

## Advancement in Carbohydrate Chemistry: Novel Approach for Synthesizing Disaccharides and Arylthiosugars

Oligosaccharides are biologically important carbohydrates embedded in various natural products and are essential components of many bioactive molecules. Among all the disaccharides 1-1 and 1-3 *O/S*-linked disaccharides have great importance in the field of glycobiology. In particular, 1-3 *S*-linked disaccharides have been extensively explored as mimetics of biologically active *O*-glycosides and act as a powerful tool to probe various biological processes (Fig 1).

In response to the growing importance of these structures, Mukherjee and his team utilized biomimetic synthesis, an emerging approach in synthetic chemistry. They developed a synthesis of 3-thiosugars stereoselectively from 2-ketophenyl glycal with regioselective displacement of C3 ester group in the presence of mild base in acetonitrile at room temperature.<sup>1</sup> Further, this strategy was explored for the divergent synthesis of 1,3- and 1,1-disaccharides using 2-benzoyl glycal and anomeric thiol and/or hydroxy sugar acceptors.<sup>2</sup> This new protocol, conducted under mild conditions at room temperature, not only simplifies the synthesis process but also delivers excellent yields and high selectivity. The regio- and stereoselectivity of the newly formed interglycosidic linkages are influenced by the nature of the glycal donor (D or L) and the anomeric acceptor.

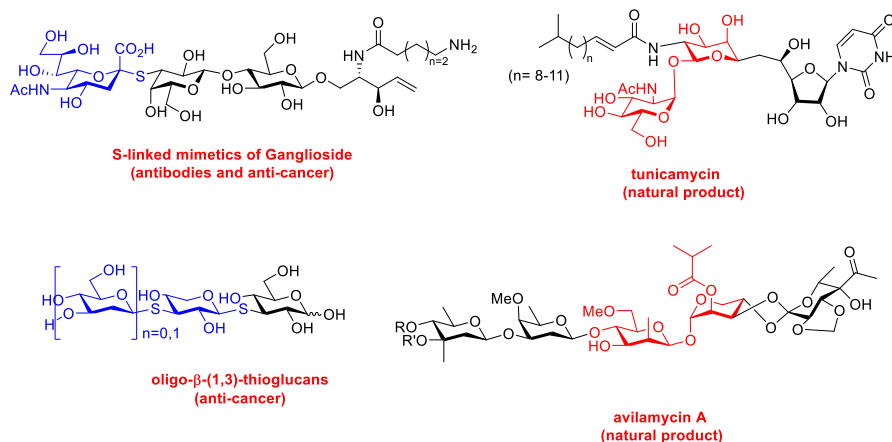


Fig.1: Naturally occurring of 1-3 linked *S*-disaccharides and 1-1 linked *O*-disaccharides

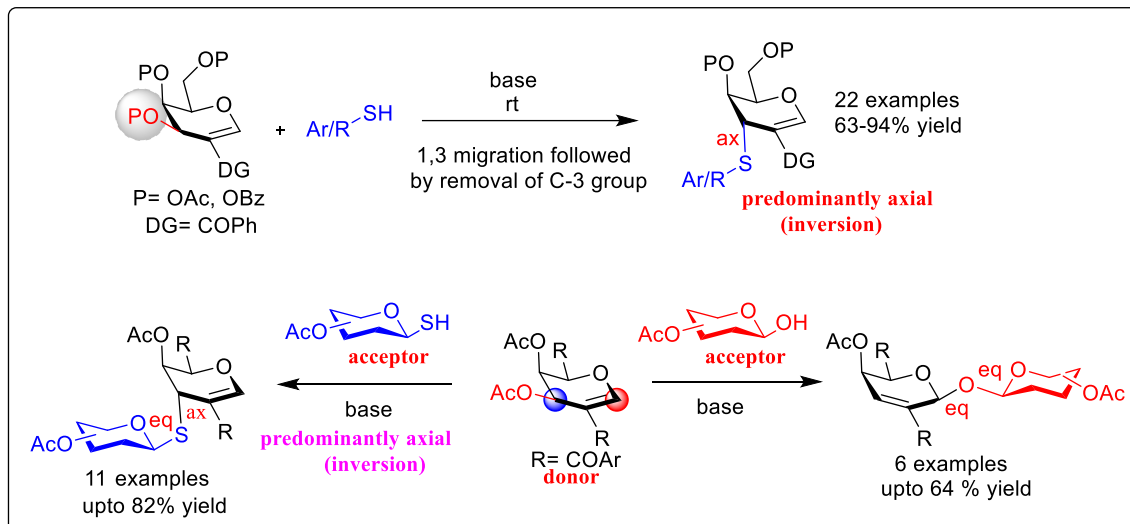


Fig.2: Current methods for the synthesis of 1-1 and 1-3 Disaccharides

- 2-Ketophenyl Assisted Biomimetic Synthesis of 3-Thio Substituted Glycals at Room Temperature. Irshad Ahmad Zargar, Norein Sakander, and Debaraj Mukherjee\*. *Eur. J. Org. Chem.* **2023**, e202300780.
- Switchable reactivity of 2-benzoyl glycals towards stereoselective access of 1-3 and 1-1 S/O linked disaccharides. Irshad Ahmad Zargar, Bisma Rasool, Norein Sakander and Debaraj Mukherjee\*. *Chem. Commun.*, **2023**, 59, 10448-10451.

(CRSI Medal Winners Themed Collection)