

Portable Prostate Cancer Test May Help Reach Underserved Men



2022-01-13

A highly portable and rapid prostate cancer screening kit could provide early warning to populations with higher incidence of prostate cancer and particularly those with limited access to health care, such as African American men.

The proof-of-concept test, described online Nov. 12 in the journal [Current Research in Biotechnology](#), is inexpensive and uses a test strip and a small cube-shaped 1.6-inch reader to quantify a marker of prostate cancer – called prostate-specific antigen (PSA) – from a drop of blood in minutes.

“We’ll be able to take a drop of blood in a community setting such as a barbershop and be able to deliver results in 10 to 15 minutes right there, which can indicate when somebody needs to come in for further tests,” said Dr. Saurabh Mehta, the Janet and Gordon Lankton Professor in the Division of Nutritional Sciences and the paper’s senior author. Balaji Srinivasan, a research associate in Mehta’s research group, is the paper’s first author.

“It’s creating that first point of contact that hopefully builds rapport and brings health care services to the people at the point of need,” Mehta said.

The kit comes with a test strip, similar to those found in at-home COVID-19 antigen or pregnancy tests. Users would draw a drop of blood and apply it to the test strip, and in about 15 minutes, two lines appear on the strip.

The color of the two lines is due to 150-nanometer gold nanoshells, which greatly enhance the test’s sensitivity to detect PSAs and make the lines appear more intense in their presence, Srinivasan said. While a pregnancy test gives a positive or negative result, the

cube reader senses the intensity of the test strip lines and then calculates and displays a measurement of PSA concentration in the blood.

“Another advantage of test strips is that the technology to make them really cheap or mass produce them has been around for many years,” Srinivasan said. He estimates that PSA test kits may be mass produced and sold for a few dollars each.

While a different PSA test kit developed by a private company has been approved by the FDA, it works by putting a blood sample into a microfluidic channel and has a larger bench-top analyzer, making it less portable and more expensive to own and operate.

Study co-author David Erickson, the S.C. Thomas Sze Director and Sibley College Professor in the Sibley School of Mechanical and Aerospace Engineering, has worked with Mehta to also develop a mobile phone-based system to detect infectious diseases, inflammation and nutritional deficiencies in saliva. Meanwhile, co-author Dr. David Nanus, professor of medicine in the Division of Hematology and Medical Oncology and a member of the Meyer Cancer Center at Weill Cornell Medicine, reached out to Mehta wanting to collaborate on a portable PSA screening device to reach underserved populations.

African American men frequently do not have access to prostate cancer PSA screening and are diagnosed with more advanced prostate cancer, contributing to disproportionately higher mortality rates. PSA testing frequency has declined among all U.S. ethnic and racial groups over the last decade, with the rate of decline steeper for African American men, particularly those between 40 and 54 years old. Close to 43% of African American men aged 41 and older have never had a PSA test, according to one study.

“There is a need for increasing access to PSA screening among African American men who are otherwise not able to get tested periodically, and one of the ways is we take the test to them at various community settings,” Srinivasan said.

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