Versatile strategy for the synthesis of biotin-labelled glycans, their immobilization to establish a bioactive surface and interaction studies with a lectin on a biochip

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Abstract: The emerging role of glycans as versatile biochemical signals in diverse aspects of cellular sociology calls for establishment of sensitive methods to monitor carbohydrate recognition by receptors such as lectins. Most of these techniques involve the immobilization of one of the binding partners on a surface, e.g. atomic force microscopy, glycan array and Surface Plasmon Resonance (SPR), hereby simulating cell surface presentation. Here, we report the synthesis of fluorescent glycoconjugates, with a functionalization strategy which avoids the frequently occurring ring opening at the reducing end for further immobilization on a surface or derivatization with biotin. In order to improve the versatility of these derivatized glycans for biological studies, a new approach for the synthesis of biotinylated and fluorescent glycans has also been realized. Finally, to illustrate their usefulness the neoglycoconjugates were immobilized on different surfaces, and the interaction analysis with a model lectin, the toxin from mistletoe, proved them to act as potent ligands, underscoring the merit of the presented synthetic approach.

Author Keywords: Carbohydrate-lectin interactions; Glycan labelling; Immobilization of glycans; Molecular recognition; NMR; SPR

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