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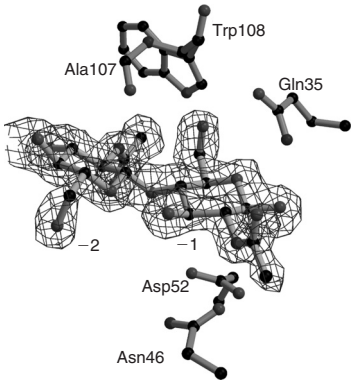
RESEARCH FRONT: Carbohydrates and Other Sticky Topics

Forewords

Reviews

0004-9425/09/06xxiii

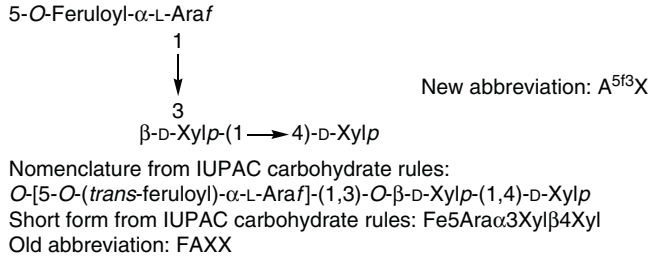
Rapid Communication



Inspiration for the design of clinically-relevant glycosidase inhibitors comes from the distortions of the substrates at the transition state. We show that, in contrast to some historical work, enzyme-product complexes of lysozyme need not be distorted. That the substrate is distorted at the Michaelis complex and transition state, however, remains at the forefront of current thinking in the field.

Highlight

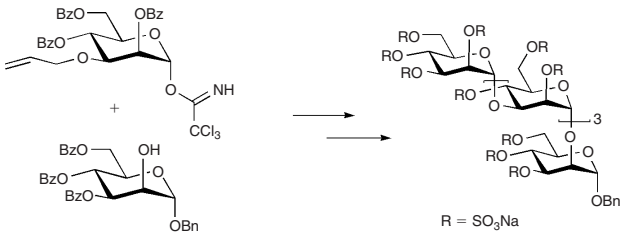
This article describes a convenient and information-rich method to name heteroxylans. IUPAC rules do not provide simple nomenclature for heteroxylans, but current short names are informationally poor. The naming system described provides a single letter-based system that should radically improve the published descriptions of heteroxylan structures, while remaining accessible to most researchers.



Full Papers

Arsenic-containing carbohydrates (arsenosugars) are natural constituents of marine organisms, which are of toxicological interest because they occur in common seafood. The first synthesis of two major arsenosugars that occur widely in seafood is reported. A full toxicological assessment of these compounds is now possible.

The illustrated sulfated pentasaccharide glycoside is a potent inhibitor of angiogenesis, i.e., the growth of new blood vessels from pre-existing ones surrounding a tumour. An efficient synthetic route to this pentasaccharide and its analogues has been developed which utilizes only two monosaccharide building blocks and minimizes the use of toxic reagents.

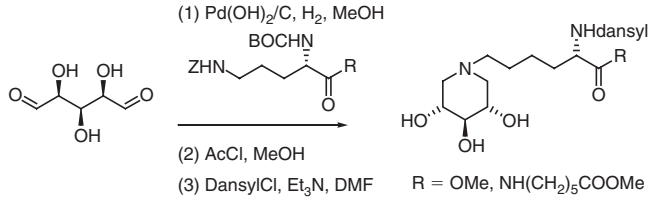


Synthesis and Biological Evaluation of 1,5-Dideoxy-1,5-iminoxylitol–Amino Acid Hybrids as Xylosidase Inhibitors

Andreas J. Steiner, Arnold E. Stütz, Chris A. Tarling, Stephen G. Withers, Tanja M. Wrodnigg

Aust. J. Chem. **2009**, *62*, 553–557.

Iminoalditols are powerful competitive inhibitors of many glycosidases. They have found important roles as biological probes, for example in the investigation of glycoprotein trimming glycosidases, and have become valuable diagnostic tools for studies of enzyme active sites and catalytic mechanisms. 1,5-Dideoxy-1,5-iminoxylitol–amino acid hybrids have been synthesized by cyclisation via a double reductive amination of *xylo*-pentodialdose, further modification with aromatic substituents gave access to fluorescent lipophilic derivatives. Kinetic studies revealed that all compounds exhibited better inhibitory properties against β-xylosidase from *Thermoanaerobacterium sacharolyticum* than the parent iminosugar. By further functionalisation with other reporter groups or attachment to suitable surfaces such compounds could be useful tools for studying xylanases and β-xylosidases.

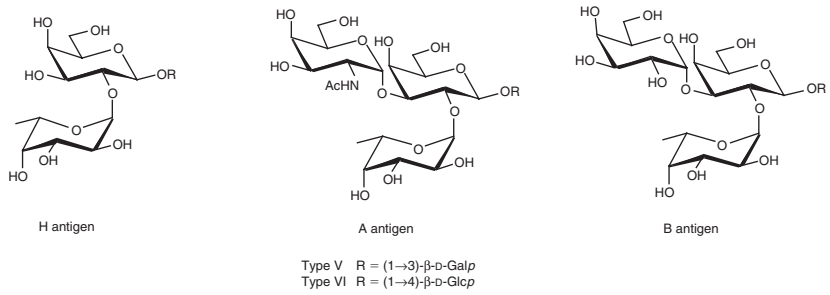


Synthesis of ABO Histo-Blood Group Type V and VI Antigens

Peter J. Meloncelli, Todd L. Lowary

Aust. J. Chem. **2009**, *62*, 558–574.

The ABO histo-blood group oligosaccharides form part of one of the most important carbohydrate-based antigen groups, and they must be considered when conducting both blood transfusions and organ transplants. Here we report the synthesis of the ABO type V and VI antigens via a linear chemical synthesis in multimilligramme quantities. These targets will play an important role in a range of biochemical studies including the development of tolerogens for ABO-incompatible heart transplants.



A Chemoenzymatic Route to Conjugatable β(1→3)-Glucan Oligosaccharides

Emilie Montel, Maria Hrmova, Geoffrey B. Fincher, Hugues Driguez, Sylvain Cottaz

Aust. J. Chem. **2009**, *62*, 575–584.

A methodology employing glycosynthase technology gives access to β(1→3)-glucan oligosaccharides conjugatable on both reducing and non-reducing ends. These oligosaccharide derivatives constitute valuable tools for the design of probes useful for the studies of receptors and enzymes associated with β(1→3)-glucans.