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Singapore: A team of research scientists here have uncovered a human antibody that can neutralize and kill the dengue virus within two hours. A way to reproduce this antibody in large quantities has also been identified, potentially opening the door to a cure for dengue-infected patients.

This discovery was made by a combined team from the NUS Yong Loo Lin School of Medicine, Duke-NUS Graduate Medical School and the Defence Medical & Environmental Research Institute at DSO National Laboratories (DMERI@DSO) with funding from the Singapore National Research Foundation under its Singapore NRF Fellowship, National Medical Research Council and DR Tech. By studying a group of cell lines from recovered dengue-infected patients over a period of two years, the team identified a recombinant antibody that could attach itself strongly to a specific part of the dengue virus and inhibit it from attacking other cells. The antibody eventually destroys the virus and at a much faster speed compared to existing anti-dengue compounds. It has been proven to increase the survival in a mouse model infected with the dengue virus.

The World Health Organization estimates there may be 50-100 million dengue infections worldwide every year. With no approved vaccines or specific treatment available and with vector control as the only method for prevention, dengue continues to be a public health concern.

To complicate matters, there are four dengue serotypes (DENV1 to DENV4), and infection with one dengue serotype means lifelong immunity to that type but only partial and temporary protection against the other three. Developing a vaccine against dengue has thus been challenging, made more so because of a global, urgent need for new treatment to manage this disease.

This newly discovered antibody specifically treats DENV1, which accounts for up to 50 percent of the dengue cases in Singapore and other Association of Southeast Asian Nation countries. To ensure its effectiveness, the team tested this new antibody with DENV1 types from these countries - with equally promising results, said Associate Professor Paul Macary of the NUS Yong Loo Lin School of Medicine's Department of Microbiology. He is the Principal Investigator who led the research team.

"We knew the antibody exists based on the fact that most patients recover naturally from dengue infection, but the chances of finding it would be like finding a needle in a haystack. We are very encouraged by this breakthrough. This represents the best candidate therapy that currently exists for dengue and thus is likely to be the first step in treating dengue infected patients who currently have no specific medicine or antibiotic to take and may take days to fully recover," said Dr Brendon Hanson, head, Bio-Defence Therapeutics Lab, DMERI@DSO. "Being a completely human antibody, it is likely to have no serious side effects and this makes not only this antibody, but the approach we took to isolate antibodies from recovered patients an attractive one."

Assistant Professor Lok Shee-Mei of the Duke-NUS Graduate Medical School Singapore, said, "The journey in finding this antibody that effectively treats dengue virus serotype 1 virus infection has been very fulfilling. Now we will be on our next quest to find other antibodies that treat Dengue serotypes 2, 3 and 4 infection. We hope to combine these antibodies into one concoction in the near future to treat each serotype and improve patient outcomes."

Moving forward the team will be embarking on a clinical trial in the next 12 -16 months and expects a therapy to be available within the next 6 - 8 years. The team hopes to uncover antibodies for the other dengue types within the next two years.