CARBOHYDRATE – LECTIN INTERACTIONS: PROBING MULTIVALENCY WITH TOPOLOGICALLY DEFINED GLYCOCALIX[4]ARENES

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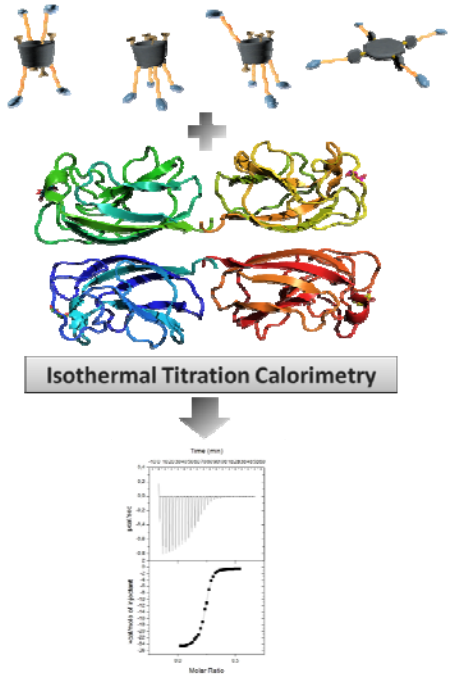
The fundamental study of glycomics is now recognized as a challenge of prime importance for a better understanding of living systems.[1] Many biological events are intimately linked with saccharidic structures and their interaction with lectins.[2] Intercellular communication, pathogenic bacteria/virus adhesion or transmembranar signaling are some examples of these major processes. The monovalent interaction between an oligosaccharide and a protein remaining generally weak, the multivalent organization of saccharidic epitopes on cell's surface is one of the most powerful natural tool for reaching high affinities and specificities. Mimicking Nature, the synthesis and biochemical evaluation of multivalent saccharidic structures have recently received much attention as fundamental tools for probing this concept or as potential therapeutic compounds.[3]



Many studies described the influence of valency or the characteristics of multivalent systems (glycodendrimers, glycopolymers, glycoclusters). In comparison, relatively few studies underlined the role of the epitopes' 3D structural arrangement on the mechanism and/or the selectivity of interaction with lectins.

Calix[4]arenes scaffolds were used as tuneable platforms for the preparation of glycoclusters with well-defined topologies. Conjugation between these rigid scaffolds and saccharidic moieties was achieved through Cu(I)-catalyzed azide alkyne 1,3-dipolar cycloaddition.[4]

The resulting neoglycoconjugates were evaluated as multivalent ligands for the galactophilic lectin PA-IL[5] by isothermal titration calorimetry (ITC). This lectin is suspected to play a crucial role in the adhesion of *Pseudomonas aeruginosa* in the lungs of cystic fibrosis patients.

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