UTEP team develops low-cost device for rapid cancer detection

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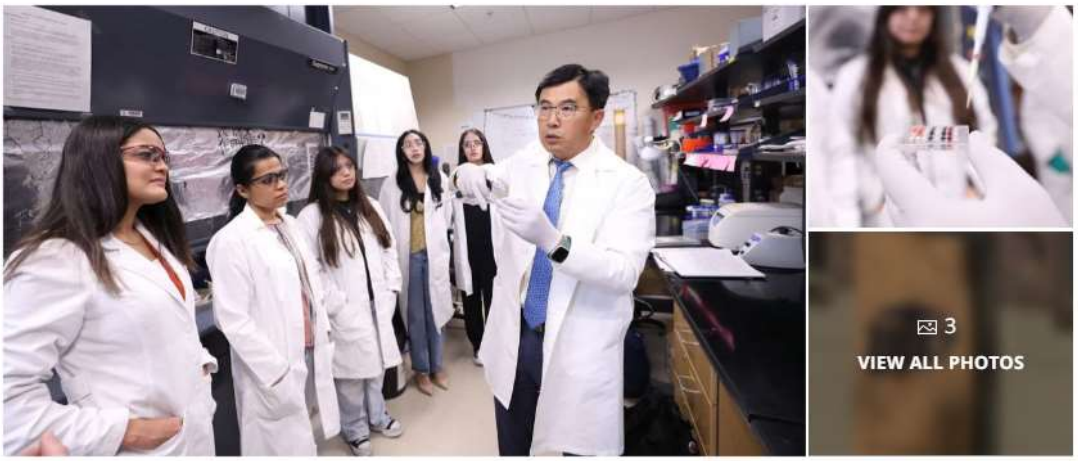

A team of UTEP researchers led by Xiujun (James) Li, Ph.D. (right), has created a low-cost, portable device that can detect colorectal and prostate cancer in as little as one hour. Credit: The University of Texas at El Paso.

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EL PASO, Texas (KFOX14/CBS4) — UTEP researchers have created a low-cost portable device that can detect colorectal and prostate cancer in just an hour.

According to the University of Texas at El Paso, XiuJun (James) Li, Ph.D., a UTEP professor of chemistry and biochemistry, led a team of researchers to develop a prototype of the device, which the team believes will help in developing countries, which experiences higher cancer mortality rates.

"Our new biochip device is low-cost — just a few dollars — and sensitive, which will make accurate disease diagnosis accessible to anyone, whether rich or poor," said Li, adding that the new device is fast and portable, eliminating the need for specialized instruments.

Li explained that the most commonly used commercial method of cancer detection, known as ELISA, requires expensive instruments to work correctly and can take 12 hours or longer to process a sample. Something Li said is heightened in rural areas of the U.S. and in developing countries where patient samples have to be taken to larger cities with specialized instruments, leading to a higher rate of cancer deaths.

“If you can detect biomarkers early on, before the cancer spreads, you increase a patient’s chance of survival," Li said. "Any delays in testing, especially in regions that don't have access to expensive tools and instruments, can be very bad for a patient's prognosis."

So far, the research has focused on prostate and colorectal cancers, but Li said the method they devised could apply to other types of cancer.

According to TUEP, the device that Li's team created is "microfluidic", which means that it can perform multiple functions using very small amounts of fluids. The device reportedly uses an innovative "paper-in-polymer-pond" structure in which patient blood samples are introduced into tiny wells and onto a special kind of paper that captures cancer protein biomarkers within minutes, changing the paper's color. Then, the intensity of the color indicates the type of cancer and how far it has progressed.

A team of UTEP researchers led by Xiujun (James) Li, Ph.D., has created a low-cost, portable device that can detect colorectal and prostate cancer in as little as one hour. Credit: The University of Texas at El Paso.

Li said that the device can analyze a sample in an hour — compared to 16 hours using some traditional methods.

According to study results, the device is also about 10 times more sensitive than traditional methods even without using specialized instruments, meaning the device can detect cancer biomarkers that are present in smaller quantities, typical of cancer in its early stages. A less sensitive device may not pick up on the smaller quantities, Li said.

Before the device can be made available to the public, Li said the prototype would need to be finalized and tested on patients in a clinical trial, which could take several years. Then it would require final approval by the Food and Drug Administration before physicians could use it.

"Dr. XiuJun Li's innovation significantly improves point-of-care diagnostics by reducing detection times and the need for costly instruments," said Robert Kirken, dean of the College of Science. "This makes it ideal for resource-limited settings, which will improve early diagnosis and lead to better cancer outcomes. I look forward to seeing what this innovation leads to."

Li is the lead author of the new study describing the device published in Lab on a Chip, a journal that focuses on micro-scale and nanoscale devices, of which Li is a member of the advisory board.

An additional co-author of the study is Sanjay Timilsina, Ph.D., a former graduate research assistant at UTEP.

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