Alpha1–2-Fucosyltransferase for Enzymatic Synthesis of Alpha1–2-linked Fucosylated Glycans

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ABSTRACT

Researchers at the University of California, Davis have discovered an alpha1–2-fucosyltransferase that efficiently catalyzes the synthesis of alpha1–2-linked fucosylated glycans that can contain different internal glycans.

FULL DESCRIPTION

Alpha1–2-linked fucosides are important for their potential application in treating inflammation, bacterial and viral infection and cancer. They are also major components of human milk oligosaccharides. Therefore, they are desirable synthetic targets for therapeutic and prebiotic development. The acid lability, however, make the chemical construction of the fucosidic bond difficult. Fucosyltransferase-catalyzed methods that are highly efficient and selective can be an indispensable resource in obtaining biomedically important fucoside-containing glycans and other biomolecules.

Researchers at the University of California, Davis have discovered an alpha1–2-fucosyltransferase that efficiently catalyzes the synthesis of alpha1–2-linked fucosylated glycans containing different internal glycans. With a one-pot multienzyme startegy, Te1-2FT-catalyzed fucosylation reactions were accomplished without needing high-cost sugar nucleotides or isolation of intermediates. Synthesis typically occurs in less than 24 hours, and purification and characterization of the product can be completed in less than 3 days, making this process faster and more efficient than chemical synthetic approaches. Finally, the enzyme reactions can be carried out in aqueous solutions, avoiding toxic organic solvents.

APPLICATIONS

- Potential target for therapeutic development for treating cancer, bacterial and viral infection, and inflammation
- Synthesis of important fucosides that play a protective role in human milk for nursing infants

FEATURES/BENEFITS

- Excellent yields with defined regio- and stereoselectivity
- Simplified isolation and purification
- Faster and more efficient than chemical synthetic methods
- Reactions can be carried out in aqueous solutions
- Avoids toxic solvents

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,572,548	02/07/2023	2015-838

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OTHER INFORMATION

KEYWORDS

alpha1–2-fucosyltransferase, fucoside, fucosylation, enzymatic synthesis, one-pot multienzyme, OPME, oligosaccharides

CATEGORIZED AS

- **Biotechnology**
  - Other
- **Materials & Chemicals**
  - Biological
  - Chemicals
  - Other
- **Medical**
  - Other
  - Therapeutics

- **Research Tools**
  - Other

RELATED CASES

2015-838-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Purification of Glycosphingosines and Glycosphingolipids
- A Photobacterium Sp. Alpha2-6-Sialytransferase 9Psp2.6St) A366g Mutant With Increased Expression Level And Improved Activity In Sialylating Tn Antigen
- Synthesis of Capsular Polysaccharides
- Legionaminic Acid Glycosyltransferases for Chemoenzymatic Synthesis of Glycans and Glycoconjugates
- 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
- 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
- Novel Methods For Chemical Synthesis Of Lactosyl Sphingosines, Glucosylsphingosines, Galactosylsphingosines, And 3-O-Sulfogalactosylsphingosines

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