

# tRNA fragments in mosquitos may play role in spreading disease

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Biogenesis of tRNA fragment modulates vector biology of the disease spreading mosquito *Ae. aegypti*. Credit: Susanta K. Behura, 2018

tRNA fragments—small sections of transfer RNA molecules—have recently been discovered to play active roles in the biology of diverse organisms. Now, these tRNA fragments (tRFs) have been found to have important functions in the mosquito *Aedes aegypti*, according to a new paper published this week in *PLOS Neglected Tropical Diseases*.

Various types of small RNA molecules, including microRNAs, small interfering RNA and, most recently, tRFs, have been implicated in health and disease. In many cases, they function through direct interactions with DNA and other RNA molecules, allowing them to regulate gene [expression](#) or affect RNA stability.

In the new work, Susanta K. Behura of the University of Missouri, and colleagues investigated tRF abundance in the *Ae. aegypti* mosquito, which is the primary global vector of a number of human diseases, including dengue fever, yellow fever, and Zika fever. The researchers profiled the expression of tRFs in different *Ae. aegypti* samples that varied in sex, strain, developmental stage, and exposure to dengue virus, blood, or antibiotics.

The team identified 55 tRFs that are expressed in *Ae. aegypti*, and each originated from a unique tRNA molecule. The most abundant tRF was that originating from a glycine tRNA. 31 of the tRNA molecules varied in expression between males and females across all strains, and two tRNA molecules showed significant changes in expression based on [developmental stage](#). In addition, four tRFs had differential expression patterns after feeding with dengue virus and three had altered levels after treatment with antibiotics, suggesting a role in gut microbiome and vector competence to dengue virus infection.

The findings suggested that biogenesis of small regulatory fragments from tRNA can have wide ranging effects on key aspects of *Ae. aegypti* vector biology. In particular, expression of tRFs in infected mosquito can modulate mosquito's ability to transmit viral diseases to humans. "The results of our current study support the report on emerging roles of tRFs to viral infections," the researchers say. "tRFs are active in this mosquito and may play diverse roles in disease vector biology."

**More information:** Eng MW, Clemons A, Hill C, Engel R, Severson DW, Behura SK (2018) Multifaceted functional implications of an endogenously expressed tRNA fragment in the vector mosquito *Aedes aegypti*. *PLoS Negl Trop Dis* 12(1): e0006186. [doi.org/10.1371/journal.pntd.0006186](https://doi.org/10.1371/journal.pntd.0006186)

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