

Bacterial Adhesion-Specific Nanomaterials in the Prevention and Treatment of Microbial Infections

Kelly Arps, Yunyan Cheng, and Professor Jeremy Tzeng
Department of Biological Sciences, Clemson University

Many pathogens adhere to host cells via adhesion to specific carbohydrate receptors. Escherichia coli strain ORN178 expressing type-1 pili binds to d-mannose receptors, while strain ORN208 does not show such an affinity. It has been found that when mannose receptors are exposed to E. coli strain ORN178, the binding affinity is directly proportional to the concentration of the sugar.

The purpose of this study is to establish a binding profile of receptor affinity for specific strains of bacteria and to determine the effect of carbohydrate saturation in reducing the binding ability of a pathogen. Whatman FAST slides were printed with D-mannose, which were then hybridized with the aforementioned E. coli strains expressing green fluorescent protein, and then examined under the fluorescent microscope. Observation of data shows binding specificity of E. coli ORN178 and the ability of free mannose saturation to prevent the aforementioned E. coli from bonding to host cells.