Synthesis and Characterization of Lectin Mimetics (Neo-Lectins)

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**Synthesis and Characterization of Lectin Mimetics (Neo-Lectins)**

College of Sciences and Health Professions

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**Abstract**

The cell surface expresses a variety of carbohydrates such as glycoproteins, proteoglycans and glycolipids. They play critical roles in pathological and physiological processes, including cell signaling, immune responses, pathogen-host interactions, tumor metastasis, and other cellular events. Due to its function and uses in cell communication, it is a curious subject of observation for scientific research. The molecular mechanism of carbohydrate recognition is still undetermined, and lectins, sugar binding proteins, are used to analyze the particular structures expressed on the cell surface. Lectins are normally found in plants and animals, and the isolation process of lectins is laborious, toxic, immunogenic and because of this it is considered a major drawback. Therefore, the exploration of lectin mimetics provide an alternative to natural lectins with multiple advantages. Bovine serum albumin conjugated with boronic acid (BA) was used in this experiment to mimic the function of lectins. Boronic acids (BA) have unique properties for carbohydrates, they form cyclic esters with diols of sugars in aqueous solution. BA conjugates are used as artificial carbohydrates receptors, drug delivery agents, and can be used to visualize the carbohydrates on the cell surface. Lectin mimetics, alternatively known as neo-lectins, preferably interact with terminal sialic acid residues at physiological pH. The research goal is to utilize BSA-BA as synthetic lectins for glycomic applications and immunotherapy.