

ABSTRACT

The present thesis, entitled "**2-Aminoglucosyl azide – Synthesis and its applications to biologically important nitrogen heterocycles,**" describes the development of efficient synthetic methodologies for the preparation and functionalization of carbohydrate-fused [1,2,3]triazolopyrazines and carbohydrate-tethered pyrazine derivatives through novel denitrogenative transformations. The work explores the synthetic potential of carbohydrate-derived fused triazoles and demonstrates their utility as versatile intermediates for the synthesis of structurally diverse nitrogen-containing heterocycles of medicinal interest.

Chapter I provides an overview of carbohydrate-tethered pyrazines, highlighting their biological significance and medicinal applications. It discusses the chemistry of fructosazine, deoxyfructosazines, and carbohydrate-linked pyrazines, as well as the denitrogenative ring-opening of fused [1,2,3]triazoles, leading to C–C and C–X bond-forming reactions. The chapter also highlights anti-HBV tetrahydro[1,2,3]triazolopyrazines as the inspiration for designing carbohydrate-tethered analogues, which ultimately motivated the development of novel carbohydrate-linked pyrazines through serendipitous denitrogenative C–C and C–X coupling transformations.

Chapter II describes the synthesis and functionalization of carbohydrate-fused 4,5,6,7-tetrahydro[1,2,3]triazolo[1,5-*a*]pyrazines from tri-*O*-benzyl-D-glucal. An efficient intramolecular thermal Huisgen [3+2] cycloaddition strategy was developed to access the fused triazolopyrazine scaffold. The scaffold was subsequently functionalized through C-3 iodination followed by Suzuki–Miyaura cross-coupling to furnish a series of aryl-substituted derivatives. Further Boc deprotection, carbamoylation, and selective/global debenzylation protocols provided a diverse library of carbohydrate-fused triazolopyrazines.