PhD in Chemical Sciences
Department of Chemistry "Ugo Schiff"
University of Florence

PhD seminar

Glycomimetics: Useful Tools and Potential Therapeutics

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Abstract

Glycomimetics are modified carbohydrate structures which have altered physical and/or biological properties as a result of the respective modifications. These modifications can be tailored towards specific biological, medicinal or technological applications. Paradigmatic examples include Tamiflu, Miglustat or AZT.

We are interested in glycomimetic structures such as iminoalditols **1** and **2**, carbacycles **3** and *C*-glycosyl type glycoconjugates **4**, as well as C-glycosides **5**. We apply these glycomimetics as inhibitors of glycoside processing enzymes, as pharmacological chaperones for the treatment of lysosomal storage diseases,[1] as ligands for *manno*-specific lectins such as FimH of 1-fimbriated bacteria,[2] as probes for ligand-directed chemistry profiling of glycoside processing enzymes,[3] and as potential agents for the treatment of Alzheimer's disease.[4] Additionally, we became interested in synthesising polysaccharidic glycomimetics by modifying polysaccharides such as cellulose.[5]

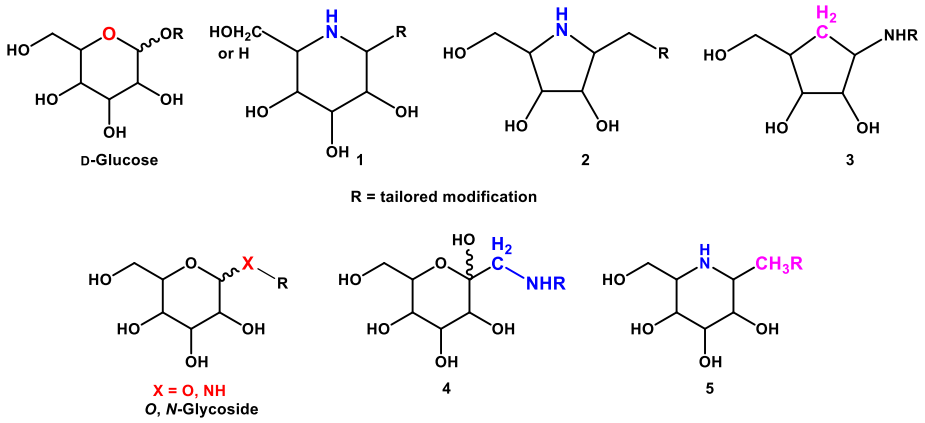

Figure: Structures of glycomimetics **1** – **5**.

Details on synthetic approaches as well as biological evaluation of assorted glycomimetics from recent studies will be presented.

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3 H. Prasch, A. Wolfsgruber, M. Thonhofer, A. Culum, C. Mandl, P. Weber, M. Zündel, S. A. Nasseri, A. Gonzalez Santana, G. Tegl, B. Nidetzky, K. Gruber, A. E. Stütz, S. G. Withers, T. M. Wrodnigg. *ChemBioChem*, **2023**, e101300480.
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5. P. Loibner, D. Bucaak-Gasser, K. Schober, T. Steindorfer, M. Brandtner, T. Dorn, T. Wrodnigg, D. Neshchadin, G. Gescheidt-Demner, M. Bracic, F. Lackner, T. Mohan, K. Stana Kleinschek, R. Kargl. *Bioconj. Chem.*, **2025**, *36*, 1933-1942.