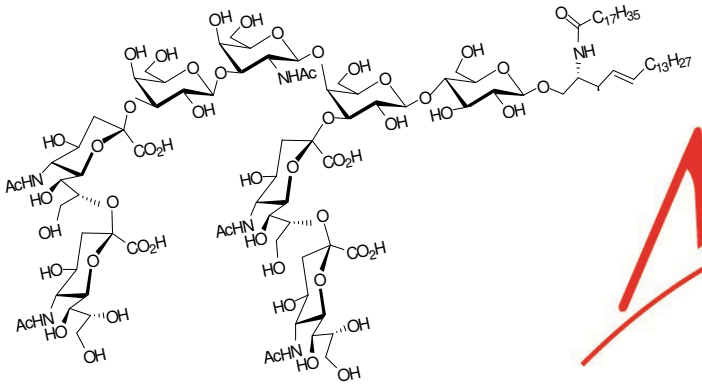


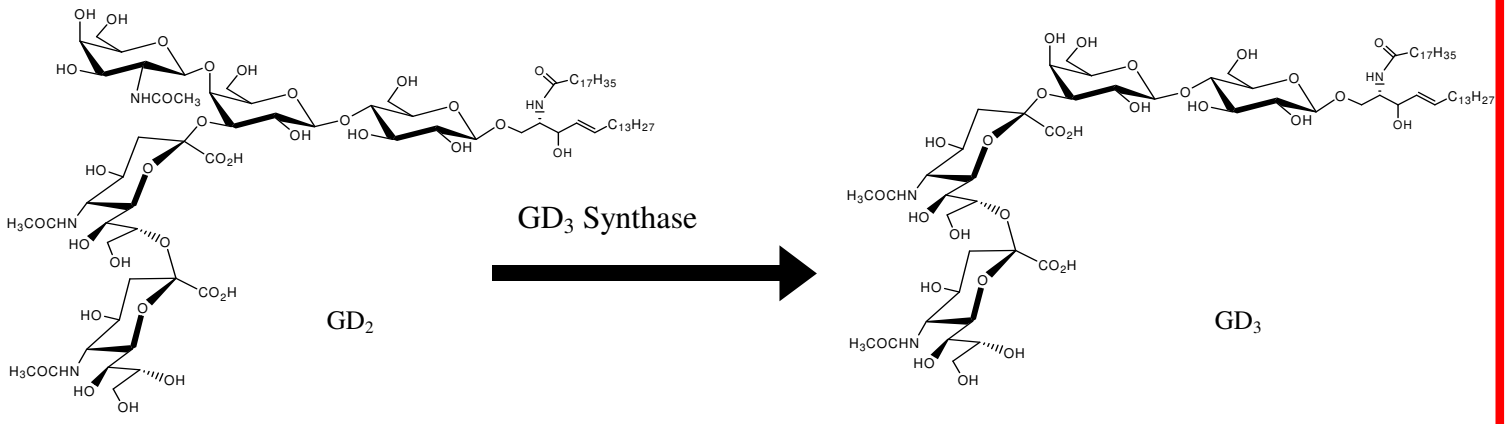
MATREYA LLC

Lipids and Biochemicals

NEWSLETTER FOR GLYCO/SPHINGOLIPID RESEARCH

MARCH 2019

Gangliosides and Cancer[1,2]



Gangliosides are an extremely important class of glycolipids containing sialic acids. They are very abundant in the brain tissue. GD_2 and GD_3 are markedly increased in certain pathological conditions such as cancer and some neurodegenerative disorders. GD_2 and GD_3 play a crucial role in cancer by controlling cell i) migration, ii) proliferation, iii) invasion, iv) adhesion, and v) angiogenesis and vi) preventing the immunosuppression of tumors. GD_3 synthase is the regulative enzyme for the synthesis of GD_3 and GD_2. This enzyme is very important in tumorigenesis and the development of cancer. Matreya produces high purity GD_2 and GD_3 gangliosides.

Triptolide, a diterpenoid epoxide inhibitor, is produced by the thunder god vine *Triptergicem wilfordi*. Synthetic, water-soluble prodrug minnelide is a derivative of triptolide being studied clinically in cancer research.

Product Name	Catalog Number	Purity
Disialoganglioside GD_2	1527	98+%
Disialoganglioside GD_3	1504	98+%

References:
1. G. Du et al. Acta Pharmaceutica Sinica B 8(5), 713 (2018)
2. Chug, Rohit (2012) Science Translational Medicine, 4(156)

Inside This Issue

Sulfatides in Alzheimer's Disease and Multiple Sclerosis

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 their role in diseases. Sulfatides are highly multifunctional glycolipids involved in the nervous system, diabetes, immune system, hemostasis/thrombosis, bacterial infection, and viral infection.[1] By understanding the correlation between sulfatide's normal physiological functions and specific roles in disease, new diagnostic and therapeutic methods can be evaluated.

Due to its prevalence in the myelin sheath of nerves, it is not surprising that sulfatide metabolism has been implicated in many neural degenerative illnesses, such as Alzheimer's disease and multiple sclerosis. Sulfatide content is found to precipitously drop in Alzheimer's disease, with its concentration in the central nervous system being modulated by apolipoprotein E.[2,3] Low levels of sulfatides are specific for Alzheimer's diseased brains as this phenomenon does not occur in other central nervous system disorders, such as Parkinson's disease, Lewy body dementia, frontotemporal dementia, or multiple sclerosis.[1]

In fact, in multiple sclerosis, a chronic inflammatory disease of the central nervous system where the myelin sheath around nerve fibers becomes the target of an autoimmune attack leading to demyelination, axonal loss, and subsequent progressive neurologic functional deficits, quite the opposite occurs. The identity of the target antigen of multiple sclerosis has long been unidentified but it was recently demonstrated that levels of anti-sulfatide antibodies were significantly higher in multiple sclerosis patients' cerebrospinal fluid than in controls' CSF.[4] Sulfatides have also been demonstrated to be able to activate inflammatory responses as an endogenous stimulator in brain-resident immune cells.

Sulfatides are highly dynamic glycosphingolipids with far-reaching biological processes. A greater understanding of these functions in living systems will lead to the elucidation of associated diseases and the development of therapeutic treatments for them.

Product Name	Source	Catalog Number
Sulfatides	Natural/Bovine	1049
lyso-sulfatide	Semisynthetic/Bovine	1904
N-Glycinated lyso-sulfatide	Semisynthetic/Bovine	2092
N-Acetyl-sulfatide	Semisynthetic/Bovine	2076
N-Dodecanoyl-sulfatide	Semisynthetic/Bovine	1938
N-Hexadecanoyl-sulfatide	Semisynthetic/Bovine	1875
N-Heptadecanoyl-sulfatide	Semisynthetic/Bovine	1934
N-Octadecanoyl-sulfatide	Semisynthetic/Bovine	1932
N-Octadecanoyl-(*cis*-9)-sulfatide	Semisynthetic/Bovine	1933
N-Nonadecanoyl-sulfatide	Semisynthetic/Bovine	1935
N-Tetracosanoyl-sulfatide	Semisynthetic/Bovine	1888
N-Tetracosenoyl-(*cis*-16)-sulfatide	Semisynthetic/Bovine	1931
N-*omega*-CD_3-Octadecanoyl-sulfatide	Semisynthetic/Bovine	1536
N-Dodecanoyl-NBD-sulfatide	Semisynthetic/Bovine	1632
N-Hexanoyl-biotin-sulfatide	Semisynthetic/Bovine	2207
N-Octadecanoly-sulfated-lactosylceramide	Synthetic	1540

References:

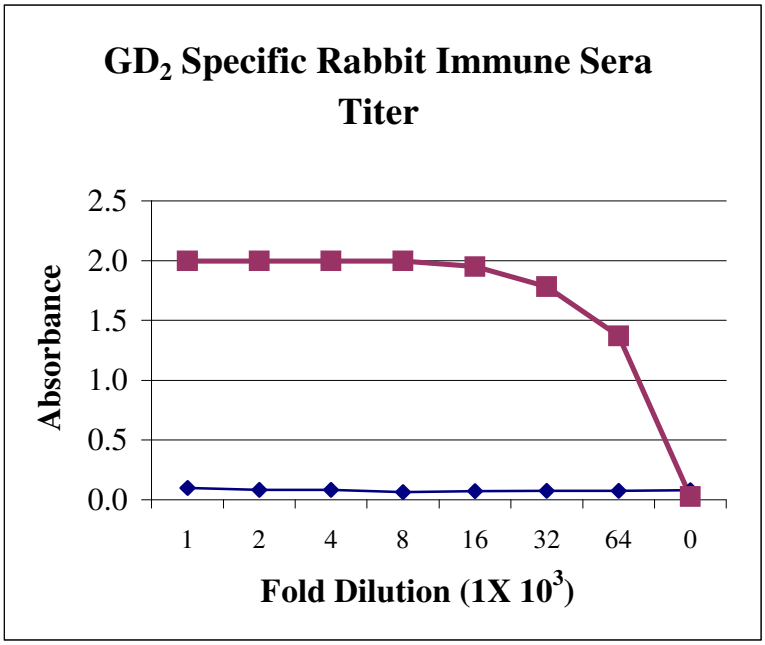
1. Chornenkyy, Y. , Wang, W. , Wei, A. and Nelson, P. T. Alzheimer's disease and type 2 diabetes mellitus are distinct diseases with potential overlapping metabolic dysfunction upstream of observed cognitive decline. *Brain Pathology*, (2019) 29: 3-17.
2. Cheng H, Wang M, Li JL, Cairns NJ, Han X. Specific changes of sulfatide levels in individuals with pre-clinical Alzheimer's disease: an early event in disease pathogenesis. *J Neurochem.* 2013;127(6):733-8.
3. X. Han et al., Sulfatides facilitate apolipoprotein E-mediated amyloid-beta peptide clearance through an endocytotic pathway.Journal of Neurochemistry (2008) 106, 1275
4. Ilyas et al., Antibodies to sulfatide in cerebrospinal fluid of patients with multiple sclerosis. Journal of Neuroimmunology (2003) 139, 76

Anti-Ganglioside GD_2

Anti-ganglioside GD_2 (anti-GD_2) is very useful in the identification of disialoganglioside GD_2 and in immunotargeting cells expressing disialoganglioside GD_2. Several gangliosides have been found to have elevated expressions in tumor cells. Many therapeutic treatments of tumor cells are being investigated using antibodies to target cells that express these elevated levels of gangliosides. Disialoganglioside GD_2 has been identified as a tumor-associated antigen and therapeutic approaches using anti-GD_2 are being investigated and show great potential.[1] Although many challenges must still be overcome in using this therapeutic approach progress is steadily going forward.[2]

Antigen: GD_2-KLH
Sample: Hyper-immune sera from rabbits at indicated dilutions

Serum Dilution	Pre-Immune Sera	Hyper-Immune Sera
1000	0.099	1.999
2000	0.084	1.999
4000	0.083	1.999
8000	0.065	1.999
16000	0.072	1.951
32000	0.074	1.781
64000	0.076	1.369
0	0.081	0.028



Product Name	Cat. Number	Amount
Anti-ganglioside GD_2	1963	50 µL

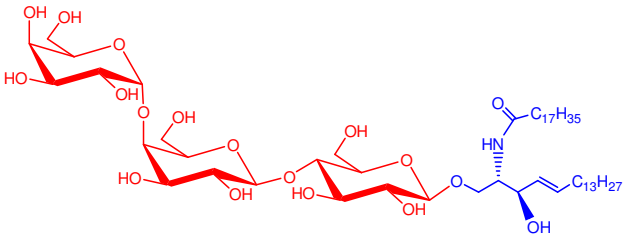
Conclusion: High antigen specific titer antibody.

References:

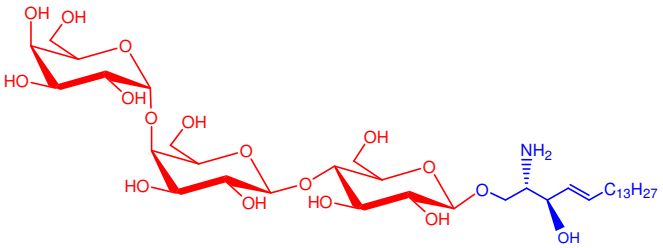
1. M. Ozkaynak et al. "Phase I Study of Chimeric Human/ Murine Anti–Ganglioside G_{D2} Monoclonal Antibody (ch14.18) With Granulocyte-Macrophage Colony-Stimulating Factor in Children With Neuroblastoma Immediately After Hematopoietic Stem-Cell Transplantation: A Children's Cancer Group Study" *Journal of Clinical Oncology*, Vol 18(24) pp. 4077-4085, *2000*
2. J. Hu et al. "Reducing Epitope Spread during Affinity Maturation of an Anti-Ganglioside GD2 Antibody" *The Journal of Immunology*, Vol. 186(4) pp. 1-8, *2009*

CTH and Shiga Toxin

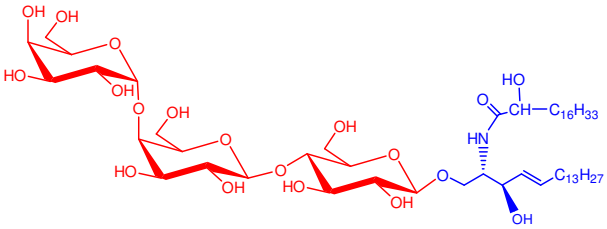
Dr. Lodato and her coworkers[1] used our bottom spot CTH [Matreya cat. no. 1514] to quantify Shiga toxins. Dr. Dudley and his group[2] at the Pennsylvania State University have also been involved in this area of research.



Ceramide Trihexoside top (non-hydroxy acyl) spot
Matreya catalog number 1513



lyso-Ceramide trihexoside
Matreya catalog number 1520



Ceramide trihexoside bottom (hydroxy acyl) spot
Matreya catalog number 1514

Product Name	Catalog Number	Amount	Purity
Ceramide trihexosides (top spot)	1513	0.5 mg	98+%
Ceramide trihexosides (bottom spot)	1514	0.5 mg	98+%
lyso-Ceramide trihexoside	1520	1 mg	98+%

References:

1. 1. Thuraisamy, T.; Lodato , P. B. Influence of RNase E Deficiency on the Production of stx2-Bearing Phages and Shiga Toxin in an RNase E-Inducible Strain of Enterohaemorrhagic Escherichia Coli (EHEC) O157:H7. *Journal of Medical Microbiology* **2018**, *67*, 724–732.
2. Matreya Newsletter for Glyco/spingolipid Research. August 2014.