As Mosquito Season Ramps Up, So Does Progress on Zika Vaccine

By Julianna LeMieux — April 11, 2017

A new Zika vaccine may be just around the corner, with incredibly promising results recently published in *Nature Medicine* [1].

A team from the University of Texas Medical Branch at Galveston and the Instituto Evandro Chagas at the Ministry of Health in Brazil published findings of a new Zika mutant that elicits an immune response that is very similar to an actual infection.

But, what makes this vaccine so exciting, in and among the other reports of progress on Zika vaccines over the past year, is that this study is the first on a live-attenuated vaccine. That distinction is important because a live, attenuated vaccine typically provides the best protection.

The reason lies in how it is made. A live, attenuated vaccine contains viruses that can replicate once they are delivered inside the body. The only difference between the vaccine strain of Zika virus and an actual infection by Zika virus is the ‘attenuation’ of the vaccine strain - meaning that it will not cause illness. This attenuation can be done in multiple ways. In the case of the Zika vaccine, the scientists removed ten nucleotides (the bases that make up DNA) from the genome to create a virus that would not cause disease. The result is a virus that may not be able to make its RNA and proteins properly or may be more sensitive to a particular immune response called interferon. Interestingly, the 10 nucleotides lie in the same region that was deleted from the dengue genome to make the dengue vaccine that is now in a phase 3 clinical trial.
This Zika vaccine strain seems to be even better than most. A single dose of the vaccine strain resulted in an antibody response that could not get any higher - not even after an infection with Zika virus itself. In addition, it showed no safety concerns. Not only that, but, the vaccine strain did not infect mosquitoes after they fed on it in spiked-blood meals.

In the world of vaccine production, this strain is as good as it gets. Although it is unclear what the next steps will be, these results are very encouraging for the possibility of a future vaccine for Zika becoming a reality. Hopefully, it will be fast-tracked through the pipeline to get it into the population who need it - starting with pregnant women and women of childbearing age in Zika-infected areas. We can only hope that we are writing up promising results from this strain in non-human primates in a few months.

Reference:
Chao Shan, Antonio E Muruato, Bruno T D Nunes, Huanle Luo, Xuping Xie, Daniele B A Medeiros, Maki Wakamiya, Robert B Tesh, Alan D Barrett, Tian Wang, Scott C Weaver, Pedro F C Vasconcelos, Shannan L Rossi, Pei-Yong Shi. A live-attenuated Zika virus vaccine candidate induces sterilizing immunity in mouse models. Nature Medicine, 2017; DOI: 10.1038/nm.4322

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Links
[2] http://dx.doi.org/10.1038/nm.4322