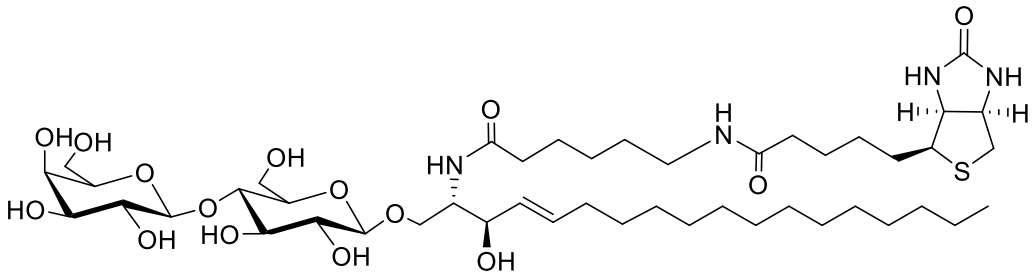
PRODUCT DATA SHEET

N-Hexanoyl-biotin-lactosylceramide

Catalog number: 2205
Synonyms: N-C6:0-Biotin-*beta*-D-lactosylceramide
Source: semisynthetic, bovine buttermilk
Solubility: chloroform/methanol 9:1, DMSO, DMF
CAS number: N/A

Molecular Formula: $C_{46}H_{82}N_4O_{15}S$
Molecular Weight: 963
Storage: -20°C
Purity: TLC: >98%, identity confirmed by MS
TLC System: chloroform/methanol/DI water (65:25:4 by vol.)
Appearance: solid



Application Notes:

N-Hexanoyl-biotin-lactosylceramide contains a biotin unit attached to the amine of the sphingosine moiety via a hexanoic acid linker and is ideal for use in sphingolipid studies. The biotin structure allows for the attachment of the lactosylceramide to streptavidin, avidin, or any other biotin binding protein making it extremely useful for substrate and toxin detection[1]. The avidin-biotin complex is the strongest known non-covalent interaction between a protein and ligand. The formation of the bond is very rapid and once formed is stable with regards to pH, temperature, organic solvents, and denaturing agents. The biotin label is attached via a 6-carbon linker reducing the interaction of the biotin with the lactosylceramide.
Lactosylceramide is the precursor of many other glycosphingolipids and also functions as a second messenger and protein receptor, making it a very important organic molecule. Many cellular processes are dependent on lactosylceramide since it is the substrate for neutral oligoglycosylceramides, sulfatides and gangliosides, all of which have their own vital functions. Lactosylceramide also helps to stabilize the lipid membrane, activate receptor molecules and acts as a receptor for certain bacteria and toxins. Its role as a second messenger has been found to be vital and dysfunctions in its processes can lead to cancer and inflammation since it is critical to neutrophil activity and in activating anti-inflammatory responses.[2] Other examples of lactosylceramide second messenger functions are tumor necrosis factor *alpha* and platelet-derived growth factor. A deficiency in the enzyme responsible for hydrolyzing the galactose of lactosylceramide leads to lactosylceramidosis, which is characterized by an accumulation of lactosylceramide that causes a primary neurological disorder.[3] Lactosylceramide is also important in the activation of platelet/endothelial cell adhesion molecule-1 which causes adhesion and diapedesis of monocytes/lymphocytes.[4]

Selected References:

1. A. Mukhopadhyay et al. "Direct interaction between the inhibitor 2 and ceramide *via* sphingolipid-protein binding is involved in the regulation of protein phosphatase 2A activity and signaling" *FASEB*, Vol. 23(3) pp. 751-763, *2009*
2. R. Pannu et al. "A Novel Role of Lactosylceramide in the Regulation of Tumor Necrosis Factor *alpha*-mediated Proliferation of Rat Primary Astrocytes: IMPLICATIONS FOR ASTROGLIOSIS FOLLOWING NEUROTRAUMA" *Journal of Biological Chemistry*, Vol. 280 pp. 13742-13751, *2005*
3. G. Dawson "Glycosphingolipid levels in an unusual neurovisceral storage disease characterized by lactosylceramide galactosyl hydrolase deficiency: lactosylceramidosis" *Journal of Lipid Research*, Vol. 13 pp. 207-219, *1972*
4. N. Gong "Lactosylceramide recruits PKCα/ε and phospholipase A_2 to stimulate PECAM-1 expression in human monocytes and adhesion to endothelial cells" *Proceedings of the National Academy of Sciences*, Vol. 101:17 pp. 6490-6495, *2004*

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