NTU team’s Covid-19 rapid test can pick up variants

A new Covid-19 rapid test that can detect variants of the virus has been developed in Singapore.

It produces results within 30 minutes and can be used directly on patient samples. It is also about 10 times more accurate than antigen rapid tests currently in use in the country.

The Variant Nucleotide Guard (VaNGuard) test is the first rapid test here to make use of a gene editing tool known as Crispr.

Developed by scientists from Nanyang Technological University (NTU), the VaNGuard test uses a reaction system containing a specific enzyme that acts like a pair of “molecular scissors”.

The enzyme targets specific segments of the genetic material of Sars-CoV-2 – the virus responsible for Covid-19 – and snips them off the rest of the viral genome. Successfully snipping off these segments is how the enzyme identifies the presence of the virus.

To ensure that variants are not missed, two short genetic sequences – known as guide RNAs – are used to recognize sequences that are extremely similar across the variants but also unique to the virus.

A successful test will show one band, while a failed test will show two bands. Otherwise, only one band will appear.

Since August last year, the NTU team has been working with a local hospital to obtain clinical samples for use on the new test kit.

The scientist leading the project, Associate Professor Tan Meng How and project officer Ooi Kean Hean – with their test kit and mobile app that helps to analyse the results.

Polymerase chain reaction tests of the genetic material of Sars-CoV-2 – the virus causing Covid-19 – snips them off the rest of the viral genome. Successfully cutting off these segments is how the enzyme identifies the presence of the virus.

“Aim to refine test to identify specific variant

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differences.

Currently, antigen rapid tests that detect proteins called antigens on the surface of the virus are used in Singapore. Should a mutation affect the viral antigen, some of these tests may be ineffective.

Redesigning an antigen rapid test takes a longer time because the test relies on antibodies and the redesigning of an antibody requires more time, Prof Tan added.

Several strains of the Sars-CoV-2 virus or its variant, two bands will appear. Otherwise, only one band will appear.

Since August last year, the NTU team has been working with a local hospital to obtain clinical samples for use on the new test kit.

The scientists hope to obtain more samples to further refine their test and eventually develop a kit that can identify the specific variant and not simply detect the presence of viral strains in general.

The project was started in January last year and the team hopes to obtain regulatory approval this year.

Clara Chong