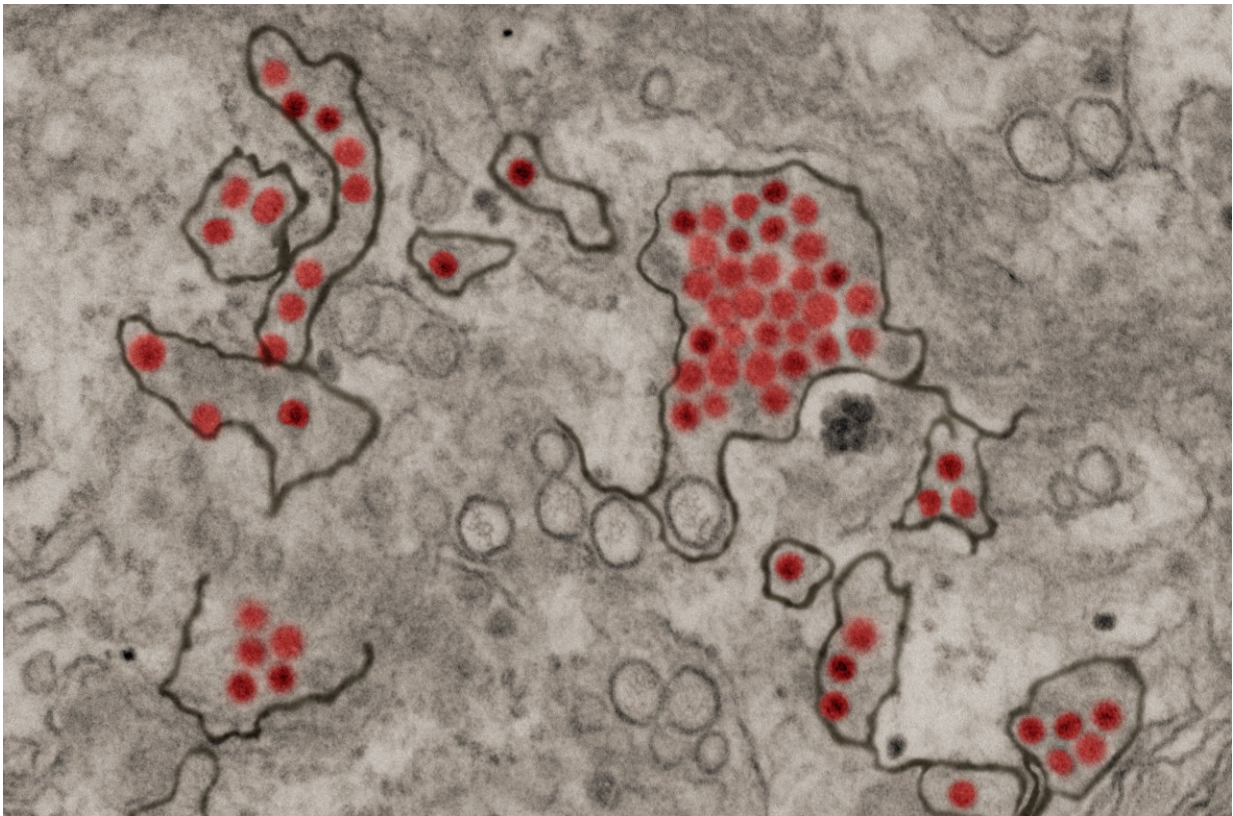


# Zika vaccine induces potent Zika and dengue cross-neutralizing antibodies

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Zika virus particles (red) shown in African green monkey kidney cells. Credit: NIAID

A new study led by scientists at the Walter Reed Army Institute of Research has shown for the first time that a single dose of an

experimental Zika vaccine in a dengue-experienced individual can boost pre-existing flavivirus immunity and elicit protective cross-neutralizing antibody responses against both Zika and dengue viruses. Findings were published today in *Nature Medicine*.

Researchers analyzed the [antibody responses](#) of a [dengue](#)-experienced volunteer who participated in a Phase 1 clinical trial of the WRAIR-developed Zika purified inactivated [virus vaccine](#). They identified a potent cross-reactive antibody called MZ4 that demonstrated a potent ability to neutralize the Zika virus as well as the dengue virus serotype-2 strain. In addition, MZ4 protected against Zika and dengue in a mouse model of infection.

"Rapid-onset countermeasures are needed to protect military personnel, travelers and residents in areas where emerging infections such as Zika and [dengue viruses](#) are already widespread and expanding," said Dr. Kayvon Modjarrad, who leads the U.S. Army Zika vaccine program, directs the Emerging Infectious Diseases Branch at WRAIR and is one of the lead authors on the paper. "These results demonstrate the potential for MZ4 to be part of the prevention toolbox for these diseases."

The individual's immune profile was compared to trial volunteers who had no previous exposure to dengue virus. While the volunteer with prior dengue exposure experienced a sharp increase in antibodies that neutralize Zika and dengue viruses, following just one dose of the ZPIV vaccine, the dengue-naïve trial participants required two vaccinations to reach a similar magnitude of Zika antibody responses. Additionally, no cross-reactive antibody response to dengue virus.

"These new findings indicate that an effective Zika vaccine could both boost dengue virus immune responses and generate potent Zika neutralizing antibodies that might have unique potential as a prevention tool in regions where both dengue and Zika are prevalent," said Dr.

Shelly Krebs, a B cell researcher at WRAIR and senior author of the paper.

Building on these findings, researchers used samples from another Phase 1 study of the ZPIV vaccine currently being conducted in Puerto Rico, where there is a higher risk of exposure to flaviviruses, a family of viruses that includes Zika, dengue, Japanese encephalitis, yellow fever and West Nile viruses. WRAIR researchers found that vaccination with ZPIV in Puerto Rican individuals with prior flavivirus-experience yielded similar cross-neutralizing potency after a single vaccination, highlighting the potential benefit of ZIKV vaccination in flavivirus-endemic areas.

Asymptomatic Zika infections can lead to severe birth defects and neurologic complications. The ZPIV vaccine candidate was developed by WRAIR based on the same inactivated flavivirus vaccine technology the Institute used to create its Japanese encephalitis vaccine, which was licensed in the U.S. in 2009. Three Phase 1 [human clinical trials](#) have shown ZPIV to be safe and well-tolerated in healthy adults and that it induced a robust immune response (Modjarrad et al., 2018). WRAIR's Zika efforts are ongoing, overseen by the Institute's Emerging Infectious Diseases Branch.

**More information:** Potent Zika and dengue cross-neutralizing antibodies induced by Zika vaccination in a dengue-experienced donor, *Nature Medicine* (2020). [DOI: 10.1038/s41591-019-0746-2](https://doi.org/10.1038/s41591-019-0746-2) , [nature.com/articles/s41591-019-0746-2](https://www.nature.com/articles/s41591-019-0746-2)

Provided by Walter Reed Army Institute of Research

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