PATENT

PCR-LESS TECHNOLOGIES FOR RAPID DETECTION OF SARS-COV-2 AND INFLUENZA RNAS

Patient need addressed

Rapid detection of SARS-CoV-2, Influenza, and other respiratory viral RNAs

The Solution

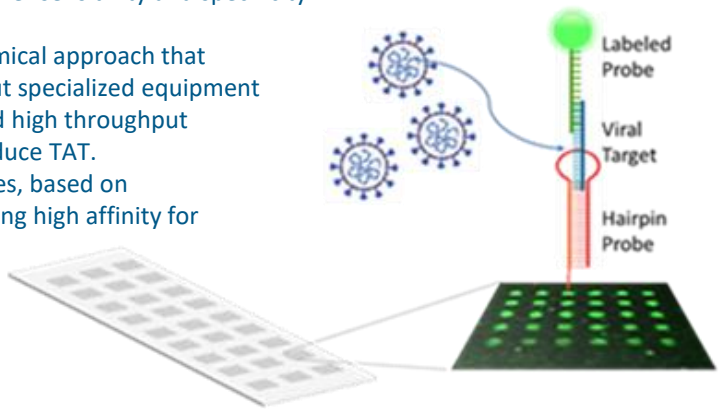
The present invention relates to the development of novel DNA probes that enable the detection of RNA sequences in few minutes, without the need for RNA extraction, purification and PCR amplification.

Industrial partners from the diagnostic or pharmaceutical industry are being sought to collaborate through a patent license agreement.

Innovative Aspects

Rapid and efficient testing is required to effectively control SARS-CoV-2 transmission. RT-qPCR is the current gold standard for population-scale testing. Although highly specific, its sensitivity in clinical practice is only 70% and requires long turnaround times (TAT) because of the need to extract the sample and amplify the viral RNA. Tests are performed on centralized laboratories, thus delaying even more the delivery of the tests results. Other diagnostic technologies, such as antigen tests, can provide rapid results but present lower sensitivity and specificity.

Here is presented a fast, sensitive and reliable biochemical approach that allows performing the test at the point of care, without specialized equipment or highly trained personnel, or to use it on multiplexed high throughput laboratory platforms to increase the efficiency and reduce TAT.
This method relies on the use of innovative DNA probes, based on polypurine reverse Hoogsteen hairpins (PPRHs), showing high affinity for RNA of SARS-CoV-2 and influenza viruses and forming triplex structures that present improved stability of the resulting complexes.



- High sensitivity: limits of detection comparable to those determined by RT-PCR in clinical samples obtained from nasopharyngeal swabs of patients infected with SARS-CoV-2 (up to 34 Ct, femtoM).
- Specificity: It has potential to differentiate SARS-CoV-2 from other viruses such as influenza (H1N1).
- Useful for on-site routine diagnosis of SARS-CoV-2 and influenza viruses as well as for high-throughput diagnostic screening.

Stage of Development: Four different diagnostic devices have been optimized (namely, thermal lateral flow PoC, an electrochemical PoC biosensor, ELISA microplate and fluorescent microarray) that are able to reach a detectability close to that achieved by other molecular methods, but without the need for PCR amplification.

Intellectual Property

European patent application (Priority date: September 13, 2021)
National phases: Europe and USA

Available for Licensing or Assignment

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