

PRODUCT DATA SHEET

N-Hexanoyl-biotin-monosialoganglioside GM₃ (NH₄⁺ salt)

Catalog number: 2056

Synonyms: Biotin-C6:0-GM₃

Source: semisynthetic, bovine buttermilk

Solubility: chloroform/methanol/water,
2:1:0.1; water

CAS number: N/A

Molecular Formula: C₅₇H₉₉N₅O₂₃S • NH₃

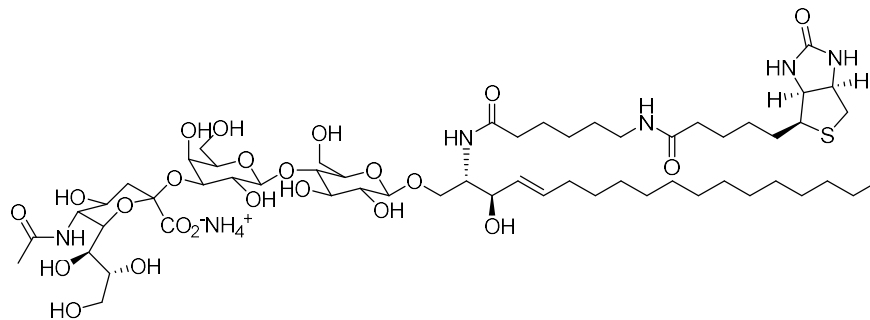
Molecular Weight: 1254 + NH₃

Storage: -20°C

Purity: TLC: >98%; identity confirmed by MS

TLC System: chloroform/methanol/2.5N
ammonium hydroxide (60:40:9)

Appearance: solid



Application Notes:

This ganglioside GM₃ analogue contains a biotin unit attached to the amine of the sphingosine moiety via a hexanoic acid linker and is ideal for use in ganglioside studies. The biotin structure allows for attachment of the ganglioside to streptavidin and avidin substrates making it extremely useful for binding to substrates and for toxin detection.¹

Gangliosides are acidic glycosphingolipids containing one or more sialic acids that generally form lipid rafts in the outer leaflet of the cell plasma membrane, especially in neuronal cells in the central nervous system.^{2,3} They participate in many cellular activities including proliferation, differentiation, adhesion, signal transduction, cell-to-cell interactions, tumorigenesis, and metastasis.⁴ The accumulation of gangliosides has been linked to several diseases including Tay-Sachs and Sandhoff disease while an autoimmune response against gangliosides can lead to Guillain-Barre syndrome. Gangliosides act as receptors for various toxins and bacteria, accumulate in various tumors, and aid in many neuronal functions.

GM₃ is the main ganglioside of human fibroblasts and can regulate fibroblast and epidermal growth factors⁴ and is also able to regulate the adhesion and migration of several carcinoma cell lines. GM₃ was also shown to inhibit tumor cell invasion. GM₃ can induce human promyelocytic leukemia HL-60 cells to differentiate to monocyte/macrophage lineage instead of granulocytes.⁵

Selected References:

1. A. Pukin et al. Chemoenzymatic synthesis of biotin-appended analogues of gangliosides GM₂, GM₁, GD_{1a} and GalNAc-GD_{1a} for solid-phase applications and improved ELISA tests. *Org. Biomol. Chem.*, 9(16):5809-5815, 2011
2. L. Svennerholm, et al. (eds.), *Structure and Function of Gangliosides*, New York, Plenum, 1980
3. T. Kolter, R. Proia, K. Sandhoff, Combinatorial Ganglioside Biosynthesis. *J. Biol. Chem.*, July Vol. 277, No. 29, pp. 25859-25862, 2002
4. E. G. Bremer, J. Schlessinger, and S. Hakomori "Ganglioside-mediated modulation of cell growth. Specific effects of GM₃ on tyrosine phosphorylation of the epidermal growth factor receptor" *J. Biol. Chem.*, Vol. 261 pp. 2434-2440, 1986
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

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