How Will Genetically Modified Mosquitoes Stop Zika?

By Julianna LeMieux — November 14, 2016

Insect repellent, screens on windows, wearing long sleeves -- there is a limit to the precautions that we can take to protect ourselves from viruses that are spread by mosquitoes.

Even by taking all of the above steps, there is no way to have guaranteed protection from mosquito bites.

But, there is one idea that would put an end to all other methods of mosquito repellents.... what if there were no mosquitoes?

That is the idea behind the work of the company Oxitec [1]. They have engineered a mosquito that leads to a decrease in the Aedes aegypti mosquito population. Here is how it works. The company has created a strain of mosquito that is "self limiting" meaning that they have a "death gene" added to their genome that kills their offspring. This strain of mosquitoes is called OX513A, but, they are referred to by the company as 'friendly Aedes.'

The process starts with the hatching of the OX513A mosquitoes. Then, the males and females are separated from each other. This is easy because males and females are different sizes. Also, the male strain is labeled with a red fluorescent marker, which makes it even easier to tell the difference, in case the size was unclear. After separation, the females are destroyed. Because male mosquitoes do not bite or spread disease, their release will not exacerbate disease spread. Those same males, upon release, mate with wild females. When the offspring of those matings hatch, they die.
If enough of these males are released, the total population of mosquitoes will decrease, and eventually become too low to transmit disease.

*Aedes aegypti* spread Zika, Dengue fever, yellow fever, and chikungunya virus. One thing that these four infectious diseases have in common is a lack of treatment. If you get them, you wait it out and hope for the best. And, although there is an incredibly effective vaccine for yellow fever, it is widely under produced. So, avoiding mosquito bites is really the only defense against these diseases.

These mosquitoes have been released in trials in Brazil, Panama (for yellow fever and Dengue) and the Cayman Islands (for Zika.) All of the trials resulted in a 90% reduction of the wild mosquito population. In Brazil, a trial was done in a town of 5,600 people that saw 133 cases of Dengue fever before the trial. After the trial - there was only one case. (1)

The mosquitoes are expensive and many of them need to be released to see an effect. However, the difference between spending money on the ‘friendly Aedes’ versus sprays and larvicides is that the mosquitoes actually work.

However, people are cautious to sign up for releasing genetically modified organisms into their community. As more and more people are affected by vector borne illnesses, we will see which is more important - fear of science or infectious disease?

References: