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Discovery of natural anthelmintic resistance mechanisms



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Abstract: Parasitic nematodes infect billions of people and animals worldwide and threaten both global health and food security. We rely on anthelmintic (anti-nematode) drugs to treat these infections, but decades of overuse has led to widespread drug resistance, and few effective treatments remain. My research asks a fundamental question: What are the mechanisms of resistance to anthelmintic drugs? First, because human helminth infections are treated with drug combinations, I examined the fitness consequences when nematodes lose one or all combinations of drug targets for two drugs commonly coadministered. By measuring multiple traits (competitive fitness, fecundity, and development) we can understand how resistance-associated fitness costs affect nematodes to inform us how we can better assess drug resistance. A second effort asks whether we can predict resistance-causing alleles across nematode species to identify patterns of convergent evolution in anthelmintic resistance. A third effort investigates how genetic diversity within a nematode species shapes responses to anthelmintic drugs to help us disentangle the genetic complexity that drives resistance. Together, these efforts aim to identify the genes and genetic mechanisms responsible for anthelmintic resistance across nematode species. Overall, my research helps build resources to preserve drug efficacy and will allow us to develop better diagnostic tests.

Wednesday, November 4 | 2:00pm-3:15pm | Science Hall 126 & Zoom

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