NEW METHODS FOR AUTOMATED CARBOHYDRATE ASSEMBLY TO ENABLE BIOLOGICAL AND MEDICAL DISCOVERIES

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The importance of cell surface oligosaccharides and glycosaminoglycans in signal transduction processes of biomedical significance is now well established. A major impediment to the rapidly growing field of molecular glycobiology was the lack of pure, structurally defined carbohydrates and glycoconjugates. Described is a comprehensive program involving all aspects of automated oligosaccharide assembly on solid support. New methods for building block synthesis, novel linkers, glycosylation procedures and purification will be disclosed building on the automated oligosaccharide synthesizer we developed previously. [1]
Based on the synthetic platform, a suite of tools for glycobiologists has been developed that includes carbohydrate arrays, fluorescently labeled oligosaccharides for imaging studies as well as affinity columns and other synthetic tools. [2]
Using the specific binding of certain bacteria to particular sugars was used to develop a visual detection system to test body fluids and water for the presence of pathogens including *E. coli*. [3] To improve the detection of several pathogens at the same time, carbohydrate arrays were utilized to measure binding of cells to sugars. [4]
Described will be the development of carbohydrate based vaccines against a series of diseases including HIV, leishmania and tuberculosis. Particular emphasis will be placed on the example of an anti-toxin malaria vaccine that is currently in preclinical development. [5]
Finally, the use of microreaction systems constructed from etched silicon for rapid reaction optimization will be described using the glycosylation reaction as example. As many as 40 reactions can be carried out with 100 mg glycosylating reagent in just 4 hours. This new reaction system should find wide application in academic and industrial research laboratories from discovery to process chemistry and production. [6]

References

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