Department of Molecular and Cellular Biology

Graduate Seminar MCB*7500

Friday, Oct. 5, 2018 in SSC 1511 @ 12:45 p.m.

presented by:

Jacob Wilde

(Advisor: E. Allen-Vercoe)

"Modeling phage-bacteria dynamics in a bioreactor model of the human gut"

Above and below the skin, humans are populated by vast numbers of microorganisms collectively referred to as the microbiome. It has become increasingly evident that these microbes play a significant role in both our health and well-being. The recent surge of research into the microbial residents of the gastrointestinal tract has brought to light two critical findings: first, that changes in the species diversity and/or abundance of key species are associated with disease, and second, that a diverse and copious population of bacteriophages is intimately linked with the state of the gut's microbial ecosystem. Metagenomic studies have revealed the majority of these bacteriophages live lysogenic lifecycles and exhibit remarkable genetic stability over extended periods of time: the antagonistic, 'arms-race' dynamics evident in most other microbial ecosystems are notably absent in the gut. However, the degree to which these phages and their encoded functions influence the composition of host bacterial populations remains poorly understood. Most related studies include highly descriptive metagenomic 'snapshots' without experimental manipulation or perturbation. The proposed study aims to characterize the impact of bacteriophage-mediated perturbations on the microbiota of model cultures. Defined communities derived from one individual's fecal sample will be perturbed with bacteriophage isolated from another individual's fecal sample. I will also determine whether priming a recipient's gut microbes with a donor's bacteriophage will render the recipient microbes more amenable to integration with the donor's microbes. Resulting changes in bacterial and viral composition will provide tangible evidence of the role bacteriophage play in shaping the resident microbiome.