A synthetic receptor for the biomimetic recognition of N-glycans

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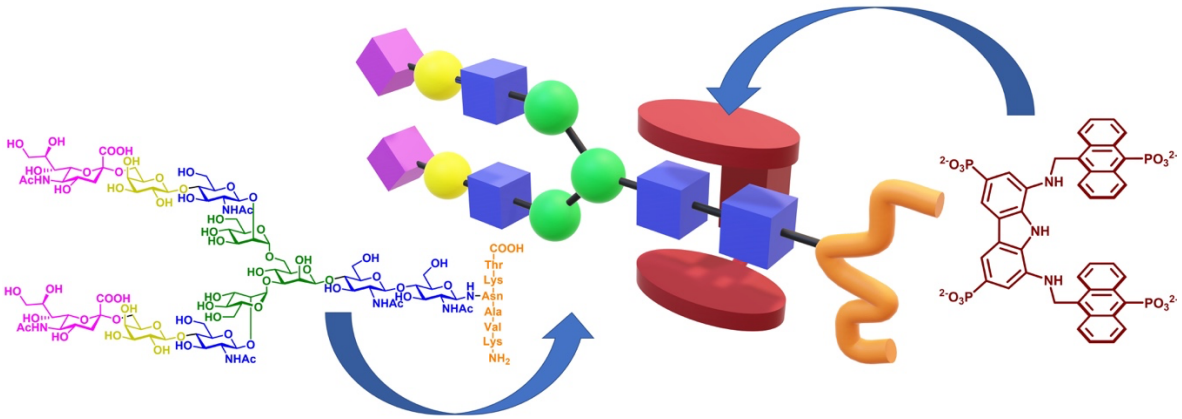
N-glycosylation is one of the most common post-translational modification of proteins in eukaryotic cells. *N*-glycans are linked to proteins through their highly conserved core disaccharide $GlcNAc_2$.[1] *N*-glycans have pervasive roles in biological systems, including protein folding, stability, solubility and resistance to proteolysis, self/non self discrimination by the immune system and pathogen adhesion and infection. Selective recognition of glycans by biomimetic receptors, to interfere with physio- and pathological processes mediated by carbohydrate recognition, represents a major challenge of the current research.[2] Because water is a strong competitor for recognition of polar molecules such as carbohydrates, most of the literature on the topic is confined to organic media, and examples of biomimetic receptors effective in water are sporadic and mainly based on appropriately sized macrocyclic architectures.[3] Recently, we have presented a simple biomimetic receptor, based on an acyclic structure, which exhibits a marked selectivity for the methyl-β-glycoside of $GlcNAc_2$ in water, showing an unprecedented affinity of 160 mM.[4] In this communication we describe the most recent advances of using this tweezers-shaped architecture to target the core $GlcNAc_2$ disaccharide of *N*-glycans.[5]



Schematic representation of the tweezers-shaped receptor binding to the GlcNAc2 disaccharide at the stem of sialoglycopeptide SGP.

Bibliographic references:

[1] A. Varki (2017), Glycobiology (27) 3-49.
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[4] O. Francesconi, F. Milanesi, C. Nativi, S. Roelens, (2021) Angew. Chem. Int. Ed. (60) 11168-11172.
[5] F. Milanesi, L. Unione, A. Ardá, C. Nativi, J. Jiménez-Barbero, S Roelens, O. Francesconi (2023) Chem. Eur. J. doi.org/10.1002/chem.202203591.