The first orthogonal photoswitchable azobenzene glycocluster: synthesis and photochromic properties

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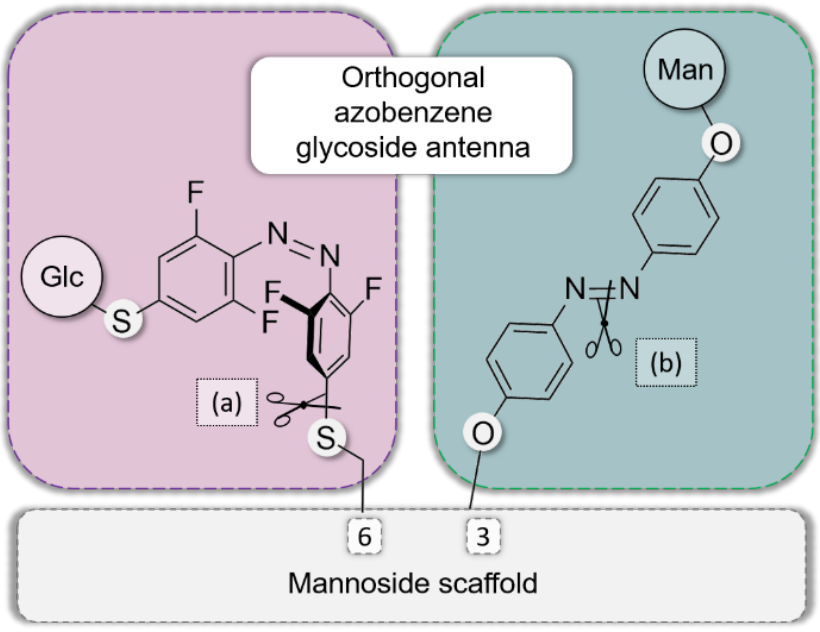
The glycocalyx of eukaryotic cells consists of a dense disordered layer of sugars conjugated to proteins and lipids. These cell surface glycoconjugates mediate diverse cell recognition processes including the adhesion of pathogens such as bacteria.[1] For the study of bacterial adhesion and the molecular details of carbohydrate recognition, photoswitchable azobenzene glycoclusters are privileged tools,[2] in particular to investigate the biological meaning of the relative orientation of sugar ligands in a 3D environment.[3]

Multivalent photoswitchable glycoconjugates also serve for the investigation of (hetero)multivalence effects in carbohydrate recognition.[4] In this project, orthogonally photoswitchable glycoazobenzene units were conjugated to a glycoside scaffold in order to widen the scope of this class of functional glycomimetics. A mannoside scaffold was functionalized at positions 3 and 6 according to typical linkages found in *N*-glycans. The employed conjugation chemistry restricts the degree of conformational flexibility of the linkages, allowing for the effective switching of ligand orientation by light (Fig. 1). The photochromic properties of the new orthogonal glycophotoswitch were analyzed and the kinetics of its thermal relaxation is described as well as its ligand properties with the lectins FimH and ConA, respectively.



Concept of the orthogonal control of carbohydrate orientation in a multifunctional glycocluster.

Bibliographic references:

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