18:1)



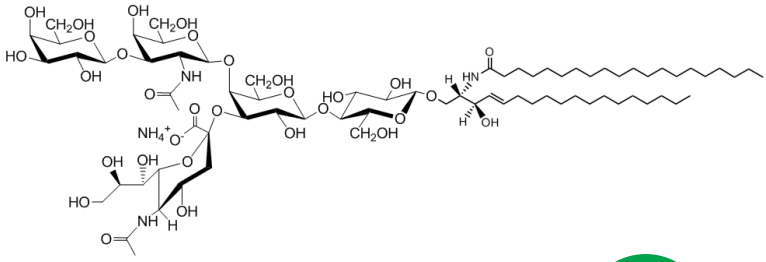
Product Code: A86130
Legacy Code: 860130
Molecular Weight: 1280.37
Purity: >97%
Package Size: 1mg
Physical State: Powder

GM1 Cer (d18:1/17:0)



Product Code: A86094
Legacy Code: 860094
Molecular Weight: 1548.85
Purity: >99%
Package Size: 100 µg
Physical State: Powder

GM1 Cer (d18:1/20:0)



Product Code: A86088
Legacy Code: 860088
Molecular Weight: 1591.93
Purity: >97%
Package Size: 100 µg
Physical State: Powder

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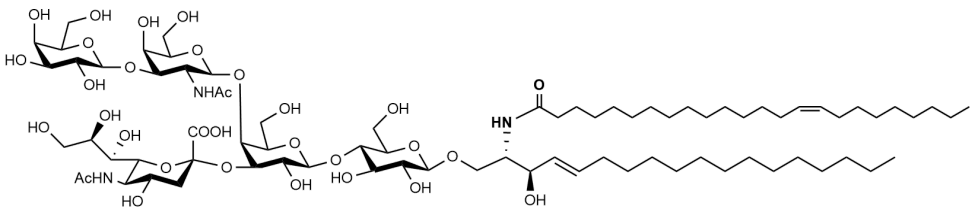
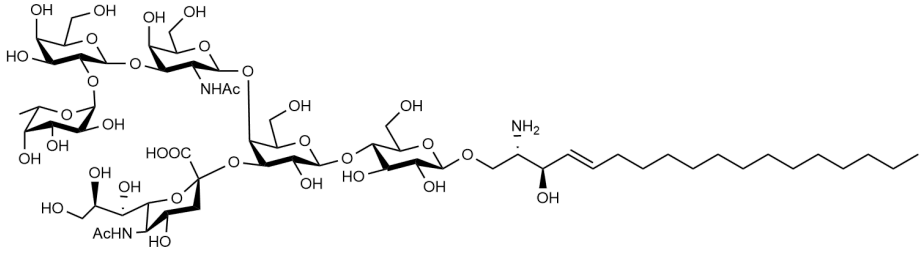
GM1 Cer (d18:1/24:1)



Product Code: A86142
Legacy Code: 860142
Molecular Weight: 1628.99
Purity: >97%
Package Size: 1 mg
Physical State: Powder

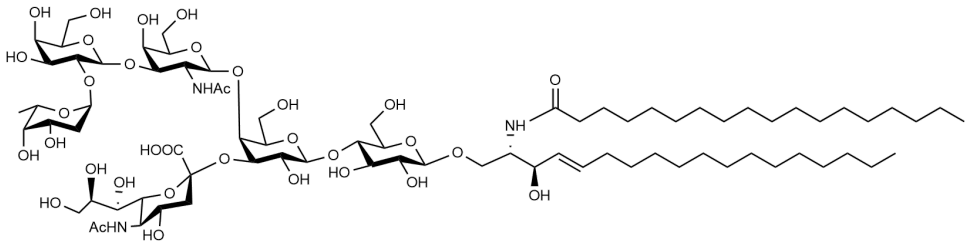
GM1 Derivatives - Glycan Modified

Fuc-GM1 Sphingosine (d18:1)



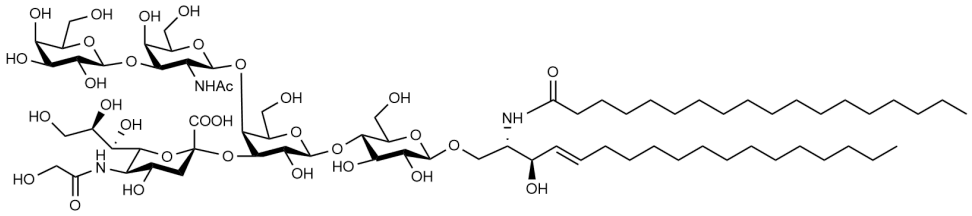
Product Code: A86139
Legacy Code: 860139
Molecular Weight: 1426.51
Purity: >97%
Package Size: 1 mg
Physical State: Powder

Fuc-GM1 Cer (d18:1/18:0)



Product Code: A86143
Legacy Code: 860143
Molecular Weight: 1692.98
Purity: >97%
Package Size: 1 mg
Physical State: Powder

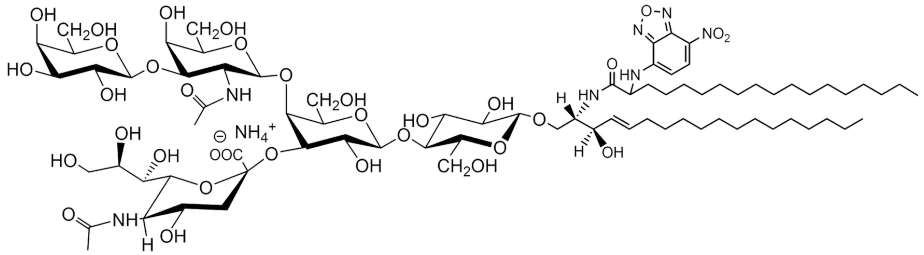
GM1(Neu5Gc) Cer (d18:1/18:0)



Product Code: A86158
Legacy Code: 860158
Molecular Weight: 1562.84
Purity: >97%
Package Size: 1 mg
Physical State: Powder

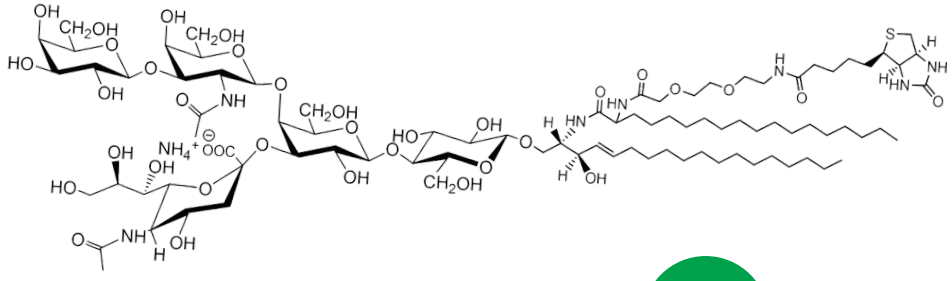
GM1 Derivatives - Fatty Acid Modified

NBD GM1 Cer (d18:1/18:0-2-NBD)



Product Code: A81170
Legacy Code: 810170
Molecular Weight: 1741.98
Purity: >99%
Package Size: 500 µg
Physical State: Powder

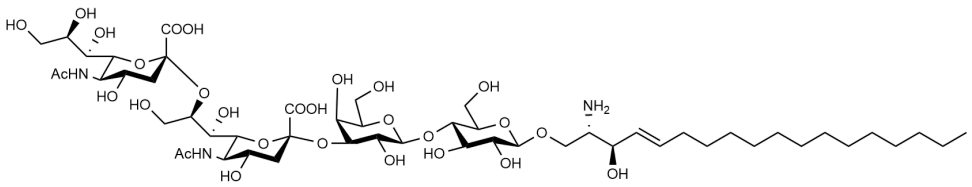
GM1 (d18:1/18:0-2-Biotin)



Product Code: A86097
Legacy Code: 860097
Molecular Weight: 1950.34
Purity: >99%
Package Size: 100 µg
Physical State: Powder

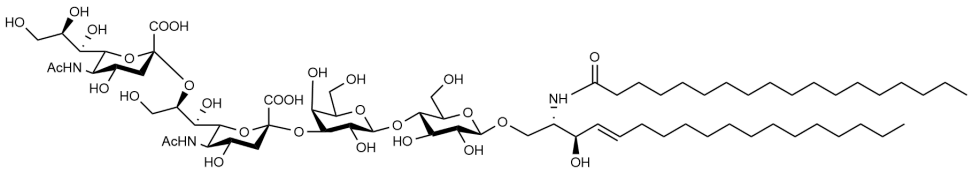
GD3 Derivatives

GD3 Sphingosine (d18:1)



Product Code: A86133
Legacy Code: 860133
Molecular Weight: 1206.29
Purity: >97%
Package Size: 1 mg
Physical State: Powder

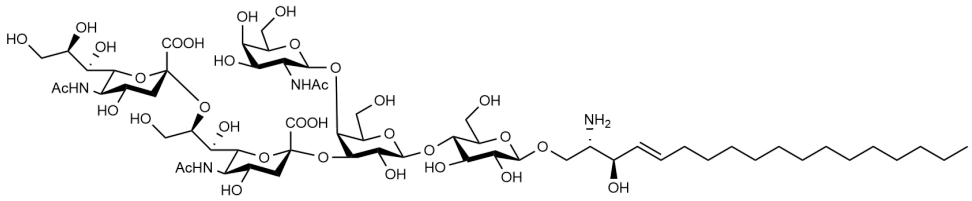
GD3 Cer (d18:1/18:0)



Product Code: A86144
Legacy Code: 860144
Molecular Weight: 1472.76
Purity: >99%
Package Size: 1 mg
Physical State: Powder

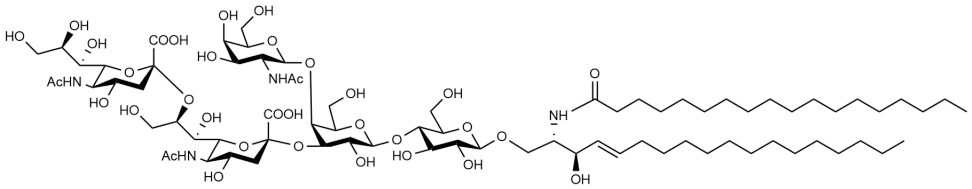
GD2 Derivatives

GD2 Sphingosine (d18:1)



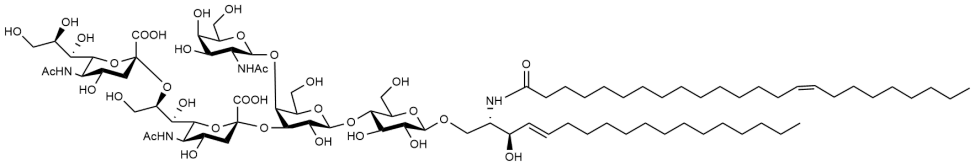
Product Code: A86134
Legacy Code: 860134
Molecular Weight: 1409.49
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GD2 Cer (d18:1/18:0)



Product Code: A86145
Legacy Code: 860145
Molecular Weight: 1675.96
Purity: >97%
Package Size: 1 mg
Physical State: Powder

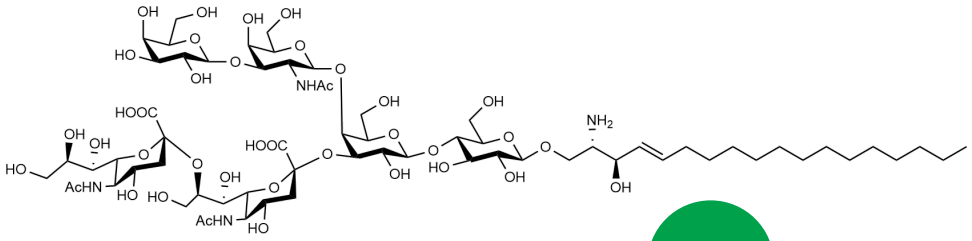
GD2 Cer (d18:1/24:1)



Product Code: A86163
Legacy Code: 860163
Molecular Weight: 1758.10
Purity: >97%
Package Size: 1 mg
Physical State: Powder

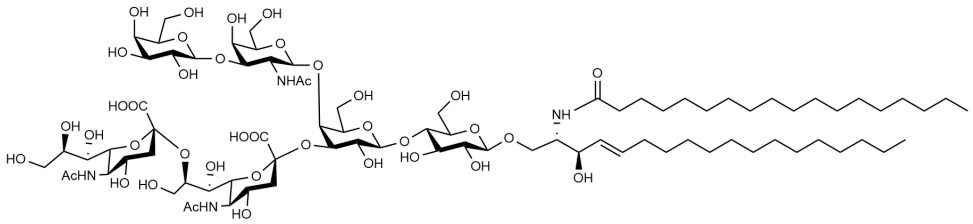
GD1b Derivatives

GD1b Sphingosine (d18:1)



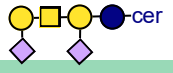
Product Code: A86135
Legacy Code: 860135
Molecular Weight: 1571.63
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GD1b Cer (d18:1/18:0)

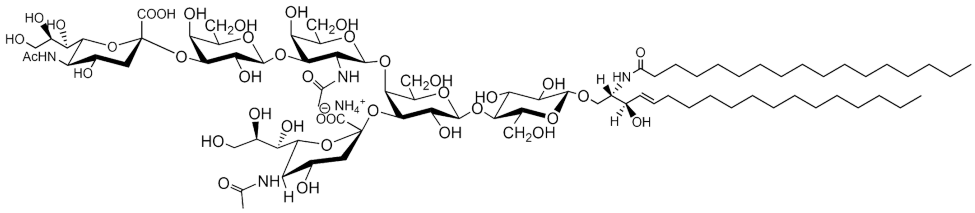


Product Code: A86146
Legacy Code: 860146
Molecular Weight: 1838.10
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GD1a Derivatives

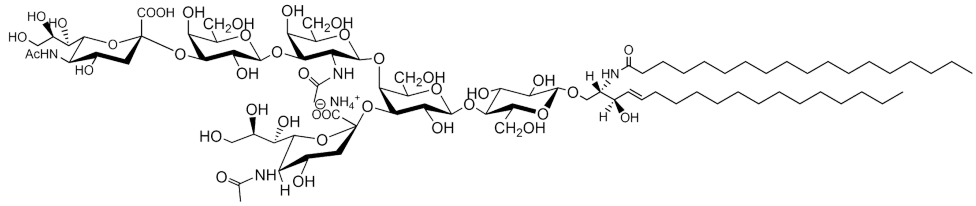


GD1a Cer (d18:1/17:0)



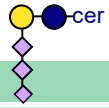
Product Code: A86075
Legacy Code: 860075
Molecular Weight: 1841.08
Purity: >99%
Package Size: 100 µg
Physical State: Methanol soln.

GD1a Cer (d18:1/18:0)

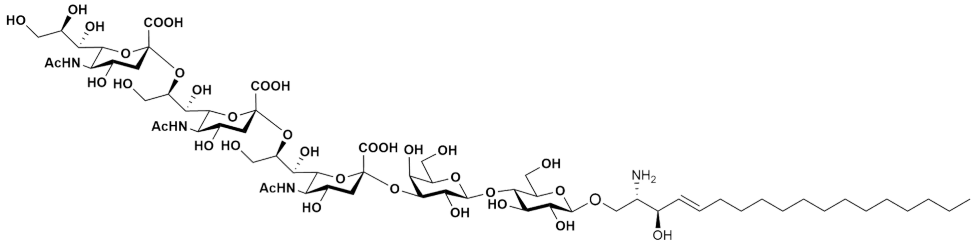


Product Code: A86091
Legacy Code: 860091
Molecular Weight: 1872.16
Purity: >99%
Package Size: 100 µg
Physical State: Methanol soln.

GT3 Derivatives

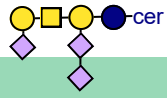


GT3 Sphingosine (d18:1)

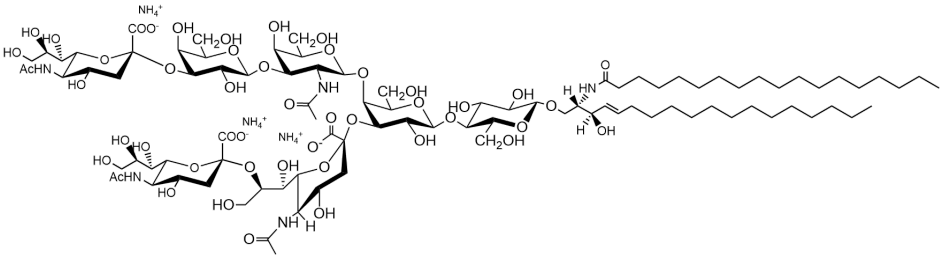


Product Code: A86136
Legacy Code: 860136
Molecular Weight: 1497.55
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GT1b Derivatives



GT1b Cer (d18:1/18:0)



Product Code: A86089
Legacy Code: 860089
Molecular Weight: 2180.45
Purity: >99%
Package Size: 100 µg
Physical State: Methanol soln.

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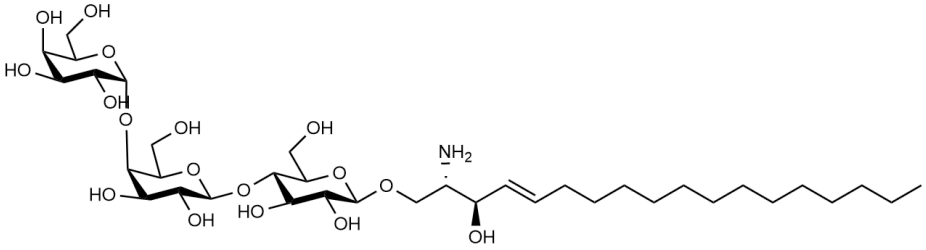
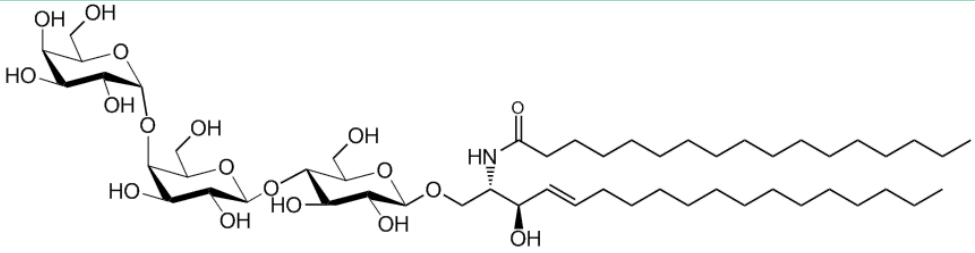
GB3 Derivatives

GB3 Sphingosine (d18:1)



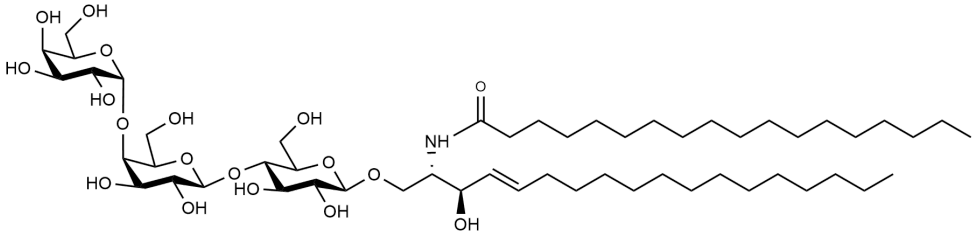
Product Code: A86137
Legacy Code: 860137
Molecular Weight: 785.92
Purity: >97%
Package Size: 1 mg
Physical State: Powder

Gb3 Cer (d18:1/17:0)



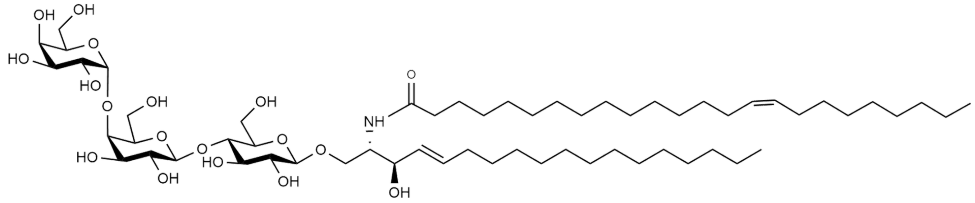
Product Code: A86699
Legacy Code: 860699
Molecular Weight: 1038.36
Purity: >99%
Package Size: 500 µg
Physical State: Powder

GB3 Cer (d18:1/18:0)



Product Code: A86147
Legacy Code: 860147
Molecular Weight: 1052.39
Purity: >97%
Package Size: 1 mg
Physical State: Powder

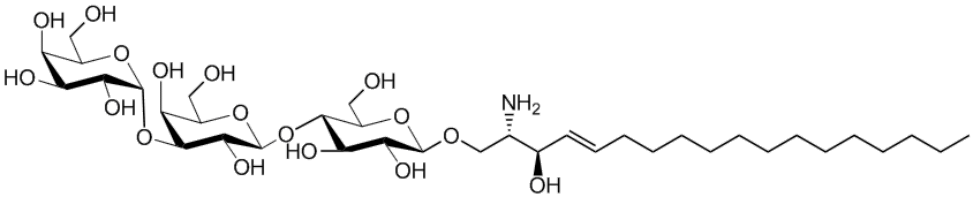
GB3 Cer (d18:1/24:1)



Product Code: A86167
Legacy Code: 860167
Molecular Weight: 1134.54
Purity: >97%
Package Size: 1 mg
Physical State: Powder

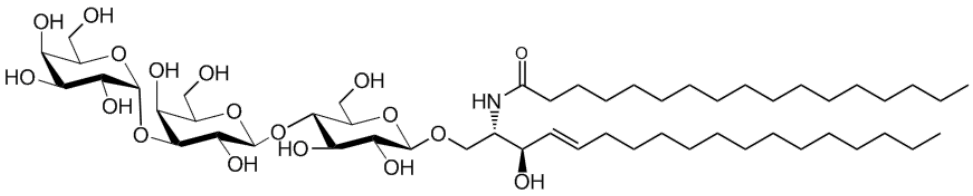
iGB3 Derivatives

iGB3 Sphingosine (d18:1)



Product Code: A86720
Legacy Code: 860720
Molecular Weight: 785.91
Purity: >97%
Package Size: 500 µg
Physical State: Powder

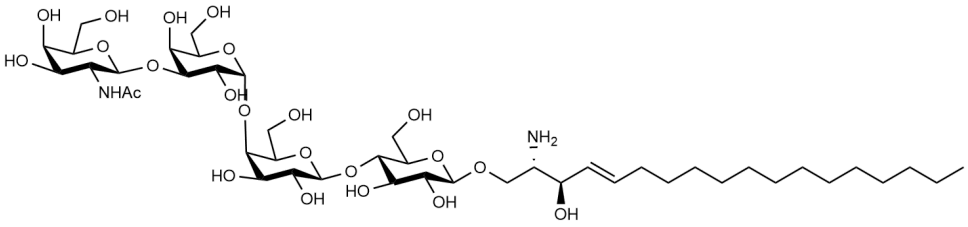
iGB3 Cer (d18:1/17:0)



Product Code: A86722
Legacy Code: 860722
Molecular Weight: 1038.35
Purity: >99%
Package Size: 500 µg
Physical State: Powder

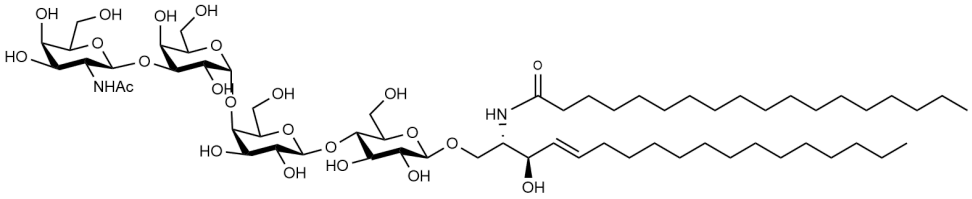
GB4 Derivatives

GB4 Sphingosine (d18:1)



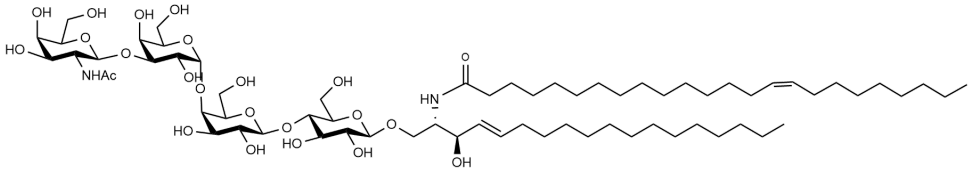
Product Code: A86138
Legacy Code: 860138
Molecular Weight: 989.12
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GB4 Cer (d18:1/18:0)



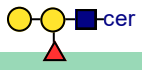
Product Code: A86150
Legacy Code: 860150
Molecular Weight: 1255.59
Purity: >97%
Package Size: 1 mg
Physical State: Powder

GB4 Cer (d18:1/24:1)

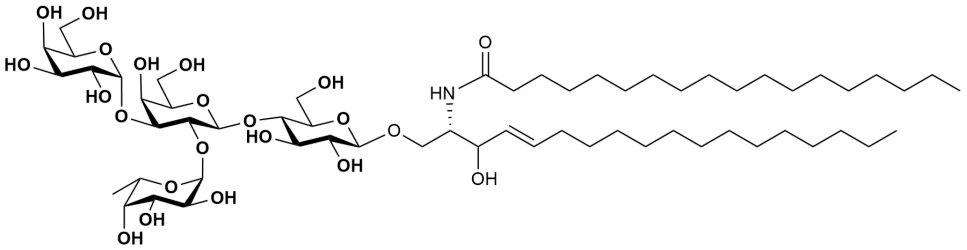


Product Code: A86166
Legacy Code: 860166
Molecular Weight: 1337.73
Purity: >97%
Package Size: 1 mg
Physical State: Powder

B-Antigen Derivatives



B Antigen Cer (d18:1/18:0)



Product Code: A86155
Legacy Code: 860155
Molecular Weight: 1198.53
Purity: >97%
Package Size: 1 mg
Physical State: Powder

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FAQ's

Avanti Research
A CRODA BRAND

1. Purity and quality assurance

Q How pure are Avanti Research's glycosphingolipids?

A All products undergo strict QC and achieve ≥97% purity, confirmed by advanced analytical techniques and detailed Certificates of Analysis (CoA).

2. LC-MS Compatibility

Q Are these products suitable for LC-MS quantification?

A Yes. Our isotopically labeled standards, like C18:0-d7 gangliosides, are validated in multiplex LC-MS workflows to enable accurate lipid profiling in serum and tissue.

3. Gangliosides vs. Globosides

Q What's the difference between gangliosides and globosides?

A Gangliosides contain one or more sialic acid residues, giving them a negative charge and roles in neuronal signaling. Globosides are neutral lipids involved in blood group expression and pathogen recognition.

4. Synthetic vs. Extracted

Q Why choose synthetic glycolipids over ones extracted from natural sources?

A Synthetic glycolipids ensure consistent performance across batches and eliminate variability caused by natural sources or isolation methods.

5. Packaging and custom options

Q Do you support bulk or custom requests?

A Yes. We provide flexible packaging, bulk formats, and custom synthesis of specific ceramide or sugar variants to meet diverse research needs.

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