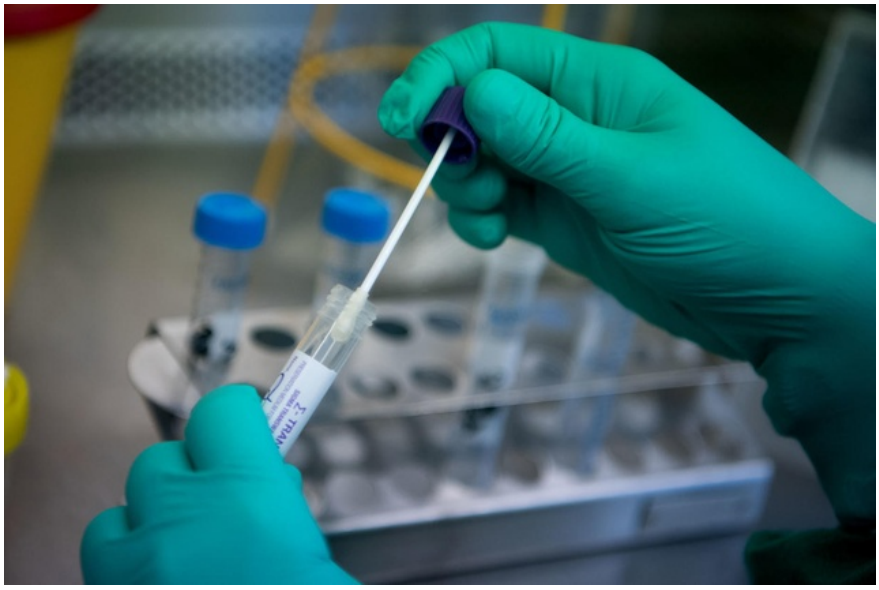
He is developing the world's fastest and most accurate Covid-19 test, which takes only 30 minutes and has no false results.

It should be said that the RT-PCR test for finding viral RNA is different from the Covid-19 rapid test that some countries like Korea are developing. Although fast results can be obtained within 10-15 minutes, these tests are not very accurate, usually only about 85%.

While the Covid-19 epidemic is booming in the UK, scientists say they have successfully improved a new RT-PCR test method for corona virus. The method, studied by Oxford University, can give up to three times faster results than today's fastest viral RT-PCR test.

What's even more amazing is that it only requires a few relatively simple technical devices, promising to be able to equip home users. The scientists also said that the test could detect patients with Covid-19 early in the early stages of the disease, something many other tests do not.



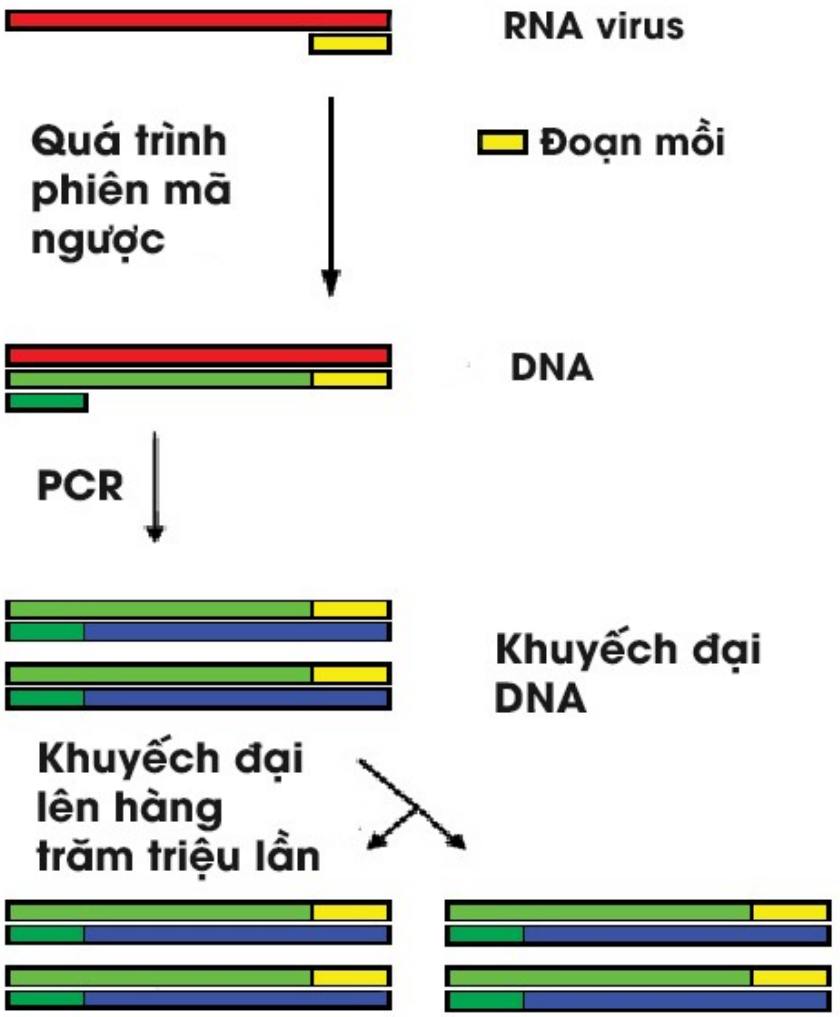
What is an RT-PCR test?

To be able to specifically test Covid-19 with 100% accuracy, scientists now have to resort to a method called Reverse Transcriptase Synthesis (RT-PCR). In it, the throat fluids of Covid-19 patients will be collected on the spot, then put in a cold container to take to the laboratory.

Here, biomedical technicians will do their first job, isolating RNA from this sample. Typically, they would have to mix it into some solution and chemicals, then spin centrifugal to roll the fragments of RNA from the virus into a bunch together.

These RNA clusters are called purified RNA. They will be drawn out of the centrifugal mixture to add reverse transcriptase enzymes. The reverse transcription process turns single RNAs into DNA with two double helices.

The DNA is then inserted into a test tube containing a mixture of liquid nucleotides, DNA-building enzymes and short DNA fragments called primers. These primers have been designed by scientists to find and link to specific segments of the new corona virus. In a culture environment, the DNA fragments will automatically multiply hundreds of millions of times, to the point where they can be detected.


RNA virus
Đoạn mồi
Quá trình phiên mã ngược
DNA
PCR
Khuyếch đại DNA
Khuyếch đại lên hàng trăm triệu lần

The entire process of reverse transcription and amplification is done in a PCR machine, which requires a qualified technician.

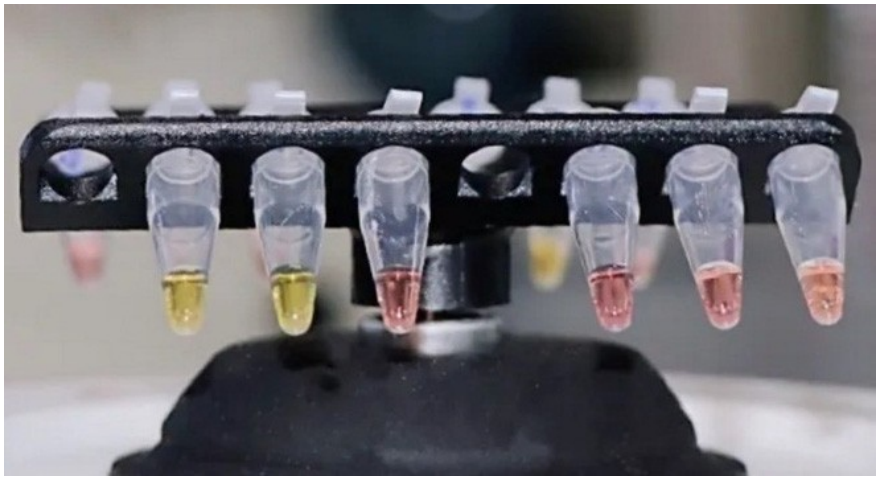
This entire reverse transcription and amplification process is done in a PCR machine, with temperature cycles constantly changing and must be preset for optimization. It will take a few dozen minutes for a DNA sequence to multiply into two. And after 30-40 cycles, scientists can read the test results, the fastest is about 1 and a half hours, slow to several days.

An improved method, 3 times faster

Now, Oxford scientists say they've improved a time-consuming process of RT-PCR, the process of heating and amplifying DNA. The common PCR cycle requires multiple heating stages with different temperatures to accelerate the reaction rate.

However, the Oxford team revealed that they have figured out how to use only a single level of heat, in a single phase, to help DNA multiply millions of times. This process will shorten the test time to only 30 minutes, compared to the fastest time of 1 and a half hours as today.

" *The beauty of this new test is that it can detect RNA fragments and RNA fragments of the SARS-CoV-2 virus," said* Professor Wei Huang, a member of the research team at Oxford. " *This test is designed to prevent false positive or negative results, and it gives high accuracy."*



Currently, the new method of Oxford University has only been tested on 16 specimens collected from Shenzhen People's Hospital in China. But this sample collection has all positive and negative samples. And the new test gave 100% accurate results.

Replace the rapid test kit with lower accuracy

It should be said that the RT-PCR test for finding viral RNA is different from the Covid-19 rapid test that some countries like Korea are developing. Rapid test kits are often aimed at indirectly detecting the presence of a virus in patient samples such as runny nose or blood, through antibodies or proteins, rather than finding the virus's own RNA.

Although fast results can be obtained within 10-15 minutes, these tests are not very accurate, usually only about 85%. The rapid test kit is often chosen when the government plans to screen the disease on a large scale, for example, in Korea, to localize infection training and isolate the necessary cases.

The RT-PCR test for finding viral RNA is different from the Covid-19 rapid test that some countries like Korea are developing.

Now, if Oxford University's new test method, with 100% accuracy and time asymptotic to a rapid test kit, could become a new option in the epidemic. The scientists say they are developing a mobile version of their test, to free up reliance on PCR manipulation and the skills of laboratory technicians.

That means anyone can perform such a test on their own at home. Compact machines can also be fitted at every clinics, airport gates and public places.

The story of the future

It must also be said that a new technology is born from the laboratory of a university will still take many more steps to conquer the scientific community, health managers to the market. Therefore, perhaps the new method of Oxford scientists will not appear immediately to serve widely in the Covid-19 epidemic.

However, with the advantages that it is showing, this will be a research direction worth investing in the future. Because it can replace and accelerate the pace of RT-PCR, this method is not the only potential application for detecting SARS-CoV-2 virus. It can identify all specific genetic sequences, to study every disease, including the normal genetic sequences of the organism.

The device can be equipped with any public health laboratory, hospitals, research facilities and even commercial companies working in the field of biology. The improvement of RT-PCR is an improvement of a pillar in the field of biological research.

References Oxford, Wired