

「A rapid, extraction-free COVID-19 RT-PCR testing has been developed」

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The novel coronavirus swept quickly across the globe and at least 1 million people have now died from COVID-19. [1] On Monday (Sept. 28), Donald Trump, president of the United States, has announced a plan to distribute millions of rapid COVID-19 tests to states, with a focus on using the tests to reopen schools. [2] The relatively high transmission rate and the large number of asymptomatic infections led to a huge, world-wide need for fast, affordable and effective diagnostic tests that could be performed in clinical as well as non-clinical settings. Recently, a study from Karolinska Institutet published in Nature Communications described a method COVID-19 testing by extraction-free RT-PCR. This new Covid-19 testing method is expected to be cheaper, faster and accurate. [3]

The method, name as heat-inactivated direct RT-PCR (hid-RT-PCR), was performed directly on heat-inactivated or lysed samples with single reaction and enables the upscaling of the diagnostics and simplifies the testing from expensive reaction steps. Their data, including benchmarking using 597 clinical patient samples and a standardized diagnostic system, demonstrate that direct RT-PCR is viable option to extraction-based tests.

Current diagnostic tests for COVID-19 are based on the detection of viral RNA in patient samples, such as nasal and throat swabs, from which RNA molecules must then be extracted and purified. RNA purification constitutes a major bottleneck for the testing process, requiring a great deal of equipment and logistics as well as expensive chemical compounds. Making the current methods simpler without markedly compromising their accuracy means that more and faster testing can be carried out, which would help to reduce the rate of transmission and facilitate earlier-stage care.

The new methods developed by cross-departmental research group at Karolinska Institutet completely circumvent the RNA-extraction procedure, so that once the patient sample has been inactivated by means of heating, rendering the virus particles no longer infectious, it can pass straight to the diagnostic reaction that detects the presence of the virus. According to the researchers, the most important keys to the method's success are both the above virus inactivation procedure and a new formulation of the solution used to collect and transport the sample material taken from the patients. "By replacing the collection buffer with simple and inexpensive buffer formulations, we can enable viral detection with high sensitivity directly from the original clinical sample, without any intermediate steps," says Dr Reinius, the principal investigator of this research. [4]

The low cost and the simplicity make the method particularly attractive for places and situations with

limited resources. The method will also help in moving resources from expensive diagnostics to other parts of the care chain and is equally interesting for repeated testing. It is also promising for cheap periodic testing of asymptomatic people to eliminate the spread of infection.

Reference:

1. COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>
2. Rachael Rettner, Sep 28, 2020. "Trump administration plans to distribute 100 million rapid COVID-19 tests to states" LiveScience news
3. Ioanna Smyrliaki et al. Sep 23, 2020. "Massive and rapid COVID-19 testing is feasible by extraction-free SARS-CoV-2 RT-PCR" Nat Commun. 11(1):4812.
4. Prachi Mankani. Sep 27, 2020. "Sweden Develops New Covid-19 Testing Method, Promises to Be Cheaper, Faster and Accurate" Republicworld news
5. "A cheaper, faster COVID-19 test" Karolinska Institute's press release

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