

New understanding of dengue fever could help with vaccine

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Some of the human immune system's defences against the virus that causes dengue fever actually help the virus to infect more cells, according to new research published today in the journal *Science*.

The researchers behind the work, from Imperial College London, hope their new findings could help with the design of a [vaccine](#) against the dengue virus. The study also brings scientists closer to understanding why people who contract [dengue fever](#) more than once usually experience more severe and dangerous symptoms the second time around.

Dengue fever is transmitted by a mosquito bite and is prevalent in sub-tropical and tropical regions including South East Asia and South America. Symptoms include high fever, severe aching in the joints and vomiting. The dengue virus can also cause hemorrhagic fever, which can be fatal.

Incidence of dengue fever has increased dramatically in the last century and two fifths of the world's population are now at risk from it, according to the World Health Organisation. There are four distinct strains of the virus and no licensed vaccines or drugs have yet been developed to combat any of them.

The researchers behind today's study have identified a set of antibodies, produced by the human [immune system](#) to fight off the dengue virus, that they believe scientists should avoid including in any new vaccine to

prevent dengue fever.

The new research shows that these precursor membrane protein (prM) antibodies do not do a very effective job of neutralising the virus. Moreover, these antibodies actually help the virus to infect more cells.

The study suggests that when a person who has already been infected with one strain of dengue virus encounters a different strain of dengue virus, the prM antibodies awakened during the first infection spring into action again. However, rather than protecting the body from the second infection, these prM antibodies help the virus to establish itself.

This activity of the prM antibodies could explain why a second infection with a different strain of the virus can cause more harm than the first infection. The researchers believe that if a dengue virus vaccine contained prM antibodies, this could cause similar problems.

Professor Gavin Screaton, the lead author of the study who is the Head of the Department of Medicine at Imperial College London, said: "A huge proportion of the world's population is at risk from dengue fever and although treatments have improved, it can be a very unpleasant, painful disease and people are still dying from it. When there is an epidemic of dengue fever, it can put a huge strain on health systems and local economies as well as on individuals and their families.

"Our new research gives us some key information about what is and what is not likely to work when trying to combat the dengue virus. We hope that our findings will bring scientists one step closer to creating an effective vaccine," he added.

The researchers reached their conclusions after analysing individual [antibodies](#) to the [dengue virus](#) extracted from blood samples donated by infected volunteers.

More information: "Cross-reacting Antibodies Enhance Dengue Virus Infection in Humans" Science, Thursday 6 May 2010.

Provided by Imperial College London

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