



HOST-MICROBE SYSTEMS

PROBLEM



What is the relationship between humans and the microbial populations that live inside of us? Many of these microbes exist as commensals that live in association with the host without causing disease. Indeed, the relationship is often mutually beneficial. Yet the interactions between a host and its microbiota in the presence of a host immune response can greatly affect human health. The study of microbial diseases has focused traditionally on single, clearly defined interactions between the host and frank pathogens. But this approach discounts the complexity of the interactions, as the normal microbiota is a key player in this system.

RESEARCH



The overall goal of the Host/Microbe Systems Theme is to exploit genomic technologies to study the dynamic interactions between the host and its commensal as well as pathogenic microbes. The theme will focus initially on the vaginal microbiota, a complex ecosystem in which the composite microbes, their relative abundance, and their interactions with and effects on cellular and immunological responses of the host are critical indicators of the state of a woman's health. Despite the important roles they play in maintenance of vaginal health, there is a profound gap in our knowledge of both the vaginal microbiota and the local immune system.

The theme will explore the various aspects of the role of normal vaginal microbiota in obstetrical and gynecological infectious diseases and how shifts in the composition of the microbiota influence the healthy or diseased state. A central goal will be to understand the pathogenesis of vaginal infections and the immune response to normal and abnormal microbiota. Researchers will study the role of normal vaginal microbiota in preventing vaginal infections and the impact of microbiota composition on susceptibility to certain pathogens, including those responsible for sexually transmitted diseases, bacterial vaginosis, yeast vaginitis, and pelvic inflammatory diseases. Other goals include:

- Identifying the microbial population and immunological components of the vagina
- Studying the population dynamics of the vaginal ecosystem
- Understanding the physiology and metabolism of the microbes and host in the vaginal ecosystem
- Enhancing our understanding of vaginal host-microbe interactions, especially those interactions that involve susceptibility to and pathogenesis of polymicrobial infections

BENEFITS

Theme research will have significant commercial implications by providing new screening and diagnostic technologies, developing novel intervention strategies, and identifying new targets for drug development, improved vaccines, and alternative treatment modalities.

THEME LEADER

Brenda A. Wilson Microbiology

FACULTY

Steven Blanke Microbiology

H. Rex Gaskins Animal Sciences

Lois L. Hoyer Veterinary Pathobiology

Gary J. Olsen Microbiology

Abigail A. Salyers Microbiology

James M. Slauch Microbiology

Richard I. Tapping Microbiology

John Xu Microbiology

Chen-Xiang Zhai Computer Science

AFFILIATES

Jiawei Han Computer Science

Lawrence B. Schook Animal Sciences