

Jayaraman, N., 2006, "Introduction to glycosylation chemistry", Contribution to IUBMB Workshop on Molecular Characterization of Glycoproteins and Glycolipids and Their Interactions with Lectins and Receptors, 2 – 7.

Synthetic carbohydrate chemistry encounters challenges, resulting primarily from complex nature of sugar molecules with varied compositions and configuration. Limiting only to the most prevalent aldohexose sugars in the D-series, at least 32 different isomers are possible, each isomer presenting a unique configuration in one of the two constitutional forms of pyranose or furanose. Because of these constitutional and configurational variations, synthetic carbohydrate chemistry was one considered most demanding. Developments in methodologies and reagents in last three decades have helped to ameliorate difficulties in synthesis of carbohydrates and their derivatives. One may be able to achieve required regio- and stereoselectivities in sugar synthesis at present with a reasonable confidence, in the light of significant developments at present concerning carbohydrate chemistry. Chemical synthesis of oligosaccharides remains a very active area of carbohydrate chemistry. The method of covalently linking two monosaccharide components leading to di- or oligosaccharide is called a glycosylation. A glycosylation reaction involves formation of a glycosidic linkage between anomeric hydroxyl groups of one sugar component, called glycosyl donor and a hydroxyl group of another sugar component, called glycosyl acceptor. The process of glycosylation is energetically demanding and thus activation of the interacting partners is a primary requirement, in order to execute the glycosylation reaction. Further, chemical manipulations of interacting partners are also necessary in order to realize regio- and stereochemical controls during the glycosylation. Thus, equipping the glycosyl donor and the acceptor in a particular fashion becomes an important exercise before the glycosylation reaction is executed. Many methods have been developed to achieve high degree of regio- and stereochemical control in glycosylations. These methods relate largely to (i) the protection/deprotection and (ii) the activation of hydroxyl groups, abundant in sugar molecules. The summary below introduces few prominent protection/deprotection, activation and glycosylation methods.