Purification of Glycosphingosines and Glycosphingolipids

Tech ID: 33347 / UC Case 2022-616-0

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ABSTRACT

Researchers at the University of California, Davis (UC Davis) have developed a simplified procedure to synthesize complex glycosphingosine compounds for the chemical preparation of glycosphingolipids.

FULL DESCRIPTION

Glycosphingolipids, a sugar-conjugated lipid, are found in the cell membranes of organisms from bacteria to humans and are used in a range of biological processes such as proteinsorting,signaltransduction,membranetrafficking,viral/bacterialinfection, and cell-to-cell communications.Obtaining pure glycosphingolipid products to evaluate their biological capabilities/function has proved challenging. Techniques to synthesize synthetic glycosphingolipids have been developed using a variety of chemical procedures. However, they have proven to be complicated to carry out and often result in low product yields due to their complexity.

Researchers at UC Davis have developed an improved process to prepare glycosphingolipids using a simplified strategy whereby glycosphingosines are produced/used as an intermediary for creating glycosphingolipids.The technique allows for the efficient synthesis of glycosphingosines and glycosphingolipids, which can be easily cleansed by adding a commercially available detergent, thereby increasing reaction efficiency, and purified/filtered using commercially available solid extraction cartridges. The developed synthesis technique increases reaction dynamics and allows modifying the created glycosphingosines and glycosphingolipids by adding sugars and fats to evaluate the product's potential for new medical applications.

APPLICATIONS

- Efficient synthesis of a range of glycosphingosines and glycosphingolipids materials.
- Exploration of the created glycosphingosines and glycosphingolipids molecules for use in new diagnostic, disease, and therapeutic treatments.

FEATURES/BENEFITS

- Efficient synthesis of glycosphingosines and glycosphingolipidsusing a single reactor vessel.
- The synthesis technique is simpler to perform and avoids lengthy separation and purification steps.
- Product cleansing/purification is performed using commercially available detergents/extraction cartridges.
- Synthesis of glycosphingosines is environmentally friendly; it requires water, not toxic reagents.

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Reference for National Filings	WO 2024/097788	05/10/2024	2022-616

Patent Pending

INVENTORS

- Chen, Xi
- Yu, Hai
- Zhang, Libo

OTHER INFORMATION

KEYWORDS

glycosyltransferase, process engineering, chemoenzymatic synthesis, ganglioside, glycosphingosine, glycosphingolipid

CATEGORIZED AS

- **Medical**
  - Diagnostics
  - Other
  - Therapeutics

RELATED CASES

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ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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- Using Escherichia coli to Produce Human Milk Oligosaccharide Lactodifucotetraose
- 4-N-Derivatized Sialic Acids and Related Sialosides
- Substrate And Process Engineering For Biocatalytic Synthesis And Facile Purification Of Human Milk Oligosaccharides (HMOs)
- O-Acetyl Glycosphingosines and Gangliosides, as well as Their N-Acetyl Analogs
- Stable N-acetylated analogs of Sialic Acids and Sialosides

- Alpha2-6-Linkage-Specific Sialidase Mutants
- Alpha1–2-Fucosyltransferase for Enzymatic Synthesis of Alpha1–2-linked Fucosylated Glycans
- Engineering Pasteurella Multocida Heparosan Synthase 2 (Pmhs2) For Efficient Synthesis Of Heparosan Heparin And Heparan Sulfate Oligosaccharides
- One-Pot Multienzyme Synthesis of Sialidase Reagents, Probes and Inhibitors
- Lacto-N-tetraose Biosynthesis from Lactose via Metabolically Rewired Escherichia Coli
- Novel Methods For Chemical Synthesis Of Lactosyl Sphingosines, Glucosylsphingosines, Galactosylsphingosines, And 3-O-Sulfogalactosylsphingosines

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