

Abstract Submitted  
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**Molecular Mechanics of Bacterial Adhesion in the Dental Bacteria Biofilm** CHAI RIN KIM, JEHUN SHIN, RICHARD KYUNG, Choice Research Group — The cause of periodontal disease and dental caries is fundamentally different from other diseases caused by single pathogenic microorganisms. Oral fluids and small molecules make their way into enamel by slowly diffusing through a thin membrane, pellicle. If prophylaxis displaces pellicle, then pellicle immediately changes its form. Taking approximately seven days, pellicle incorporates bacterial elements and develops its reduced, mature structure. Examination of the plaque site determines either bacterial accumulation on teeth or bacterial removal. This paper examines the molecular mechanisms of bacterial adhesion in the dental bacteria biofilm. In this paper, a computational model displays the interaction of bacterial protein's side chain of a phenylalanine component through hydrophobic bonding with a salivary glycoprotein's side chain component in the acquired pellicle. In addition, electrostatic attraction explains the phenomenon of a bacterial protein's negatively charged carboxyl group being attracted to a positively charged calcium ion. Applying the attraction force, the salivary phosphoprotein's negatively charged phosphate group in the acquired pellicle is attracted to the calcium ion.

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