

## Characterization of a Novel Hemin-Binding Protein, HmuX, in *Porphyromonas gingivalis* W50

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**Abstract :** *Porphyromonas gingivalis* is a black-pigmented, anaerobic Gram-negative bacterium that is important in the progression of chronic and severe periodontitis. This organism has an essential requirement for iron, which is usually obtained from hemin, using specific membrane receptors, proteases, and lipoproteins. In this study, we report the characterization of a novel 24 kDa hemin-binding protein, HmuX, in *P. gingivalis* W50. The hmuX gene is 651 bp long which encodes for a 217 amino acid protein. HmuX was found to be identical at the C-terminus to the previously reported HmuY protein, differing by an additional 74 amino acids at the N-terminus. Recombinant HmuX demonstrated hemin-binding ability by LDS- PAGE and TMBZ staining. Sequence analysis of HmuX revealed a putative lipoprotein attachment site, suggesting its possible role as a lipoprotein. HmuX was also localized to the outer cell surface by transmission electron microscopy. Northern analysis showed hmuX to be transcribed as a single gene and that hmuX mRNA was tightly regulated by the availability of extra-cellular hemin. *P. gingivalis* isogenic mutant deficient in hmuX gene exhibited significant growth retardation under hemin-limited conditions. Taken together, these results suggest that HmuX is a hemin-binding lipoprotein, important in hemin utilization for the growth of *P. gingivalis*.

**Keywords :** *Porphyromonas gingivalis*, periodontal diseases, HmuX, protein characterization

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