MedicalXpress

Laboratory technique can detect Zika virus infection and make diagnostic tests more accessible

December 22 2017

A new test for the Zika virus could help limit future outbreaks, especially in areas without access to sophisticated diagnostic methods.

An international team led by Lisa F. P. Ng of the A*STAR Singapore Immunology Network found that an existing flow cytometry technique can accurately detect the presence of a key Zika virus antigen.

Most people infected with the mosquito-borne virus have no symptoms or very mild effects. However there is strong evidence that it can cause severe birth defects. While the number of new cases has dropped significantly since the major outbreak in the Americas in 2015-16, outbreaks are thought to be cyclical.

The current gold standard diagnostic test identifies the presence of Zika virus RNA in blood or urine. To be sure of detecting infection, however, blood samples must be taken within seven days of the onset of symptoms or within 14 days for urine. There are also tests for antibodies against the virus in blood, but these tests can fail to distinguish Zika from closely-related flaviviruses like dengue.

A team of researchers from Singapore, Estonia and Russia made a synthetic version of NS3, a protein that helps the Zika virus replicate. They injected these proteins into rabbits to generate NS3 antigen-specific antibodies, which they then added to blood samples taken from

47 Zika patients at Tan Tock Hospital in Singapore.

The researchers used a flow cytometry technique called fluorescence-activated cell sorting (FACS) to measure the proportion of white blood cells containing Zika virus antigen in the patient samples. After tests on samples from healthy controls, the group set the threshold for Zika virus infection at 0.5 per cent.

Detection rates of less than 10 per cent, 10–40 per cent and more than 40 per cent were characterized respectively as low, medium and high.

All the samples from patients in the high detection group were taken between two and five days after the onset of symptoms, suggesting this may be the optimum window for the test. Further tests also showed the technique can differentiate between Zika virus and similar viruses.

"The current detection methods all have limitations," says Ng. "Using FACS to detect Zika virus NS3 antigen in the blood could offer a relatively efficient and fast complementary method. It can be done using fresh blood samples and requires minimal processing, and so could be especially useful in settings where there is no access to the equipment and trained technicians required by current molecular tests."

More information: Fok-Moon Lum et al. A Sensitive Method for Detecting Zika Virus Antigen in Patients' Whole-Blood Specimens as an Alternative Diagnostic Approach, *The Journal of Infectious Diseases* (2017). DOI: 10.1093/infdis/jix276

Provided by Agency for Science, Technology and Research (A*STAR), Singapore