
Mosquito scent discovery could change a billion lives

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US researchers genetically modify mosquitoes making females less likely to spread diseases like dengue and Zika fever.

Researchers in the [United States](#) have genetically modified mosquitoes to make humans less attractive to them - a discovery that could dramatically reduce the spread of mosquito-borne diseases, such as dengue, malaria and Zika fever.

Female mosquitoes have been long known to use an array of sensory information to find people to bite. They can sense exhaled carbon dioxide from as far as 10 metres away, as well as being able to detect body odour, heat and moisture.

But new research, published in the journal *Current Biology*, has shown an acidic component in human sweat plays a key role in attracting the insect.

"We wanted to understand the genetic basis of how the mosquitoes detect their human hosts," Matthew DeGennaro, a mosquito neurobiology researcher at Florida International University, told Al Jazeera.

Gene identified

The scientists identified a gene - known as *Ir8a* - expressed in the mosquito's antenna. This gene appears to allow female mosquitoes, the ones that suck blood, to smell lactic acid, a

particular acidic vapour in human sweat.

Using advanced CRISPR/Cas9 gene-editing technology, the researchers were able to disrupt that gene, making the female *Aedes aegypti* mosquitoes significantly less interested in humans.

"Removing the function of Ir8a removes approximately 50 percent of host-seeking activity," said DeGennaro.

The genetically-modified mosquitoes were less likely to detect and bite humans, making them much less likely to spread mosquito-borne illnesses.

For a species such as *Aedes aegypti*, which lives alongside half of the world's population and spreads diseases that kill millions of people each year, this genetic modification has huge potential health benefits.

"The transmission of diseases like dengue, yellow fever, Zika, and malaria can be blocked if we stop these mosquitoes from biting us," said DeGennaro

Repellent potential

While the release of [genetically-modified](#) mosquitoes into the wild to combat the spread of dengue fever has been a controversial practice, this latest research is not only focused on the potential of cross-breeding them with wild populations.

The researchers say their work can also offer a more advanced understanding of how mosquitoes hunt and feed on their human targets and will allow them to develop improved mosquito repellents.

These could include life-saving perfumes or scents that would disrupt mosquitoes' sense of smell and protect people from being bitten.

"Odours that mask the IR8a pathway could enhance the efficacy of current repellents like DEET or picaridin. In this way, our discovery may help make people disappear as potential hosts for mosquitoes," said DeGennaro.

In the same way, the researchers say they may be able to use the discovery to overstimulate parts of the insect's detection system and use the scent to lure them away from our humans and into traps.

The effect is "like getting on an elevator with someone who has put on way too much cologne", Larry Zwiebel, a biologist at Vanderbilt University, [told](#) US broadcaster NPR.

In February this year, the [World Health Organization](#) warned that an emerging resistance to insecticides could lead to a large increase in malaria cases and mortality.

The effects of climate change, which will make more parts of the world hospitable to mosquitoes and the diseases they spread, are also expected to hamper control efforts.

It's in this context that new and innovative insect control methods like those developed by the Florida researchers are going to become increasingly important.



Researchers were able to disrupt the *Ir8a* gene, making female mosquitoes significantly less interested in humans [Florida International University/Flickr]