

9-6-2012

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Recommended Citation

Jones, Rhonda D., "Derivatization of Free Glycans for Glycan Sensor and Glyco-Functionalization Applications" (2012).
Undergraduate Research Posters 2012. Book 23.
http://engagedscholarship.csuohio.edu/u_poster_2012/23

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Derivatization of Free Glycans for Glycan Sensor and Glyco-Functionalization Applications

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Abstract

Glycans, especially, cell surface glycans acting as receptors, are involved in a wide range of biological processes. Analysis of the cell surface glycans provides a basis for understanding the molecular mechanism of glycan-mediated biological process. For various studies of glycan functions, it is necessary to obtain their homogeneous glycoforms and re-present them in a bio-assay system. In this CSU Undergraduate Summer Research Project, we aimed to develop a direct derivatization of free glycans for glycan sensor and glyco-functionalization applications. Briefly, lactose (model sugar) was subjected to 2-azidobenzohydrazide in the presence of acetate buffer pH 5.5 with 5% aniline as a catalyst and thus, was derived to an azide functionalized lactose that was characterized by ^1H NMR. This azide functionalized lactose was then immobilized on a DBCO modified glass slide *via* copper free click chemistry at pH 7.4. The lactose immobilized glass slides were incubated with lectin (*Arachis hypogaea*, labeled with FITC), which binds specifically to galactose at pH 7.4, then protein binding was evaluated. The ability to modify natural glycans while retaining their natural binding affinity is very important. The present method can be applied in derivatizing sugars from natural sources for glycan sensor and glyco-functionalization applications.