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Researchers develop first chikungunya vaccine from virus that does not affect people

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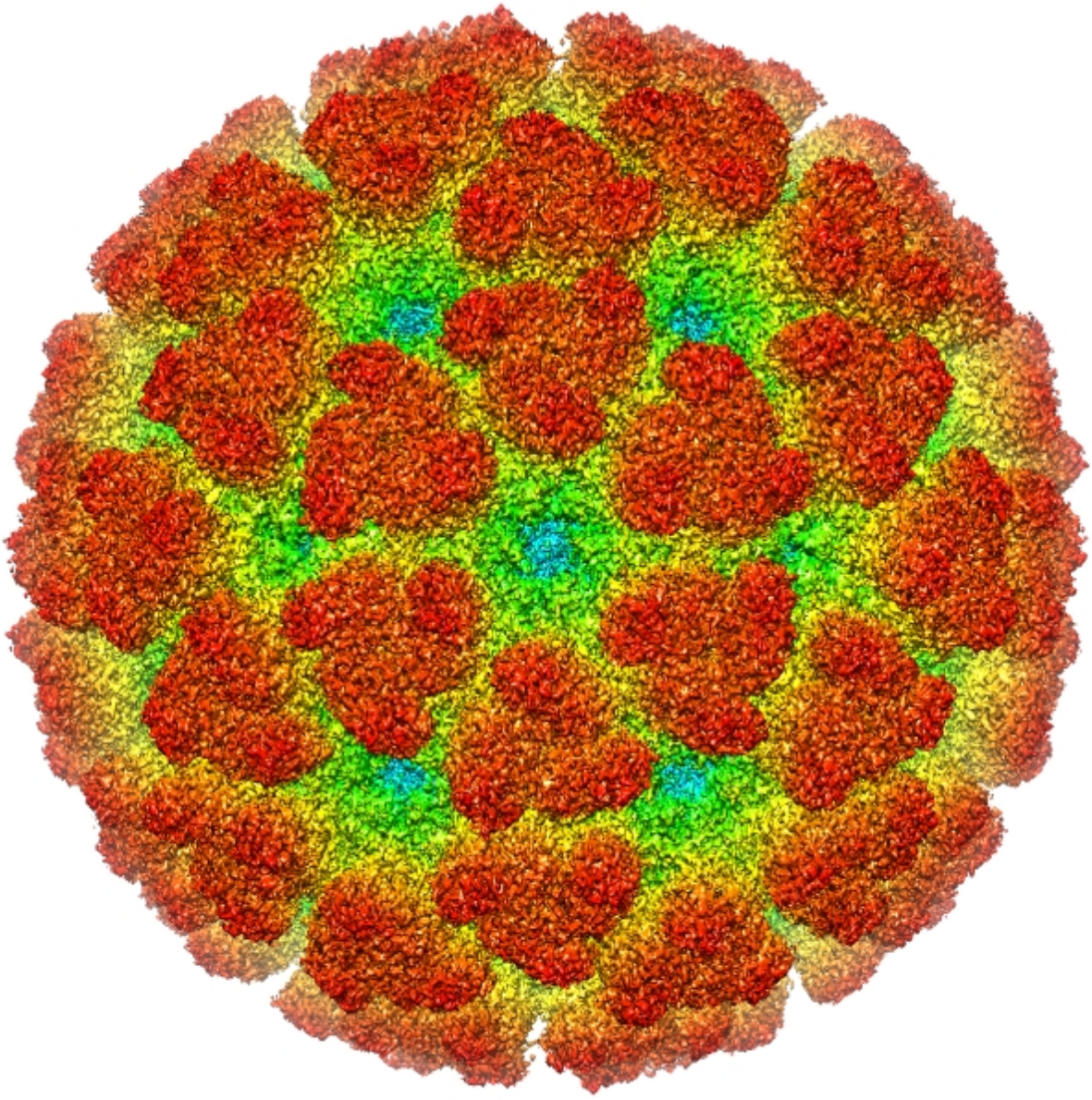

Cryoelectron microscopy reconstruction of Chikungunya virus. From EMDB entry 5577. Credit: Wikipedia

Researchers from The University of Texas Medical Branch at Galveston have developed the first vaccine for chikungunya fever made from an insect-specific virus that doesn't have any effect on people, making the vaccine safe and effective. The newly developed vaccine quickly produces a strong immune defense and completely protects mice and nonhuman primates from disease when exposed to the chikungunya virus. The findings are detailed in *Nature Medicine*.

"This vaccine offers efficient, safe and affordable protection against chikungunya and builds the foundation for using viruses that only infect insects to develop vaccines against other insect-borne diseases," said UTMB professor Scott Weaver, senior author of this paper.

Chikungunya is a mosquito-borne virus that causes a disease characterized by fever and severe joint pain, often in hands and feet, and may include headache, muscle pain, joint swelling, or rash. Some patients will feel better within a week but many develop longer-term joint pain that can last up to years. Death is rare but can occur.

Traditionally, vaccine development involves tradeoffs between how quickly the vaccine works and safety. Live-attenuated vaccines that are made from weakened versions of a live pathogen typically offer rapid and durable immunity but reduced safety. On the other hand, the inability of inactivated vaccines to replicate enhances safety at the expense of effectiveness, often requiring several doses and boosters to work properly. There may be a risk of disease with both of these vaccine types, either from incomplete inactivation of the virus or from incomplete or unstable weakening of the live virus that is only

recognized when rare vulnerable individuals develop disease.

To overcome these tradeoffs, the researchers used the Eilat virus as a vaccine platform since it only infects insects and has no impact on people. The UTMB researchers used an Eilat virus clone to design a hybrid virus-based vaccine containing chikungunya structural proteins.

The Eilat/Chikungunya vaccine was found to be structurally identical to natural chikungunya virus. The difference is that although the hybrid virus replicates very well in mosquito cells, it cannot replicate in mammals.

Within four days of a single dose, the Eilat/Chikungunya candidate vaccine induced neutralizing antibodies that lasted for more than 290 days. The antibodies provided complete protection against chikungunya in two different mouse models. In nonhuman primates, Eilat/Chikungunya elicited rapid and robust immunity - there was neither evidence of the virus in the blood nor signs of illness such as fever after chikungunya virus infection.

More information: Jesse H Erasmus et al. A chikungunya fever vaccine utilizing an insect-specific virus platform, *Nature Medicine* (2016). DOI: 10.1038/nm.4253

Provided by University of Texas Medical Branch at Galveston