

New test speeds up SARS detection

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In the fight against epidemics, those battling on the front lines may be on the verge of a new weapon, thanks to a team of University of Alberta researchers.

Mavanur Suresh, a professor and associate dean of the Faculty of Pharmacy and Pharmaceutical Sciences along with graduate student Sriram Kammila, are receiving global recognition for creating an improved test for the early diagnosis of influenza and other emerging diseases.

The two-part test is conducted using a simple cotton swab stick treated with carefully selected antibodies, in this case antibodies derived from antigens shed by the SARS-CoV virus. First, the nasal passage or mouth of someone suspected of carrying the SARS virus is swabbed with the tester. If the patient is infected with the SARS virus, the SARS antigen is present and will bind to the antibody in the swab. The swab is then treated with a second antibody. The resulting chemical reaction turns blue, indicating a positive result.

"Detecting a virus is similar to selecting a certain kind of bait to pull out a specific fish," said Suresh, adding that, because all viruses carry unique antigens, this test can become a "unique diagnostic marker for us to follow both the detection and the course of infection."

The easy part is making the antibody, Suresh said.

"But what is unique about this test is how low the levels of antigen you're

trying to detect can be. The sensitivity of the assay is key to its success."

In this case the antibody binds to an important component of the SARS virus. The antibody is "Y" shaped, binding to two different spots on the SARS virus.

Kammila describes the test as a "sandwich assay," with the bread being the antibodies, and the meat in the middle being the antigen that is detected. In this case, the nucleocapsid protein of SARS was selected because it sheds antigens that can be detected early in the virus's incubation period - in some cases long before symptoms begin to blossom.

"At any port of entry whether it be plane, train, boat or car, this test can be available," said Kammila, pointing to the 2003 SARS outbreak in Toronto where hundreds of people were infected by a man flying in from Germany who had previously been exposed in Hong Kong. "The total assay takes about a half hour."

However, Kammila said he understands that half an hour might create logistic nightmare for travelers, particularly those who fly. Kammila and Suresh are currently working on a way of reducing the time to 15 minutes or less.

"There are many advantages to this kind of test," said Kammila, adding that current gene therapy-based diagnostic tests are expensive, difficult to administer and slow to produce results.

"The cost is low, it's only a cotton swab stick and you can have a minimally trained health or social worker administering the test at all ports of entry," he said. "It is also applicable to all types of viruses and bacterias."

Kammila's discovery made international headlines after he presented his work at the American Association of Pharmaceutical Scientists National Biotechnology Conference in June.

"I was pretty excited when it worked," said Kammila," who had two previous projects fail before realizing success. "I didn't think it would pan out so well."

His research was being tested against available SARS, and further tests will be designed using different strains of bird flu and tuberculosis.

Source: University of Alberta

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