Trent University
Chemistry/Physics Seminar Series

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Wednesday, October 21, 2015
11:00 a.m. to 11:50 a.m.
Science Complex Room 115

Lessons from chemical ecology: bacterially produced small molecules and fungus-farming ants

Fungus-farming ants of the tribe Attini originated ~50 MYA and have since evolved into more than 200 species that collectively are the major herbivores of the Neotropics. The ants cultivate fungal gardens using plant material and attempt to maintain a monoculture of their crop. In addition, the ants carry bacterial symbionts, which often localize with specialized anatomical structures on their exoskeleton and provide chemical defenses to the ant colony. Notably, these bacteria are in a class that is renowned for an ability to produce biologically active small molecules, many of which have played prominent roles in both drug discovery and organic chemistry. As part of a larger study of the small molecules produced by the bacterial symbionts of fungus-farming ants, we have discovered both significant chemical diversity and a specific subset of small molecules, the piperazic acid-containing cyclic depsipeptides, that are prominent in this ecological niche. By pairing chemical isolation and characterization with genome sequencing we have revealed that genetic exchange of entire biosynthetic gene clusters accounts for both the chemical diversity and the more commonly observed cyclic depsipeptides produced by these symbiotic bacteria. This seminar will present a number of small molecules from ant-associated bacteria, the biosynthetic pathways thereof, the variability of the genomic contexts in which they are found, and provide an ecological and evolutionary perspective that unifies this chemical and genetic data.

All Welcome!