

Researchers uncover viral small RNAs in mosquito cells

13 January 2021



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Researchers from Boston University School of Medicine (BUSM) provide a new genomics resource that details the small RNA transcriptomes (gene expression) of four bio-medically important mosquito species.

This is the first study to provide a platform for biologists to compare the characteristics of these small RNAs between these four mosquitoes as well as the most widely used insects for genetic experiments, the fruit fly, *Drosophila*. Although previous studies looked at each of the individual mosquito species separately, this study is the first to allow comparisons between all four species.

"Although mosquitoes are related to *Drosophila*, they have very different genomes. In addition, mosquitoes bite humans for blood meals that allow them to reproduce and but unfortunately allows serious human pathogens like viruses to infect us and cause diseases like yellow fever virus, dengue fever virus, [zika virus](#) and eastern equine encephalitis virus," explained corresponding author Nelson Lau, Ph.D., associate professor of biochemistry at Boston University School of

Medicine (BUSM).

The researchers obtained [cell cultures](#) and dissected samples of the mosquito species *Anopheles gambiae*, *Culex quinquefasciatus*, *Aedes aegypti* and *Aedes albopictus*. They extracted and purified the small RNA molecules, created libraries for [high-throughput](#) sequencing, and then developed a special bioinformatics platform to provide thorough genomic analysis of these small RNAs. They provide all this analysis in a database website for the public to access at laulab.bu.edu/msrg/.

The four mosquito species have global impacts on human health. *Anopheles* is the major vector for the parasite causing malaria, but is not known to transmit many viruses. In contrast, *Culex* and *Aedes* mosquitoes are well known to pass viruses between humans during [mosquito bites](#), but it is still unknown why there is this difference between mosquito species for this capacity to spread viruses.

According to the researchers this study will allow for better biochemical studies in mosquito cells. "If we can find weaknesses in the small RNA pathways of mosquitoes to make them more intolerant of [viruses](#), perhaps they won't be so able to pass the virus from biting one human to the next human victim."

The findings appear online in the journal *Genome Research*.

More information: Qicheng Ma et al. A mosquito small RNA genomics resource reveals dynamic evolution and host responses to viruses and transposons, *Genome Research* (2021). [DOI: 10.1101/gr.265157.120](https://doi.org/10.1101/gr.265157.120)

Provided by Boston University School of Medicine

APA citation: Researchers uncover viral small RNAs in mosquito cells (2021, January 13) retrieved 25 January 2021 from <https://phys.org/news/2021-01-uncover-viral-small-rnas-mosquito.html>

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