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Specialty Areas

- Insect Pathogenic Viruses
- Bee Pathogens
- Baculovirus Expression Systems
- Insect Cell Culture

Insect pathogenic viruses offer a safe and environmentally sound alternative to chemical insecticides. These naturally occurring agents are quite often specific to particular target insects and do not infect plants or other animals. Research in my laboratory is centered on understanding more about the biology and the molecular biology of the interactions between these viruses and their insect hosts with the idea that this information can be used to improve them as microbial control agents. One research project involves developing a sexually transmitted, sterilizing virus as a microbial insecticide. We are interested in determining what molecular events occur during virus replication in the host that lead to both productive replication, resulting in sterile insects and persistent replication, producing asymptomatic carriers of the virus.

Another interesting aspect of insect pathogenic viruses is how they interact with the host to favor their replication and transmission. We are currently examining how a sexual transmitted insect virus affects host physiology and mating behavior. We have found that virus-infected, sterile males mate with females which unlike females mated to normal males continue to call and mate with other males potentially transmitting the virus to those insects. Our hope is that in learning more about the molecular events surrounding the complex interactions between the virus and the host we can gain information that can be used in integrated systems for insect pest control.

Honey bees and bumble bees are the major pollinators of large variety of food crops in the U.S. and the health of the bees ultimately impacts the commercial value of these crops. We are currently developing efficient methods of monitoring the viruses, bacteria, fungi, and other microflora carried by native and commercially managed bumble bee and honey bees in order to asses the health of these bee populations. Microbes know to be harmful to bees will be quantified, as will other microbes that are potentially beneficial to the bees. By comparing the microflora of thriving bee colonies with colonies that are not doing as well, we hope to develop a good microbial indicators that can be used to determine for bee colony health. This information will provide a better understanding of factors affecting bee health, and hopefully lead to IPM practices that will aid in the maintenance of beneficial microbes associated with bees.