

Research Diary

Lab on chip device for the detection of multiple proteins for SARS-CoV-2 infection diagnosis

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The novel coronavirus formally SARS-Cov-2 has recently emerged to cause the outbreak of COVID-19 which has expanded into a worldwide human pandemic and also continued to affect our country to an exponentially increasing extent. Due to the rapid rise in the number of cases and uncontrolled worldwide spread of this virus, it is crucial to diagnose asymptomatic carriers to prevent further virus transmission and treatment of patients. Although the virus nucleic acid RT PCR test has become the standard method for diagnosis of the coronavirus infection, there is an urgent need for developing and optimizing other methods to quickly identify the infected patients. So that various instruments and national resources can be of use in handling the critical situation. Furthermore, since this virus can cause severe respiratory infections in humans, it is also important to classify the disease stage through the detection of the amount of inflammation present.

We propose a prototype imaging device that can be fabricated using 3D printed templates. Additionally, we envision a test kit and the protocol that can be used for testing the coronavirus infection in facilities that have fluorescent microscope/laser-based microscope.

In particular, we propose an immunofluorescence assay on the device that can be used to have high sensitivity and specificity for detecting the SARS-Cov-2 N protein, E protein, S protein, and interleukin-8. The proposed prototype can be an important supplement method for rapid screening of COVID-19 carriers, symptomatic or asymptomatic, in hospitals, clinics, as well as test laboratories.



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