

Highly Efficient Glycosylation Chemistry that Enables Automatic Carbohydrate Synthesis

Tech ID: 32316 / UC Case 2021-867-0

BACKGROUND

Carbohydrates serve essential biological functions, and among them, oligosaccharides play a critical role in cell recognition (e.g. blood type recognition) and cell binding. The structural complexity of oligosaccharides independently or with biomolecules (e.g. natural products, lipids, proteins) poses significant challenges to their synthesis and obstructs the analysis of their biological functions. A highly stereoselective construction of 1,2-cis glycosidic bonds that applies to every sugar type has yet to be developed due to the lack of efficient access to oligosaccharides, despite over a century of research in carbohydrate chemistry. Such a construction would allow for the automation of complex carbohydrate synthesis.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed an efficient synthesis of carbohydrate molecules using a traceless directing group on the anomeric leaving group. Unlike the current construction of 1,2-cis glycosides that is limited to a specific glycosyl donor, this invention employs a traceless directing group and permits a general application to any glycofuranosyl/glycopyranosyl donor. Automatic synthesis of complex carbohydrate molecules using this approach will have significant commercial potential due to glyco-molecules' critical biological/medical roles in a range of cellular events including combating diseases and viral infections (i.e. COVID-19), and cell-cell recognition. Alternatively, this technology can be developed into marketable glyco-synthesizers by producing more complex and demanding oligosaccharides, similar to the commercial success realized by automatic peptide and nucleic acid synthesis technologies.

ADVANTAGES

- ▶ General application of glycosylation strategy
- ▶ Control of anomeric stereochemistry
- ▶ Enables automated carbohydrate synthesis

APPLICATIONS

- ▶ Therapeutics/drug screening programs
- ▶ Viral infection and disease characterization
- ▶ Cell-cell recognition applications

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OTHER INFORMATION

KEYWORDS

glycosides, glycosyl donor, traceless directing group, glycofuranosyl, glycopyranosyl, Automatic synthesis, carbohydrate, cell-cell recognition, glyco-synthesizers, carbohydrate synthesis, drug screening, viral infection, Disease characterization

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Bioinformatics
 - ▶ Health
 - ▶ Other
- ▶ **Medical**
 - ▶ Diagnostics
 - ▶ Disease: Infectious Diseases
 - ▶ Disease: Substance Abuse
 - ▶ New Chemical Entities, Drug Leads

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240132530	04/25/2024	2021-867

- ▶ Other
- ▶ Screening
- ▶ Therapeutics

RELATED CASES

2021-867-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Two-Step Synthesis Of Properly Protected and Activated Unnatural Amino Acid For Peptide Synthesis
- ▶ Sn2 Glycosylation Suitable For Automated Glycan Synthesis

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