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Simple Beam of Light Can Tell if Mosquitoes Carry Zika

By Julianna LeMieux — May 25, 2018

Mosquito [1]

Memorial Day weekend: Three days that serve to honor our military and remember those that gave their lives for our country. It is also the unofficial kick-off off summer fever. The warm summer evenings by the lake and the barbeques in the park bring with them an unfortunate consequence - bug bites. And, in certain areas of the world, being bit by a mosquito is more than just a nuisance. It is a major health risk.

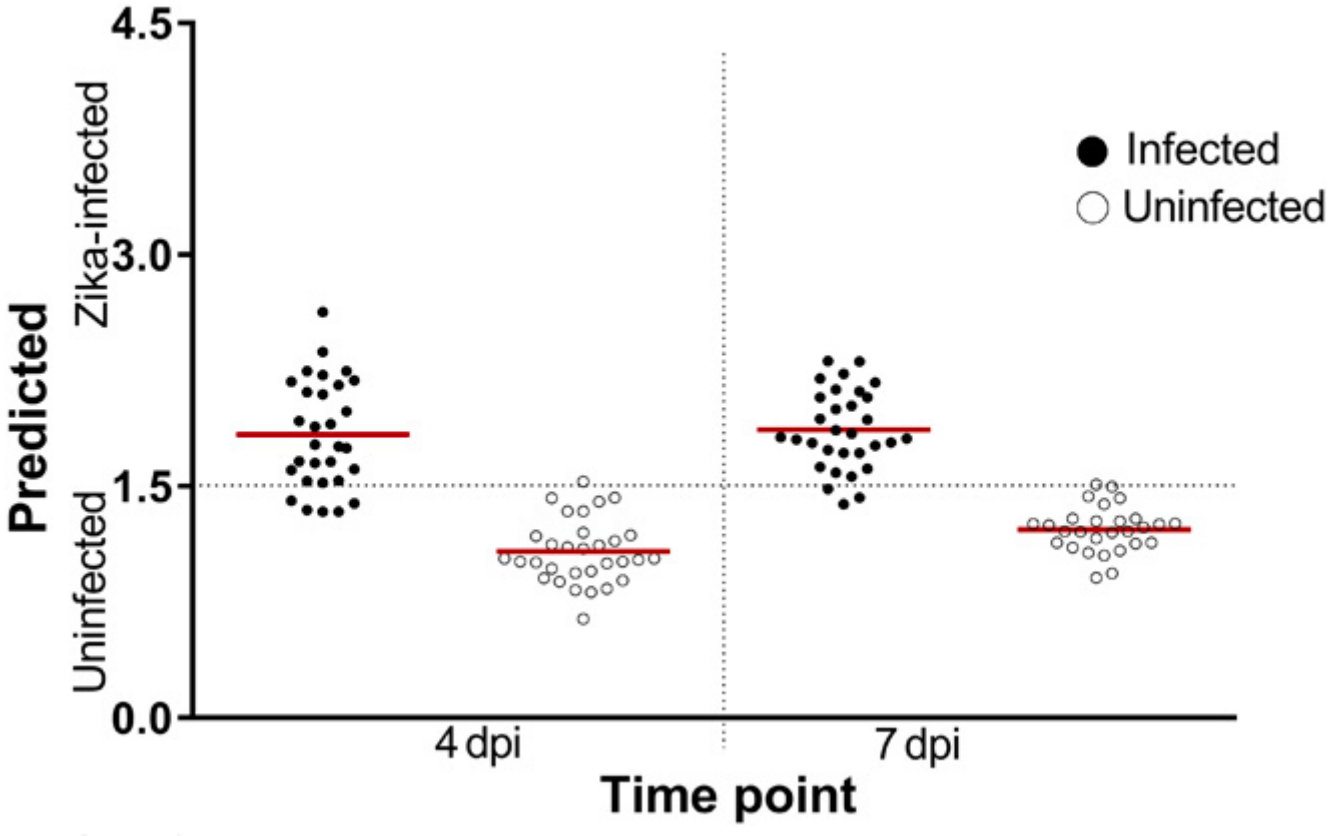
Infectious diseases that are carried by mosquitoes like malaria, Zika virus, dengue virus and Chikungunya virus to name a few, infect millions of people worldwide and any efforts to reduce spread are important to improving global human health. One way to tackle these diseases is to detect the virus or bacteria once it has infected a person and treat that person. Another way is to go after the mosquito.

Some scientists are doing just that. Published this week in *Science Advances,* one team of researchers have devised a tool using near-infrared spectroscopy (NIRS) to tell if a mosquito is infected with the Zika virus. NIRS is a rapid, reagent-free and cost-effective tool that can detect Zika virus in the heads and thoraces of living *Aedes aegypti* mosquitoes.

To understand whether NIRS can differentiate an infected versus an uninfected mosquito, the scientists raised 275 female *A. aegypti* mosquitoes. Half of the mosquitoes where fed blood that contained Zika virus. The other half were fed blood with no virus.

Using NIRS, the spectra from the head of the mosquitoes was measured at both 4 and 7 days after infection. The NIRS data could accurately tell if the mosquito was infected or not as shown in the figure below. (The mosquitoes infection was confirmed in the lab by PCR - a method that can

detect the presence of Zika virus DNA in the mosquito.)



And, it's accurate. The tool, when compared to the PCR results, was over 94% accurate.

And, all that you have to do is to shine a beam of light on a mosquito.

Mosquitoes are found near standing water, where they lay their eggs. The NIRA tool could be pointed at individual puddles. If it lights up, spray it. If not, leave it alone. So, instead of spraying an entire country with highly toxic insecticides, more specific areas could be targeted with this tool, resulting in a more effective approach with less risk.

Is it feasible to use this type of device out in the field? That answer remains unknown. A device like the one used in this study costs tens of thousands of dollars. But, increased mosquito surveillance could be a game changer and a life saver, if used at the start or in the middle of an outbreak.

Source [2]: Fernandes JN, et al. *Rapid, noninvasive detection of Zika virus in Aedes aegypti mosquitoes by near-infrared spectroscopy* Science Advances 23 May 2018: Vol. 4, no. 5, eaat0496 DOI: 10.1126/sciadv.aat0496

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[1] https://en.wikipedia.org/wiki/Aedes_albopictus

[2] http://advances.sciencemag.org/content/4/5/eaat0496