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# Loop Mediated Isothermal Amplification for Detecting Covid-19

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## DESCRIPTION

Slowing the transmission of SARS-CoV-2 requires rapid and accurate diagnostic testing. Toward this end, loop-mediated isothermal amplification (LAMP), an isothermal genomic detection method, offers great promise but the readout tends to be difficult because it does not generate linear DNA products. antigen tests are coupled to lateral flow strips, with positive or negative bands providing simple rapid readout, but are less sensitive than genomic amplification methods. To address the need for a genomic amplification method that can be visualized on a lateral flow strip, we developed a novel strand-displacement probe. In this work we validate this pipeline for purified RNA, intact virus, and even virus deposited onto a surface. We demonstrate robust sensitivity (100 genomic copies) and and we demonstrate the utility of our assay as a surveillance system, with the capability to detect viral particles from surfaces, even after a week of complete dry-down. Our innovation couples the diagnostic advantages of a nucleic acid amplification test (NAAT) with the simplicity of lateral-flow readouts.

The worldwide COVID-19 pandemic, driven by SARS-CoV-2 virus, is a particularly potent challenge to healthcare infrastructure, posing enhanced risk for individuals with preexisting risk factors such as cardiovascular disease, cancer, and obesity. Even with the advent of highly efficacious vaccines, the spread of SARS-CoV-2 continues due to the emergence of new variants and vaccine hesitancy . Thus diagnostic and surveillance testing are ongoing needs for the foreseeable future. Currently, the main strategy is to use either PCRbased methods or rapid tests, which involve viral antigen detection with antibodies. PCR methods are highly accurate because they are based on nucleic acid amplification; however, the assay must be run in a lab, with expensive, specialized equipment and well-trained lab technicians. By contrast, antigen tests are simpler to run, and yield faster results, but are less sensitive than PCR. Isothermal amplification methods, which are related to PCR but are generally faster and can be run without complex equipment , offer the potential to bridge the best of both worlds. However, these isothermal methods often lack a simple readout equivalent to an antigen test.

We chose to utilize the Loop Isothermal Amplification (LAMP) strategy. Light intensifies nucleic acids with preliminaries and DNA polymerase-interceded strand relocation. Dissimilar to PCR, LAMP enhanced at steady temperature and created huge intensification in 1015 min. In contrast to PCR, polymerase (Bst) is for the most part not repressed by intensifies found in clinical examples, so RNA sanitization is generally pointless, improving on arrangement. In any case, LAMP perusing strategies are confounded by the strange crisscross construction of the produced DNA, which forestalls conventional gel electrophoresis. Colorimetric readouts have been fostered that depend on an example's pH changes to show enhanced item. In any case, this strategy is inclined to both misleading positive and bogus negative. A recognition strategy straightforwardly connected to enhanced DNA would stay away from these blunders. The Ellington research center as of late depicted the strand displacement test , a double stranded oligo that can straightforwardly interface LAMP amplified DNA to a sidelong stream strip through uprooting hybridization.

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## CONFLICT OF INTEREST

The author declares there is no conflict of interest in publishing this article.

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