**Interdisciplinary approaches to characterizing biochemistry in the vaginal microbiome**

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Host-associated microbiomes play a major role in human health. In the vaginal microbiome, different *Lactobacillus* speciesare associated with protection from with bacterial vaginosis, STIs, and infection-associated preterm birth. Understanding the molecular mechanisms by which these bacteria prevent disease will be an important step to establishing microbiome-focused therapeutics such as probiotics. New tools, such as those provided by chemical biology, are uniquely suited to this type of mechanistic work in complex biological systems. This talk will discuss some of my research group’s work using bacterial genome sequencing and activity-based protein profiling (ABPP), a chemoproteomics technique that uses small molecules to label functionally active enzymes. Probe labeled enzymes can then be enriched and identified, providing a clear picture of which proteins are truly responsible for a function *in situ*. ABPP enabled us to answer a long-standing question in the vaginal microbiome as to exactly how vaginal *Lactobacillus* obtain carbon and energy. We are also utilizing ABPP to assign function to hypothetical proteins in poorly-characterized vaginal, gut, and environmental microbiota. I will also highlight some of the ways that this research can be brought into undergraduate classrooms to help train the next generation of scientists.