

Zhiyong Xi

Associate Professor of Microbiology and Molecular Genetics at Michigan State University

East Lansing, MI, US

Expert in controlling Zika, Malaria and Dengue fever

Biography

Dengue Fever, and associated dengue hemorrhagic fever, is emerging globally as the most important arboviral disease threatening human populations. Approximately 2.5 billion people are at risk of the disease and each year an estimated 50-100 million cases occur. Moreover, this disease continues to both expand into temperate climates and increase in severity. The virus is transmitted to humans by the mosquitoes *Aedes aegypti* and *Aedes albopictus*. In the U.S., *Ae. albopictus* is present in 36 states while *Ae. aegypti* is found in several southern states. Experience elsewhere in the world shows that the disease's occurrence usually follows where the mosquitoes are breeding. At the present time, no treatment or vaccine is available for dengue fever leaving vector control as the primary intervention tool. One such method is population replacement, in which natural mosquito populations would be replaced with modified populations that are unable to transmit the dengue virus. It is in this aspect that the endosymbiotic bacterium *Wolbachia* has shown great potential to be used as a vehicle for introducing disease-resistance genes into mosquitoes, or to directly reduce the mosquito's ability to transmit the pathogen.

Our long-term goal is to develop *Wolbachia*-based control strategies to block dengue virus transmission in mosquitoes. Toward this, we will identify factors that enable *Wolbachia*-based population replacement to succeed in a way that reduced vectorial capacity for dengue viruses. Specifically, we are interested in:

The mosquito immune responses to dengue viruses and *Wolbachia*

The potential interactions between dengue viruses and *Wolbachia* in mosquitoes

The molecular mechanism of *Wolbachia*-induced cytoplasmic incompatibility in mosquitoes

The improved *Wolbachia*-based mosquito population replacement and suppression

Our lab owns a state-of-the-art insectary and BSL-2 facility to work on dengue virus in both mosquito and cell culture. We have strong expertise in the functional genomic assay, including microarray, RNA interference and mosquito transgenesis. Our lab is also one of the leaders on *Wolbachia* transfection via embryo microinjection.

Zhiyong Xi's work with mosquitoes and *Wolbachia* bacteria was highlighted in MSU President's report. Dr. Xi and his colleagues are developing strategies that bring us closer than ever to eradicating dengue virus transmission in mosquitoes.

Industry Expertise

Biotechnology, Education/Learning, Medical Equipment / Supplies / Distribution, Research, Health and Wellness

Areas of Expertise

Dengue Fever, Microbiology, Disease Control and Prevention, Disease Transmission Dynamics, Mosquito-Human Transferrable Diseases, Molecular Genetics

Education

University of Kentucky
Ph.D. Medical Entomology

China Pharmaceutical University
B.S. Biopharmaceutics

Accomplishments

Combating Zika and Future Threats Grand
Awarded by USAID

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