ELECTROCHEMICL AND SURFACE ANALYSES FOR STUDYING AND UTILIZING GLYCAN INTERACTIONS

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Modifications of complex glycans govern their binding preferences and biological activities. Evaluating the effect of modifications, e.g. sulfation and sialylation, on interaction preferences is not straightforward. First, obtaining pure modified complex glycans in sufficient quantity is not easy. Second, many interactions are too weak to study using standard bioanalytical tools. We use electrochemical and surface analysis for studying the effect of modifications on complex glycans interaction preferences. These alternative approaches have seveal advantages. They are label-free and utilize minute quantities of complex glycans for elucidating a variety of interaction. The resulting electrochemical signal provide sensing even of weak interactions. The signal is the outcome of the glycan monolayer reorganization thereby reflect on interaction of the analyte with an ensemble rather than from an interaction of a single entity.
The talk will highlight the empowering combination between synthetic glycans and electrochemical methods for analyzing huge variety of glycans-derived interactions. I will explain how surface characterization provide atomic level evidence that connects between glycan sulfation patterns, metal-ion glycan binding preference and metal-ion mediated glycan-protein interactions [1]. I will present a new multiparameteric diagnostic tool to profile neuraminidase and sialyl transferases activities and inhibition utilizing both the surface properties and glycan structural features [2]. An electrochemical gas phase biosensors based on systematically modified synthetic monosaccharides will be presented. Enantiomer discrimination of volatile organic molecules using the monosacchride-based biosensor will be described.

References:
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