Sn2 Glycosylation Suitable For Automated Glycan Synthesis

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BACKGROUND

Glycans and their conjugated forms including peptidoglycans, glycoproteins, glycopeptides, glycolipids, and lipopolysaccharides play key roles in a variety of vital biological processes and many pathological events including signal transduction, fertilization, metathesis, cell-cell adhesion, viral infection, and immune responses. Chemical synthesis of these complex carbohydrate structures hinges on the stereoselective construction of glycosidic bonds, can only be performed by well-trained carbohydrate chemists, and may require significant time commitment, due to the unpredictable nature of various transformations. As a result, there is an unmitigated bottleneck in studying complex glycans for their cellular functions and medical utilities, due to the lack of material access. The solution to this long-standing challenge is the development of highly stereoselective glycosylation of broad applicability, with high efficiency, and in short duration. With these features, automated synthesis of complex glycans can become a reality. Like peptide or nucleic acid synthesizer empowering a broad range of biomedical research, automated glycan synthesizer can spur dramatic advances in glycobiology and glycomedicine by making complex glycan available to biomedical researchers.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed a novel directing group on leaving group strategy to achieve SN2 glyclosylation. This innovative approach uses an extremely mild, cheap, functional groupcompatible stoichiometric activation strategy and features high levels of stereoselectivity, high reaction efficiency, and general applicability. The reaction time typically ranges from 30 minutes to 1 hour, which is ideal for automated synthesis. This approach is particularly effective in the construction of challenging 1,2-cisglycosidic linkages and has the potential to greatly facilitate automated carbohydrate synthesis.

ADVANTAGES

- Fills a significant gap in glycosylation synthesis technology with stereospecificity
- Facilitates advance in glycobiology and the development of glycomedicines
- Cost-effective and timesaving quick reaction times

APPLICATIONS

- Stereospecific glycosylation motif that enable automation

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Highly Efficient Glycosylation Chemistry that Enables Automatic Carbohydrate Synthesis

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OTHER INFORMATION

KEYWORDS

glycosylation, glycan, glycan synthesis, peptidoglycans, glycoproteins, glycopeptides, glycolipids, lipopolysaccharides, biomedical, glycosidic bonds, stereoselective glycosylation, automated synthesis, synthesis, SN2 glyclosylation, stoichiometric, automated carbohydrate synthesis

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Other

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