

New defense against dengue and emerging mosquito-borne viruses

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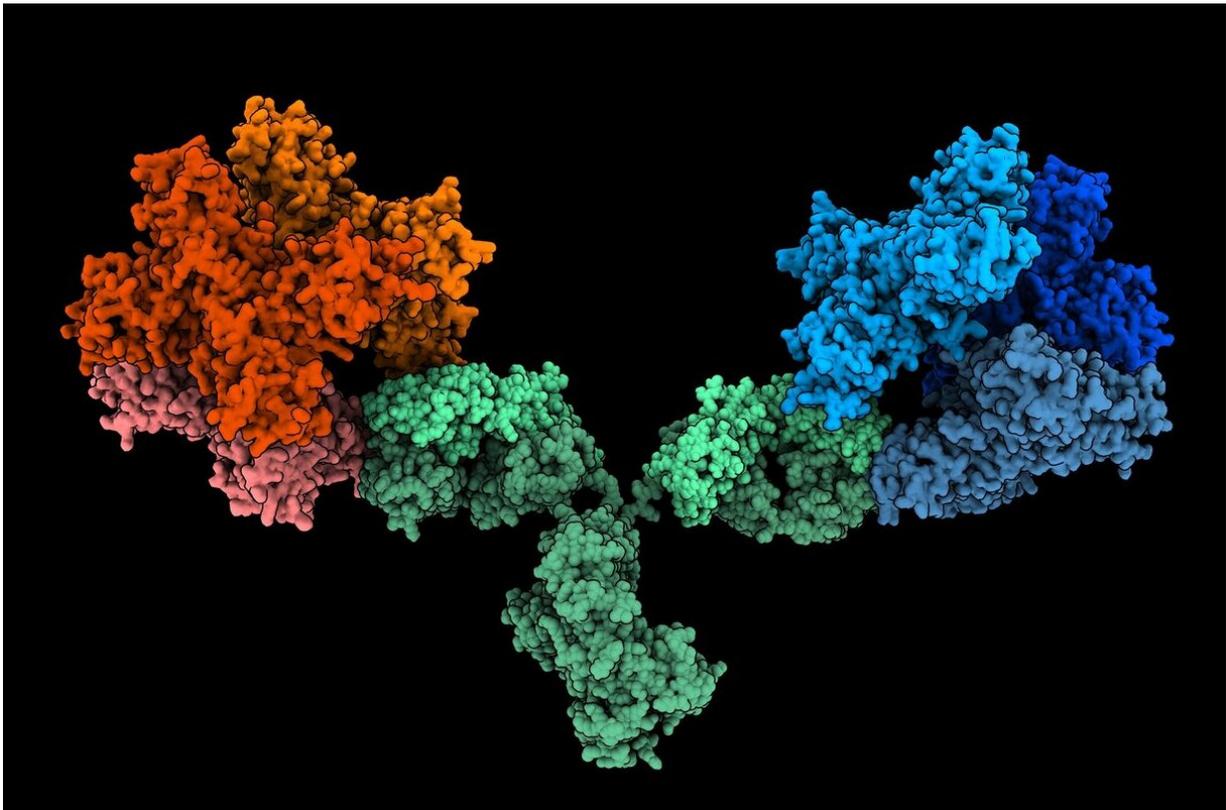


Image depicts the 1G5.3 antibody(green) bound to both Zika (red) and dengue(blue) NS1 proteins. It's based on structural data but idealised to showing binding to both viral proteins simultaneously. Credit: Dr Daniel Watterson

New treatments to cut the global death rate from dengue, Zika and West Nile viruses could result from research led by The University of

Queensland.

Associate Professor Daniel Watterson from UQ's School of Chemistry and Molecular Biosciences said the team identified an antibody that improved [survival rates](#) in laboratory trials and reduced the presence of [virus](#) in the blood.

"We made a discovery in 2015 in the wake of the Zika outbreak that identified a new target for flavivirus treatments, a [viral protein](#) called NS1," Dr. Watterson said.

"Now we've shown for the first time that a single NS1 antibody can be protective against multiple flaviviruses including [dengue](#), Zika and West Nile.

"No other antibody reported has shown such a broad range of protection.

"The improved protection we saw compared to existing treatments was really unexpected."

An estimated 390 million people are infected with dengue globally each year, particularly in tropical and sub-tropical areas.

Of those cases, about half a million people develop a more severe form of the disease, which can be fatal.

Dr. Watterson said the discovery was important, as the development of a vaccine for viruses like dengue is an unmet global challenge.

"Creating vaccines and therapies has been greatly hindered because antibodies that target the main viral envelope protein can also enhance disease.

"This phenomenon is called antibody dependent enhancement (ADE), and contributed to the complications arising from large-scale roll-out of the first licensed dengue vaccine.

"But because NS1 antibodies don't drive ADE, our findings provide the blueprint for new and safe broad-spectrum vaccines against multiple flaviviruses, including dengue."

Lead author UQ's Dr. Naphak Modhiran said the antibody could also provide the first line of defence in future viral outbreaks across the world.

"The antibody binds to a wide range of flaviviruses including Usutu virus in Europe, and Rocio and Ilheus viruses in South America," Dr. Modhiran said.

"These viruses have already caused local outbreaks in the past and have the potential to be the next Zika."

Co-author Professor Paul Young said the [antibodies](#) were first developed in his group more than 30 years ago.

"Since then, they have provided numerous insights into the biology of dengue and have been employed in the development of diagnostics," Professor Young said.

"It's great to see them now progressing as potential templates for therapeutics.

"This highlights the critical nature of discovery research in providing the foundation for translation into clinical practice."

The research has been published in *Science*.

More information: "A broadly protective antibody that targets the flavivirus NS1 protein" *Science* (2021). science.sciencemag.org/cgi/doi/10.1126/science.abb9425

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