

Going viral: Insights on Zika

October 13 2016, by Allison Mills



The vector that serves as a host for the Zika virus (ZIKV) is the mosquito *Aedes aegypti*. Credit: US Department of Agriculture

To better understand how to prevent and treat Zika, doctors, biologists

and epidemiologists all need to know the virus' history.

The Zika virus (ZIKV) is not a new contagion; researchers have known about the virus since the 1950s. However, not much was known about the virus until recent outbreaks cropped up with debilitating impacts.

While searching for targets that could be used to generate antibodies against the virus, biologists from Michigan Technological University set out to bring together all the available information about new Zika research. Their review paper, published in BioMed Central's *Journal of Virology* last week, provides a comprehensive overview of the virus, its history, the multiple modes of transmission and connections to miscarriage risks and how [dengue virus infection](#) may exacerbate ZIKV infection.

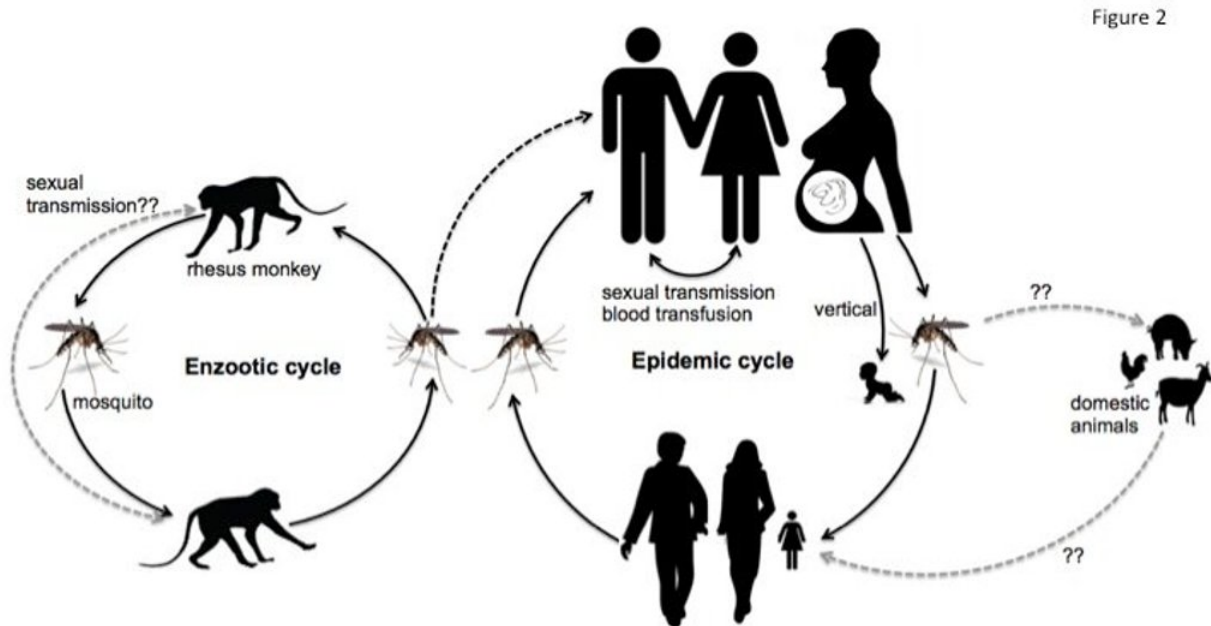
Not Just a Mosquito Bite

The key message of the paper is that Zika is not only transmitted through mosquito bites, says study author Ebenezer Tumban, an assistant professor of biological sciences at Michigan Tech.

"There is a lot we still don't know about Zika," he says, but new insights do provide some guidance. "Sexual transmission is a major risk that isn't widely discussed, as is screening for Zika in blood transfusions."

Tumban, who has studied a range of infectious diseases including human papillomaviruses (HPV) and other Zika virus-related arboviruses like dengue and Langkat, says that having multiple transmission routes is not uncommon, but does make the epidemic more pernicious. The fact that many people are asymptomatic—and that the host mosquitoes and similar species are found throughout the world (except in Canada and Chile)—makes Zika especially difficult to contain.

In addition to a more complicated transmission scheme than previously thought, new research on Zika suggests that mothers infected with the virus can have a miscarriage as well.



The transmission cycle of the Zika virus is complex, moving from a mosquito to humans, and potentially other animals, and it can also be sexually transmitted or passed through blood transfusions. Credit: Michigan Technological University

A virus' replication/infection process is very complex—it makes more copies of itself only when it is inside cells and, during the infection of cells, it can even interact with antibodies produced against other viral infections. In particular, dengue virus antibodies have been shown to enhance Zika infections in cells. Recent research illuminated this double whammy, although less attention has been given to the risks that may be associated with being vaccinated against dengue virus (in countries

where [dengue virus](#) vaccine is approved) and how that vaccine may affect Zika virus infection.

Towards a Vaccine

Tumban says there is no silver bullet—or rather a silver needle—that will take care of all aspects of the Zika outbreak. While the first step towards controlling Zika is controlling mosquitoes, he says it is more pressing to look at prophylactic and therapeutic solutions.

"No matter what you do, it only takes one Zika virus-infected mosquito to spread the disease," Tumban says. "Prevent the disease and treat those who are already infected—we need to develop a vaccine or drugs."

Tumban's research group is moving ahead to assess whether Zika virus antigens they are developing can generate antibodies against the virus, which is the foundation of a vaccine. His team will join with hundreds of other scientists working to lessen the impacts of Zika both at home and around the world. The new review paper is a launching pad to bring more awareness to all aspects of Zika and inform the whole community of biologists, epidemiologists and clinical staff.

More information: Rupsa Basu et al, Zika Virus on a Spreading Spree: what we now know that was unknown in the 1950's, *Virology Journal* (2016). [DOI: 10.1186/s12985-016-0623-2](https://doi.org/10.1186/s12985-016-0623-2)

Provided by Michigan Technological University

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