UNIVERSITY of GUELPH

COLLEGE of BIOLOGICAL SCIENCE

DEPARTMENT OF MOLECULAR AND CELLULAR BIOLOGY

Distinguished SPEAKER SERIES

2019 - 2020

OCT **WED** **16** **10:30 AM**

Summerlee Science Complex
SSC 2315

DR. SYLVAIN MOINEAU

FULL PROFESSOR, DEPARTMENT OF BIOCHEMISTRY, MICROBIOLOGY AND BIOINFORMATICS, UNIVERSITÉ LAVAL; CANADA RESEARCH CHAIR IN BACTERIOPHAGES

MCB HOST: DR. JENNIFER GEDDES-MCALISTER

Phages and CRISPR-Cas Systems: The ongoing battle

Fighting viruses is no easy task. Bacterial cells have survived phage attacks by evolving sophisticated defence strategies that enable them to thrive even in virus-rich ecosystems. CRISPR-Cas is one of these mechanisms used by microbes to protect against viral infection. Bacterial CRISPR-Cas type II systems function by first incorporating short DNA 'spacers', derived from invading defective phage genomes, in the CRISPR array located in their genome. The bacterial CRISPR array is then transcribed and matured into short RNAs, which, by recruiting Cas9 endonuclease, act as surveillance complexes that recognize and cleave subsequent invading matching DNA sequences. The cleavage occurs near a short motif, called the PAM, adjacent to the sequence targeted by the spacer.

Phages have evolved counter-tactics to thwart such mechanisms, leading to a so-called biological arms race. For example, phages can bypass CRISPR immunity through point mutation or deletion of the CRISPR target or PAM in their genome as well as by the production of anti-CRISPR proteins (ACRs).

Using the Gram-positive dairy bacterium *Streptococcus thermophilus* as a model, this presentation will recall the roles played by virulent phages in the understanding of CRISPR-Cas systems as well as in the development of industrially relevant phage-resistant bacterial strains. I will also highlight the recent discovery and characterization of two families of ACRs from *S. thermophilus* phages. The emergence of ACR-containing phages illustrates that novel approaches are needed to control phages in industrial settings.

All welcome to attend
Light refreshments will be served

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