



The Connecticut Agricultural Experiment Station

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Tuesday, January 7, 2020

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New Study Finds Extra Blood Meals Enhances Zika Virus Transmission by Mosquitoes

New Haven, CT- Scientists from the Center for Vector Biology & Zoonotic Diseases at the Connecticut Agricultural Experiment Station (CAES) in collaboration with scientists from Yale School of Public Health and Colorado State University, recently published their findings describing a previously unrecognized link between mosquito feeding behavior and Zika virus transmission in the journal *Nature Microbiology*.

The yellow fever mosquito (*Aedes aegypti*) transmits a number of deadly viruses, including Zika, dengue, chikungunya, and yellow fever. These mosquitoes blood feed frequently (every 2-3 days) and acquire viral infection after feeding upon the blood of an infected individual. Once in the mosquito, the virus must make its way from the gut to the salivary glands before the mosquito can infect a new individual. In this study, the team applied a natural feeding regimen by refeeding mosquitoes 3-4 days after virus infection. They found that successive blood feeding transformed mosquitoes into more efficient transmitters of Zika virus by damaging the gut and accelerating virus movement to salivary glands. Similar results were observed in the Asian tiger mosquito, *Aedes albopictus*, an invasive Zika virus competent species present in Connecticut. By incorporating these findings into Zika virus transmission models, the team was able to explain the explosiveness of the Zika epidemic in the Americas, a phenomenon that was not fully understood.

"This is the first study to implement a feeding regimen in the laboratory that more accurately mimics the feeding behavior of *Aedes aegypti* mosquitoes in nature and the effects were profound," said Dr. Doug Brackney, senior author and Virologist at CAES. "We show that repeated blood meals enhance virus

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dissemination and transmission by these mosquitoes and this helps explain how *Aedes aegypti*, can sustain large epidemics.”

"This study shows the value of replicating nature as best as possible when performing experiments in the laboratory and demonstrates a clear connection between mosquito feeding behaviors, virus infection, and elevated risk of human exposure," said Dr. Philip Armstrong, lead author and Medical Entomologist of CAES. "

Journal Reference

Armstrong, P.A., Ehrlich, H., Magalhaes, T., Miller, M.R., Conway, P.J., Bransfield, A., Misencik, M.J., Gloria-Soria, A., Warren, J.L., Andreadis, T.G., Shepard, J.J., Foy, B.D., Pitzer, V.E., and D.E. Brackney. Successive bloodmeals enhance virus dissemination within mosquitoes and increase transmission potential. *Nat Microbiol.* 2019 Dec 9. doi: 10.1038/s41564-019-0619-y.

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