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Taiwan's NHRI develops a prototype COVID-19 rapid diagnostic kit

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The strip test yields result in 10 to 15 minutes



The National Health Research Institutes (NHRI) in Taiwan announced on 2 April 2020 that it has successfully developed a rapid diagnostic test for the COVID-19, promising results within 10 to 15 minutes.

National Institute of Infectious Disease and Vaccinology Director Liao Ching-len explains the functions of a prototype COVID-19 rapid diagnostic tool in Taipei on 8 April 2020.

Based on findings from previous studies on the SARS epidemic, the NHRI in collaboration with the National Defense Medical Center discovered that SARS antigens could also be used to test for the coronavirus, reported.

The NHRI and the center's Institute of Preventive Medicine used SARS-CoV antibodies produced during the SARS outbreak in 2003 and picked out one that can identify SARS-CoV-2, which causes COVID-19, to develop the rapid test kit.

The test works by placing a specimen taken from the mouth or nose onto a test strip, which siphons the specimen toward the antibodies on the strip, NHRI National Institute of Infectious Disease and Vaccinology Director Liao Ching-len said. The secretions placed in a test kit containing coronavirus antibodies cling to the virus.

As researchers have identified the coronavirus' spike protein, if the specimen contains SARS-CoV-2, the spike protein would be caught by the antibody and two lines would appear on the test strip, indicating a positive result. The result is interpreted similarly to the pregnancy test; one line means negative and two lines mean positive.

The prototype has been proven to avoid cross-reaction with other viruses, including human coronaviruses OC43, 229E and NL63; adenoviruses; respiratory syncytial virus; type A influenza viruses H1N1, H5N1 and H7N9; and enterovirus 71, NHRI National Institute of Infectious Disease and Vaccinology Director Liao Ching-len said.

The prototype is not meant to replace the real-time reverse transcription-polymerase chain reaction test, which is currently being used for diagnosis, he said, adding that they hope the rapid test will be used as a complementary measure to allow hospitals to screen patients rapidly and sort them, Liao added.

The nasal swab test would be less costly to produce than a nucleic acid test and could be widely used at clinics and hospitals for a quick diagnosis. This would contribute to early intervention and prompt quarantine measures before suspected patients' symptoms get worse while reducing the risk of additional infections, NHRI Vice President Sytwu Huey-kang stated.

The diagnostic test still needs to undergo multiple screening to ensure accuracy and to be ready for clinical use. The institute is convening a tender settlement meeting to select interested companies for trial mass production of the kits, Sytwu concluded.

NHRI presented the prototype to pharmaceutical companies on 8 April 2020 in Taipei with the hope to achieve technology transfers and starting mass production. Pharmaceutical companies are expected to join them in refining the prototype and manufacture and release the final product for front line disease prevention.

NHRI President Liang Kung-yee said that the Food and Drug Administration has also launched a scheme, which grants permission for clinical trials and mass production at the same time, to shorten the duration required for a product to hit the market. If the procedures go smoothly, the test kit could be out in three months, Liang said.