

Research Theme: Infection and Immunity
Research Project Title: Mechanisms of Immune Modulation by Epithelial Pathogens
Principal Investigator/Supervisor: Asst/Prof Kimberly Kline (SBS/SCElse)
Co-supervisor/ Collaborator(s) (if any): Prof Eric Harvill (LKCSOM)
Project Description
<p>a) Background</p> <p>Inflammation is a critical component of nearly every human disease. It is also a vital part of the protective response to most pathogens, and it is therefore highly advantageous to bacterial pathogens to have evolved mechanisms to suppress inflammation. So it is not surprising that diverse bacteria have evolved sophisticated mechanisms to interfere with the signaling pathways involved in inflammation, such as NFκB and the Inflammasome. Understanding the different mechanisms diverse pathogens use to suppress inflammation will inform not only our treatment of those particular pathogens/diseases. This will also suggest novel approaches to the suppression of the inflammatory components of many other diseases.</p>
<p>b) Proposed work</p> <p>We have defined experimental systems in which two very different bacterial pathogens modulate the inflammatory response to infection via distinct mechanisms. Our goal is to identify the different molecular mechanisms involved in these effects.</p> <p>Aim 1 of the project is to identify the bacterial factors that contribute to the ability of <i>Enterococcus faecalis</i> to suppress the LPS-induced NF-κB activation. A convenient and sensitive 96-well assay will be used to screen a Transposon library for mutations that affect the macrophage NF-κB response to lipopolysaccharide (LPS). The identified genes will be further studied via reverse genetics and recombinantly expression to study cellular and biochemical activities.</p> <p>Aim 2 of the project will identify the <i>Bordetella</i> genes that contribute to the ability to suppress LPS-induced Inflammasome activity. We have devised a robust 96-well assay in which <i>B. parapertussis</i> inhibits LPS-induced IL-1β production and will use this assay to screen a Transposon library to identify genes involved in this activity. We will use a combination of reverse genetics and recombinant expression to examine the molecular mechanisms involved.</p>
Supervisor contact:
<p>If you have questions regarding this project, please email the Principal Investigator: kkline@ntu.edu.sg</p>
SBS contact and how to apply:
<p>Associate Chair-Biological Sciences (Graduate Studies) : AC-SBS-GS@ntu.edu.sg Please apply at the following: http://admissions.ntu.edu.sg/graduate/R-Programs/R-WhenYouApply/Pages/R-ApplyOnline.aspx</p>