

Tulane researchers develop a rapid COVID-19 saliva test read by a smartphone device

Carolyn Scofield
cscofiel@tulane.edu



Tony Hu, Weatherhead Presidential Chair of Biotechnology Innovation at Tulane University, says the research team's development addresses the need for a rapid, ultra-sensitive COVID-19 test.

Researchers from Tulane University have developed a 15-minute COVID-19 test that is read by a smartphone to address the need to expand testing capacity in community-based settings. This test uses the same CRISPR-based approach that the researchers have submitted to the Food and Drug Administration for Emergency Use Authorization.

Rapid PCR tests typically use nasal swab samples and are performed in laboratory settings by

highly trained individuals using sophisticated equipment. The saliva-based COVID-19 test, which doesn't require lab processing, could rapidly expand testing capacity in outpatient clinics, community testing sites and other locations.

The assay developed by researchers at Tulane detects SARS-CoV-2 virus RNA in saliva to diagnose COVID-19 and is more sensitive than PCR-based tests, the current gold standard for COVID-19 diagnosis. A report describing the development and validation of this test has recently been published in the journal [*Science Advances*](#).

“This test addresses the critical needs for a rapid, ultrasensitive COVID-19 diagnosis along with effective large-scale screening efforts,” said [Tony Hu](#), PhD, corresponding author of the study and Weatherhead Presidential Chair in Biotechnology Innovation at Tulane University School of Medicine. “Our development can quickly identify patients who have the virus, which is required to help address the ongoing threat to public health worldwide.”

This assay platform developed by Hu and his associates can detect very small amounts of SARS-CoV-2 virus RNA in saliva by leveraging CRISPR, the revolutionary gene editing technology, to amplify assay signal. The Tulane technology doesn't require an RNA isolation step used in PCR tests. Saliva is mixed with an assay solution on an assay chip and heated to amplify a small region of viral RNA. A modified CRISPR complex that contains a “guide” RNA specific for this virus RNA region rapidly binds and cuts both this amplified RNA region and a tagged DNA probe to produce a fluorescent signal that is read by the smartphone device.

This assay is faster, more sensitive, and more user-friendly than standard PCR tests, while requiring fewer steps and less equipment, and is read by a prototype smartphone-based fluorescent microscope device designed for point-of-care use.

“The sensitivity and simplicity of this test, its straightforward sample collection procedure, and the inexpensive nature of the readout device should permit the rapid translation of this approach to COVID-19 testing efforts once we obtain FDA approval,” Hu said.



The prototype device developed by Tulane researchers can produce COVID-19 results within 15 minutes.