



[Home](#) / [News Releases](#) / [2015](#)

Scientists Successfully Edit Genes of Dengue Fever Mosquitoes

This research could lead to methods for preventing mosquito-borne diseases

Sept. 02, 2015

Story Contact(s):

Nathan Hurst, hurstn@missouri.edu, 573-882-6217

COLUMBIA, Mo. – Mosquitoes are a key contributor to the spread of potentially deadly diseases such as dengue and malaria, as they harbor parasites and viruses that are spread when mosquitoes bite humans and animals. Now, researchers at the **University of Missouri** have found an effective way to edit the genes of mosquitoes. Shengzhang Dong, postdoctoral fellow in the [Department of Veterinary Pathobiology](#) of the [MU College of Veterinary Medicine](#), says this new technique opens the door for future research into genetically modifying mosquitoes so they cannot carry and transmit viruses and parasites that are harmful to humans.

“By successfully editing specific genes in the *Aedes aegypti*, the mosquito species which transmits the dengue virus, we have established techniques which can be used in future research to target the virus-carrying capabilities of this mosquito,” said Dong, who is the first author of the study.

For their study, Dong and his colleagues used the CRISPR/Cas9 gene editing system, and adapted it for use in mosquitoes to disrupt the blue fluorescent eye color gene in a previously generated genetically-modified mosquito line, which originally expressed both fluorescent blue and red color genes in their eyes. As a consequence, future generations of these mosquitoes no longer showed the blue color, but still showed the red color expression in their eyes. This new trait was stably inherited over several mosquito generations.

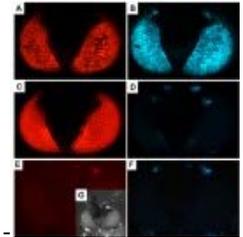
“While, for this study, we simply disrupted a fluorescent marker in the eyes of mosquitoes using CRISPR/Cas9, we were able to prove that this system can be used to perform more impactful gene edits in the future,” Dong said.

Alexander Franz, an assistant professor of veterinary pathobiology at MU and senior author of the study, says future research using this established technique could search for ways to genetically edit mosquitoes so they cannot harbor diseases like dengue.

“Infection of a mosquito with a human pathogen, such as dengue virus, alters the gene expression profile of the mosquito due to innate immune responses produced by the insect,” Franz said. “These complex genetic interactions are not well understood. However, being able to knock out an individual mosquito gene that responds to the presence of a virus will allow researchers to understand the gene’s underlying molecular mechanism in order to find ways to genetically block virus infection in the mosquito.”

Franz says in the case of viruses such as dengue, blocking the ability for the virus to reproduce in the

Related Media



Dong and other MU researchers successfully disrupted the gene in mosquitoes that creates both a blue and a red fluorescence in their eyes. Image B shows a mosquito with blue eyes, and images C and D shows a newly bred mosquito that maintains the red fluorescence without the blue fluorescence.

 **Photo**
[Download photo](#)

News Releases

MU Experts

Hometown Connections

Resources for Media

Subscribe

 [SHARE](#)    ...

 [Releases by E-mail](#)

 [News Feeds](#)

 [Research News at Mizzou](#)

 [@MizzouNews](#)

For Media Inquiries

MU News Bureau
329 Jesse Hall
Columbia, MO 65211

Phone: 573-882-6211

Fax: 573-882-5489

[Contact by email](#)

[Staff contacts](#) »

mosquito will interrupt the viral disease cycle with the consequence that humans no longer become infected when bitten by the mosquito.

This study was published in [PLOS ONE](#) and was funded by a National Institutes of Health NIAID grant R01 AI091972.

--30--