



Life Sciences Institute

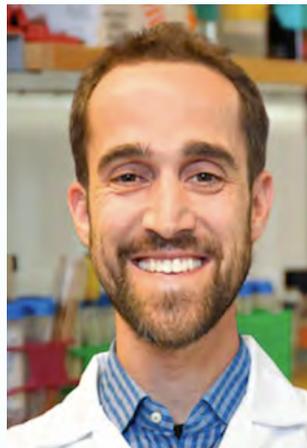
Department of Microbiology and Immunology

Dmitry Apel Memorial Seminar

Presents a seminar by

Dr. Andrew Cameron

Assistant Professor, Department of Biology, University of Regina & co-director of the Institute for Microbial Systems and Society



The severe health burden of bacterial infections will continue to increase with the loss of effective antibiotics, growing and aging human populations, and eroding environmental quality. My lab is using next-generation DNA and RNA sequencing for functional genomic studies of antibiotic resistance in model organisms and emerging pathogens to understand the evolution of resistance genes and ecological determinants of resistance phenotypes. We have discovered a global gene regulatory mechanism that confers ciprofloxacin resistance in *Salmonella enterica*, and a uncharacterized transcription factor that confers bedaquilin resistance in *Mycobacterium intracellulare*. Next I will present how toxic proteins called colicins, regarded as future alternatives to traditional antibiotics, can have the counterintuitive effect of enhancing bacterial community survival. To study the ecological role of colicins, we developed a two-species community wherein *E. coli* is the only species able to access a lactose carbon source, making *Salmonella* dependent on *E. coli* to excrete nutrient byproducts. *Salmonella* produces colicins that kill *E. coli*, creating a paradox in which *Salmonella* absolutely requires *E. coli* to produce food but simultaneously kills *E. coli* with a toxin. In an attempt to crash the essential *E. coli* population, an iron chelator was added to the community to enhance colicin production. Surprisingly, the community grew better at higher chelator concentrations than *E. coli* did alone. I will present a genetic model in which colicins trigger a stress response that inadvertently helps *E. coli* survive severe iron limitation. Altogether, these insights demonstrate the importance of finding the ecological context of antimicrobial resistance mechanisms.

entitled:

The genetic regulation of antibiotic resistance and bacterial competition

**Hosted by: Dmitry Apel Memorial Seminar
Committee & Dr. Erin Gaynor**

**Tuesday April 25, 2017
12:30pm to 1:30pm, LSC 3**