IDENTIFICATION OF THE SURFACE-ASSOCIATE PROTEINS AND FUNCTIONS OF ENOLASE OF *STREPTOCOCCUS MUTANS*

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ABSTRACT

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IDENTIFICATION OF THE SURFACE-ASSOCIATE PROTEINS AND FUNCTIONS OF ENOLASE OF *STREPTOCOCCUS MUTANS*

Streptococcus mutans is a gram positive bacterium, which can cause dental cavities and bacterial endocarditis. Surface-associated proteins may play an important role in bacterial adherence and cell metabolism in pathophysiological processes. In this study, the surface-associated proteins of *S. mutans* were separated by electrophoresis and identified by mass spectrometry. A total of 42 surface-associated proteins were identified, and the pIs of those proteins were in the range of 3 to 10. The putative functions of *S. mutans* surface-associated proteins were adhesion factors, catalytic enzymes, transporters, and hypothetical proteins. Enolase, a critical enzyme in the glycolytic pathway, was confirmed as a surface-associated protein, and the interactions of enolase with human plasminogen and salivary mucins were demonstrated using transmission electron microscopy, ELISA, and Western blotting. These interactions may facilitate *S. mutans* attachment, clearance, or breach of the bloodstream barrier in bacterial endocarditis. The crucial amino acids for these binding activities of enolase to plasminogen and salivary mucins were studied by site-mutagenesis. It was demonstrated that the last two C-terminal lysine residues of enolase were crucial for plasminogen-binding activity, but the binding domain of enolase to salivary mucin II needs further study.

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