Announcement:
All interested members of the university community are invited to attend the Final Oral Examination for the degree of Master of Science of

JOSHUA CHUN
on Wednesday, May 8, 2019 at 1:30 p.m. in SSC 2315

Thesis Title: Investigating the interaction between lytic transglycosylases and Ivyp1 & Ivyp2 in Pseudomonas aeruginosa

Examination Committee:
Dr. M. Kimber, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. A. Clarke, Dept. of Molecular and Cellular Biology
Dr. C. Khursigara, Dept. of Molecular and Cellular Biology
Dr. C. Whitfield, Dept. of Molecular and Cellular Biology

Advisory Committee:
Dr. A. Clarke (Adv)
Dr. C. Khursigara

Abstract: Peptidoglycan is an essential component of the bacterial cell wall, acting as the cellular exoskeleton to provide strength and rigidity to the cell and to counter-balance the cell’s high osmotic pressure, while at the same time providing a scaffold for the anchoring of other cell-wall components such as proteins and teichoic acids. Lytic transglycosylases (LTs) are important enzymes that cleave the β-1,4-glycosidic linkages making up the peptidoglycan backbone. These enzymes have been implicated in cell wall remodelling, assembly of secretion systems, septation and separation of dividing cells, and flagella and pili formation. However, the regulation of these enzymes is poorly understood, especially in Pseudomonas aeruginosa. The existence of the proteinaceous inhibitors of lysozyme, Ivy, has remained a paradoxical puzzle since their discovery. From the time they were shown to inhibit an LT (MltB), efforts have been made to map the interaction of Ivyp1 and Ivyp2 with all eleven LTs produced by P. aeruginosa. To explore the hypothesis that the Ivys function as inhibitors of LTs, a complete pH-activity profile was first established for all LTs, followed by inhibition profiles of each LT by both Ivyp1 and Ivyp2. The pH-activity profiles reveal that the LTs operate under a slightly acidic range of pH optima. Additionally, the first experimental evidence for interactions of Ivyp1 and Ivyp2 with the LTs MltD, MltG, Slt70 and SltB1 are reported here. Altogether, these results support the hypothesis that Ivy acts to inhibit certain LTs and present possibilities for interplay with other proteins such as PBPs.

Curriculum Vitae: Joshua obtained his Bachelor of Science (Hons.) at McMaster University in June 2015 and began his MSc. in the lab of Dr. Anthony Clarke in January 2017.