Graduate student opportunity: MSc position in bacteria-host interactions

The Geddes-McAlister lab at the University of Guelph uses state-of-the-art mass spectrometry to explore the interplay between hosts and pathogens during infection. We are interested in defining changes to the proteome to uncover novel infection-associated proteins and identify opportunities to perturb interactions with the host to promote the clearance of infection. The ultimate goal is to discover novel anti-virulence strategies to reduce our reliance on antimicrobial agents and impede the evolution of antimicrobial resistance. We work in a variety of biological systems, including fungal and bacterial pathogens (e.g., Cryptococcus neoformans, Klebsiella pneumoniae, Fusarium graminearum) and different host environments (e.g., mammalian and plant).

Dr. Geddes-McAlister is recruiting an MSc student to lead an investigation of the interplay between neutrophils and the bacterial pathogen Pseudomonas aeruginosa and during infection in a Cystic fibrosis model. The project will provide technical training in mass spectrometry-based proteomics, metabolomics, advanced bioinformatics, molecular biology and biochemistry, as well as other disciplines.

**Project overview:**
In healthy individuals, the innate immune response and specifically, neutrophils, play a critical role in clearing Pseudomonas aeruginosa and protecting the host from acute and chronic infections. However, in Cystic fibrosis (CF) patients, neutrophils are incapable of clearing lung infections due to dysfunction associated with inflammation, impaired intracellular killing, and metabolic variability, each contributing to tissue damage and host death. Moreover, P. aeruginosa can adapt and resist neutrophil-associated killing in the airways of CF patients, resulting in the onset of chronic infections, which cause rapid progression of lung disease and mortality in CF. Despite our understanding of the role neutrophils play in P. aeruginosa clearance in a healthy individual, the mechanisms responsible for the diminished effectiveness of neutrophils in CF patients have not been well characterized. In this project, we aim to define the interaction between neutrophils and P. aeruginosa biofilms using a cell culture model of CF to uncover novel therapeutic strategies against bacterial infection.

Interested candidates should submit a cover letter, CV, unofficial transcripts, and contact information for three referees to Dr. Jennifer Geddes-McAlister: jgeddesm@uoguelph.ca by Tuesday, March 31st, 2020.