

Analytical Seminar

Amanda Buchberger

Lingjun Li Research group
University of Wisconsin-Madison

“Mass Spectrometric Investigation of Crustacean Neuropeptides and their Role in Environmental Stress”

Extreme environmental fluctuations pose physiological challenges for many organisms, and questions remain regarding how some have evolved to tolerate these stressful conditions. Neuropeptides are thought to be the major regulators of these stress-induced responses; however, the full complement of neuropeptides and their expression changes during stress are not well characterized. This is mainly due to the complexity of the mammalian nervous system and current lack of tools to probe such intricate systems. Invertebrates (e.g. crustaceans), with their relatively simple nervous system and well-characterized physiology, are an excellent model for understanding the roles of neuropeptides in the stress response. Crustaceans also contain several neuropeptide homologs to higher order animals, suggesting that this research can be easily translated to a mammalian model system. With the development of high resolution and accurate mass (HRAM) instrumentation, mass spectrometry has become a predominant tool to study neuropeptides. Furthermore, the development of mass spectrometric imaging (MSI) has allowed for high-throughput analysis of molecular species in a biological tissue with no prior knowledge, thus obtaining the spatial information of hundreds of analytes in one experiment. Overall, this talk will focus on the development and implementation of novel multifaceted mass spectrometry-based analytical platform to probe the nervous system to understand the biochemical changes due to environmental perturbation. Several stressors were investigated, including temperature, salinity, hypoxia, and pH. Via chemical labeling and molecular imaging, various neuropeptide families were shown to be involved in the stress response. By increasing understanding of the molecular mechanisms underlying the stress regulation inside crustaceans, this research provides novel insight into the mammalian nervous system during duress.

Thursday
October 15
Room 1315
Chemistry
12:15 pm



DEPARTMENT OF
Chemistry
UNIVERSITY OF WISCONSIN-MADISON