

Researchers find gene that reduces female mosquitoes

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An *Anopheles stephensi* mosquito obtains a blood meal from a human host through its pointed proboscis. Credit: Centers for Disease Control and Prevention/William Collins

Virginia Tech researchers have found a gene that can reduce female mosquitoes over many generations.

Males are preferred because they do not bite. Female mosquitoes bite to get blood for egg production and are the prime carriers of the pathogens that cause malaria, Zika, and [dengue fever](#).

In this case, Zhijian "Jake" Tu and colleagues found that placing a particular Y chromosome gene on the autosomes of *Anopheles stephensi*

mosquitoes—a species responsible for transmitting malaria—killed off 100 percent of all female embryos that inherited this gene.

The extra copy of this gene, which the researchers call Guy1, is passed on to both sexes but only males survive. Furthermore, these [male mosquitoes](#) do not appear to have any detectable reproductive disadvantages in the laboratory.

The findings were published Sept. 20 in the journal *eLife*.

"The Guy1 protein is a strong candidate of the male determining factor in *Anopheles stephensi*," said Tu, a professor of biochemistry in the College of Agriculture and Life Sciences and a member of the Fralin Life Science Institute Vector-borne Disease Research Group. The Guy1 gene is not related to Nix, a male determining factor recently discovered in the *Aedes aegypti* mosquito by Tu's lab and collaborators.

"The extra copy of the Guy1 gene is only passed down to half of the progeny, leaving some females among the mosquitoes that did not inherit the gene in the next generation," said Frank Criscione, who is the first author of the paper and worked on the project when he was a graduate student in the Tu laboratory.

In order to produce all male offspring, all progeny needs to inherit this extra copy of Guy1. This is one of the group's future objectives and can potentially be achieved by using genome-editing.

More information: Frank Criscione et al. GUY1 confers complete female lethality and is a strong candidate for a male-determining factor in, *eLife* (2016). [DOI: 10.7554/eLife.19281](https://doi.org/10.7554/eLife.19281)

Provided by Virginia Tech

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