



Project Title: Explore the Role of Gingipain Adhesin Domains in Mediating Porphyromonas gingivalis Host Cell Invasion		Code: DENT2
Host School / Institute: Sydney Dental School		Address: Institute of Dental Research, Westmead Centre for Oral Health
Certificates & Clearances required: No		
Primary Supervisor: Dr Jinlong Gao		
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Co-Supervisor/team: -Dr Xiaoyan Zhou, Postdoctoral researcher, Sydney Dental School, -A/Prof Ky-Anh Nguyen, Academic Leader Research Education, Sydney Dental School -Prof Neil Hunter, Director, Institute of Dental Research, Westmead Centre for Oral Health		
Project Type: Laboratory based		
Project Category: Molecular biology; Oral Health/Dentistry		
Skills / Attributes of a successful student: Curiosity in laboratory based research, interested in oral microbiology and/or molecular biology, competent in literature search and evaluation, be able to work collaboratively in a team, have the basic academic writing and communication skills.		
Project Keywords: gingipain adhesion domains ; epithelial cell ; Porphyromonas gingivalis; invasion ; adhesion		
<p>Project Description: Porphyromonas gingivalis is the “keystone” bacterium in chronic destructive periodontitis or gum disease, a common disease affecting the tissues supporting the teeth. Even in relatively low abundance in a tissue site P. gingivalis, by virtue of potent gingipain proteinases, mediates degradation of host defenses and leads to an ecological shift from a commensal oral microbiota to a more pathogenic microbial consortium associated with disease. Recently it has been demonstrated that P. gingivalis infection is also associated with systemic conditions such as Alzheimer's disease, rheumatoid arthritis, atherosclerosis. An important aspect of colonization by P. gingivalis is the capacity of the organism to invade lining epithelial cells to form a depot which provides the potential to re-colonise the local tissue environment.</p> <p>We have recently determined the crystal structures of a new family of adhesin modules that comprise the haemagglutinin/adhesin region of gingipains, the key virulence factor of P. gingivalis. Given the knowledge of the unique adhesin domains defined by our structure, we intend to further investigate the biological functions of the individual adhesin domain as critical bacteria-host interaction modulator. To further exploit the molecular mechanism which operates in bacterial infection processes, this project is proposed to identify the adhesion binding partners of epithelial cells using crosslinking and mass spectroscopy techniques.</p>		