

Arthropod Genomics Seminar Series



The Mosquito Microbiota in the Defenses against Human Pathogens



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Malaria transmitting mosquitoes are continuously exposed to microbes, including their midgut microbiota. This naturally acquired microbial flora can modulate the mosquito's vectorial capacity by inhibiting the development of Plasmodium and other human pathogens through an unknown mechanism. We have undertaken a comprehensive functional genomic approach to elucidate the molecular interplay between the bacterial co-infection and the development of the human malaria parasite Plasmodium falciparum in its natural vector *Anopheles gambiae*. Global transcription profiling of septic and aseptic mosquitoes identified a significant subset of immune genes that were mostly up-regulated by the mosquito's microbial flora, including several anti-Plasmodium factors. Microbe-free aseptic mosquitoes displayed an increased susceptibility to Plasmodium infection while co-feeding mosquitoes with bacteria and *P. falciparum* gametocytes resulted in lower than normal infection levels. Infection analyses suggest the bacteria-mediated anti-Plasmodium effect is mediated by the mosquitoes' antimicrobial immune responses, plausibly through activation of basal immunity. We show that the microbiota can modulate the anti-Plasmodium effects of some immune genes. We have characterized the microbiota of malaria vectors in the field and identified bacteria species that have the capacity to render the mosquito completely resistant to Plasmodium infection. In sum, the microbiota plays an essential role in modulating the mosquito's capacity to sustain Plasmodium infection.

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1:30 p.m.

Room 137, Waters Hall

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