Université de Montréal

MICROBIOLOGIE, INFECTIOLOGIE ET IMMUNOLOGIE

CONFERENCE

March 12 at 11:30AM
Room N-833

2900 boul. Édouard Montpetit (Chemin de la tour), Montréal.

Dr. Sarah Bier

Post-doc at Yves Brun's Laboratory, Faculty of Medicine, department of microbiology, infectiology and immunology, Université de Montréal, Canada

A Coordinated Attack: Selective Elimination of *Vibrio* Pathogens via a Type Six Secretion System and a Natural Phenazine Antibiotic

Vibrio species, like *Vibrio cholerae*, are recognized for their role in food- and water-borne diseases in humans, fish, and aquatic invertebrates. To combat the aquatic spread of these pathogens, we screened bacterial strains isolated from raw food shrimp for those that are bactericidal to *Vibrio*. We identified and characterized *Aeromonas dhakensis* strain A603, which shows robust bactericidal activity specifically towards *Vibrio*, but not against other Gram-negative taxa.

We determined that two antibacterial mechanisms account for A603's vibriocidal activity *in vitro* -- a highly potent Type Six Secretion System (T6SS) and biosynthesis of a vibriocidal phenazine-like small molecule, named Ad-Phen. Further analysis suggested coregulation between Ad-Phen and a pore-forming T6SS effector TseC, which potentiates *V. cholerae* to killing by Ad-Phen. These findings could be used to develop new therapeutics to treat *Vibrio* disease.

Recently, we determined that A603 can prevent disease in aquatic hosts, such as Acute Hepatopancreatic Necrosis Disease (AHPND) caused by the *V. parahaemolyticus* strain TM-1. Infection by this pathogen typically causes large disruptions of the host microbiome, then kills >50% of infected shrimp hosts within 4 days. We find that adding low levels of A603 to shrimp tanks eradicates TM-1, blocks AHPND mortality, and protects shrimp microbiomes from nearly all disease-related changes. As such, A603 could serve as a safe and effective method to reduce *Vibrio* contamination in aquaculture and possibly reduce the water-borne spread of cholera.