

REGULATION OF SPECIALIZED METABOLITE PRODUCTION IN HOST-MICROBE SYMBIOSES

Marcy J. Balunas, Ph.D.
University of Michigan

Microbial symbioses are increasingly recognized to play an integral role in host structure and function. Co-evolution of these benign and/or beneficial relationships has been the focus of numerous microbiology studies, although the role of secondary metabolite interactions has received considerably less attention. Small molecule interactions in these host-microbe symbioses are likely to contribute to the complex molecular conversations occurring between bacterial symbionts and hosts. Given that these host-microbe associations have naturally evolved to select for biologically active bacteria, they provide a source of secondary metabolites more likely to have potent medicinal activity and thus be poised for future preclinical drug development. We utilize several unique host-microbe symbioses to explore the interactions between eukaryotic hosts and their associated bacteria, integrating natural products and analytical chemistry, medicinal and synthetic chemistry, microbial chemical ecology, biological assays, and advanced molecular biology to provide a comprehensive understanding of secondary metabolite production in these symbioses. Recent developments from these studies will be presented including experiments to explore changes in the production of secondary metabolites in the presence of pathogenic organisms.