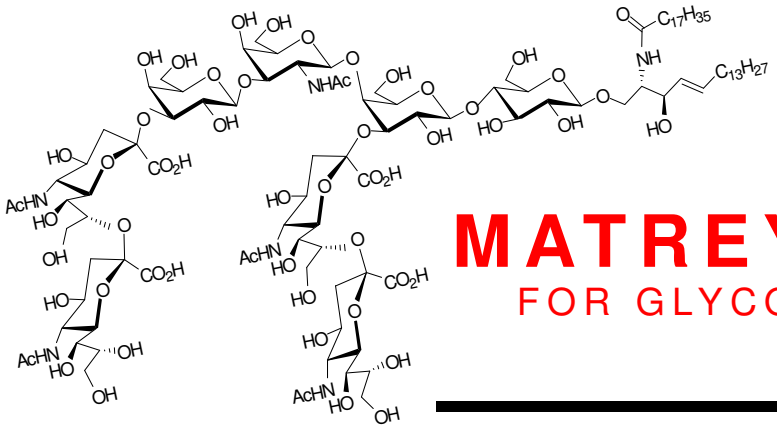
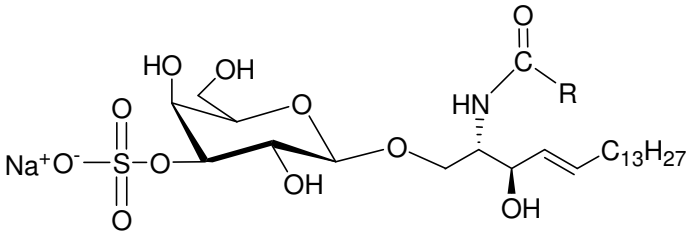


MATREYA NEWSLETTER

FOR GLYCO/SPHINGOLIPID RESEARCH

JULY 2011

Sulfatides



Sulfatides are 3-sulfated galactosylceramides that are found primarily in the central nervous system and are myelin specific sphingolipids. Over the last several decades sulfatides have been linked to many physiological functions and recently there has been a renewed interest in its role in diseases. Sulfatides derived from the brain and spinal cord have different molecular species of varying fatty acyl chains containing saturated, unsaturated, and 2-hydroxy acyl chains, the composition of which are vital in influencing their function. Sulfatides have been found to have many critical physiological functions both intracellular and intercellular. Sulfatides have also been found to be involved in numerous diseases, especially demyelinating diseases. Various infections, including influenza virus A and tuberculosis, have been demonstrated to be influenced by the actions of sulfatides. Recently studies have implicated sulfatides in numerous inflammatory responses and there has been significant interest in its biological role towards CD1-restrticted T cells.

Physiological Properties of Sulfatides:

1. Cell growth
2. Cell adhesion
3. Cell signaling
4. Protein trafficking
5. Neuronal signal transduction
6. Cell/cell recognition
7. Neuronal plasticity
8. Cell morphogenesis

Sulfatide Related Diseases:

1. Metachromatic leukodystrophy
2. Parkinsons disease
3. Globoid-cell leukodystrophy (Krabbe disease)
4. Alzheimer disease
5. Abnormal axonal disfunction
6. Dysmyelinosis, loss of axonal conduction
7. ApoE Lipoprotein/sulfatide complex in cerebrospinal fluid (in CNS and PNS)
8. Ligand for HIV and Influenza

One of the most important areas of sulfatide research today is the study of its involvement in diseases and disorders. Recently Merrill and his coworkers[1] described that sulfatide levels are elevated in ovarian cancer with the most prevalent sulfatide species detected via MALDI-TIMS being d18:1/C16:0, d18:1/C24:1 and d18:1/C24:0-ST. This elevation in sulfatides can be exploited as an ovarian cancer biomarker and as a possible therapeutic approach. Thiagarajan and his coworkers[2] demonstrated that sulfatides play a significant role in hemostasis and thrombosis by forming stable platelet aggre-

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Sulfatides (Continued)

gates. Kyogashima[4] has written an excellent review on the role of sulfatides in thrombogenesis/hemostasis. Han and his group[3] found that sulfatide content precipitously drops in Alzheimers Disease and CNS sulfatide content is modulated by apolipoprotein E. In multiple sclerosis the identity of the target antigen has long been unidentified but Ilyas et al.[5] found that elevated antisulfatide antibodies were significantly higher in multiple sclerosis patients than in controls. Park's group[6] in Korea found that sulfatide activates inflammatory responses as an endogenus stimulator in brain-resident immune cells. Kumar et al.[7] found that sulfatide derived from myelin binds promiscuously to several human CD1 molecules and to murine CD1d and is recognized by type II NKT cells. Among the sulfatides, cis-tetracosenoyl sulfatide is immunodominant and can either prevent or reverse antigen-induced experimental autoimmune encephalomyelitis in $CD1d^{+}/^{+}$mice. Kumar[8] also has written an excellent mini-review article about the "Immune Response to Myelin-Derived Sulfatide and CNS-Demyelination" and he proposes the use of sulfatide to reverse autoimmune demyelinating diseases in humans. Kumar's group[9] found in hepatic ischemic reprofusion injury (IRI) subsets of NKT cells have opposing roles. Type I NKT cells promote injury while sulfatides-reactive type II NKT cells protect against injury. CD1d activation of NKT cells is conserved from mice to human, so strategies to modify these processes might be developed to treat patients with hepatic reperfusion injury. Suzuki's group[10] reported that sulfatides bind to human and animal influenza A virus and inhibits viral infection. Han's group[11] reported that abnormal sulfatide metabolism can induce cell apoptosis due to endosome-mediated ceramide generation and the accumulation of cytotoxic levels of sulfatides in lysosomes.

We at Matreya, are proud to introduce our sulfatide series for your research. The following list will satisfy your requirement of saturated, unsaturated and fluorescent labeled fatty acyl chain containing sulfatides.

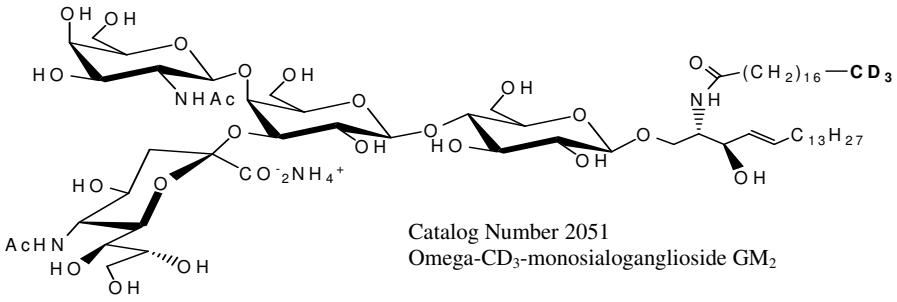
Sulfatides from Matreya (purity 98^{+}%)

	Catalog #	Product Name	Unit Size	Price
	1049	Sulfatides	50 mg	$325.00
	1904	lyso-Sulfatide	1 mg	$370.00
	2076	N-Acetyl-sulfatide (C2:0-sulfatide)	1 mg	$250.00
	1875	N-Palmitoyl-sulfatide (C16:0-sulfatide)	1 mg	$250.00
New!	1932	N-Octadecanoyl-sulfatide (C18:0-sulfatide)	1 mg	$275.00
New!	1933	N-Octadecenoyl-sulfatide (C18:1-sulfatide)	1 mg	$275.00
	1536	N-Octadecanoyl-D3-sulfatide (C18:0-D3-sulfatide)	1 mg	$357.00
	1888	N-Tetracosanoyl-sulfatide (C24:0-sulfatide)	1 mg	$275.00
New!	1931	N-Tetracosenoyl-sulfatide (C24:1-sulfatide)	1 mg	$275.00
	1632	N-Dodecanoyl-NBD-sulfatide (C12:0-NBD-sulfatide)	100 µg;1 mg	$102.00; $453.00

References:

1. Merrill, A. H. Jr. et al., Mol. Cancer 9,186 (2010)
2. Thiagarajan, P. et al., Arterioscler. Thromb. Vasc. Biol., 25,258 (2005)
3. Han, X. et al., Journal of Neurochemsitry 106,1275 (2008)
4. Kyogashima, M., Archives of Biochemistry and Biophysics, 426(2),157 (2004)
5. Ilyas, A. A. et al., Journal of Neuroimmunology, 139,76 (2003)
6. Park, E. J. et al., Journal of Immunology, 181,8077 (2008)
7. Kumar et al., Journal of Clinical Investigation, 117,2302 (2007)
8. Kumar et al., Neurochemical Research, 32,257 (2007)
9. Kumar et al. Gastroenterology, 140(2),646 (2011)
10. Suzuki, Y. et al., Biochem. J., 318,389 (1996)
11. Han, X. et al. Biochem. J. 410,81 (2008)

Deuterated Gangliosides



Catalog Number 2051
Omega-CD_3-monosialoganglioside GM_2

Matreya is pleased to introduce a series of high purity **deuterated** gangliosides that are ideal as mass spectrometry standards. We now offer monosialogangliosides GM_1, GM_2 and GM_3 as labeled compounds. These deuterated gangliosides are ideal for the identification of gangliosides in samples and biological systems using mass spectrometry.[1] Gangliosides are acidic glycosphingolipids that form lipid rafts in the outer leaflet of the cell plasma membrane, especially in neuronal cells in the central nervous system. They participate in cellular proliferation, differentiation, adhesion, signal transduction, cell-to-cell interactions, tumorigenesis, and metastasis.[2]

GM_1 stimulates neuronal sprouting and enhances the action of nerve growth factor (NGF) by directly and tightly associating with Trk, the high-affinity tyrosine kinase-type receptor for NGF. It is the specific cell surface receptor for cholera toxin.

GM_2 regulates the function of ciliary neurotrophic factor receptors. The accumulation of GM_2 (due to a deficiency in β-hexosaminidase) has characterized Tay-Sachs disease (due to a mutation in the gene *HEXA*) and Sandhoff disease (due to a mutation in the gene *HEXB*). A mutation in the *GM2A* gene results in GM2 activator deficiency that also leads to accumulation of GM_2.[3]

GM_3 is the main ganglioside of human fibroblasts and can regulate fibroblast and epidermal growth factors[4] and is also able to regulate the adhesion and migration of several carcinoma cell lines. GM_3 was also shown to inhibit tumor cell invasion. GM_3 can induce human promyelocytic leukemia HL-60 cells to differentiate to monocyte/macrophage lineage instead of granulocytes.[5]

	Catalog #	Product Name	Unit	Price
	2050	N-omega-CD_3-Octadecanoyl monosialoganglioside GM_1 (NH_4^+ salt)	0.5 mg	$375.00
New!	2051	N-omega-CD_3-Octadecanoyl monosialoganglioside GM_2 (NH_4^+ salt)	250 µg	$275.00
New!	2052	N-omega-CD_3-Octadecanoyl monosialoganglioside GM_3 (NH_4^+ salt)	250 µg	$250.00

References:

1. Gu, C. Tifft and S. Soldin "Simultaneous quantification of G_{M1} and G_{M2} gangliosides by isotope dilution tandem mass spectrometry" *Clinical Biochemistry*, Vol. 41(6) pp. 413-417, *2008*
2. S. Birkle, G. Zeng, L. Gao, R.K. Yu, and J. Aubry "Role of tumor-associated gangliosides in cancer progression" *Biochimie*, Vol. 85 pp. 455–463, *2003*
3. R. Gravel et al., *The Metabolic and Molecular Bases of Inherited Disease* (C. R. Scriver, W. S. Sly, B. Childs, A. L. Beaudet, D. Valle, K. W. Kinzler, and B. Vogelstein, eds) pp. *3827*–3876, McGraw-Hill Inc., New York, *2001*
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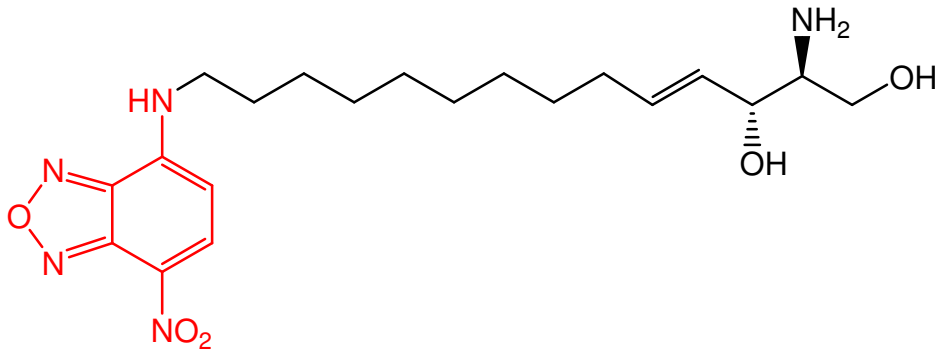
5. T. Chung, H. Choi, Y. Lee, and C. Kim "Molecular mechanism for transcriptional activation of ganglioside GM3 synthase and its function in differentiation of HL-60 cells" *Glycobiology,* Vol. 15:3, pp. 233-244, *2004*

Fluorescent Labeled Sphingosine Analog



Sphingolipids tagged with fluorescent groups are important probes to study the lipid trafficking in living cells and is ideal as an internal standard. Specifically, NBD fluorescent lipids are ideal for studying the intracellular accumulation and localization of lipids. NBD-labeled sphingolipids have higher rates of transfer in the aqueous phases than their BODIPY analogs and are environmentally-sensitive in their fluorescence characteristics. NBD-labeled lipids also allow for the detection of very small amounts of the studied compound.

Matreya is proud to announce that we have successfully synthesized omega-N-NBD-D-*erythro*-C_{14}-Sphingosine. Purity of this product is 98^{+}% and has the natural D-*erythro* stereochemistry.

	Catalog #	Product Name	Unit Size	Price
New!	1634	omega-N-NBD-D-*erythro*-C_{14}-Sphingosine	1 mg	$450.00

Reference:

K. Högenauer et al., Chem. Commun., 5086 (2005)