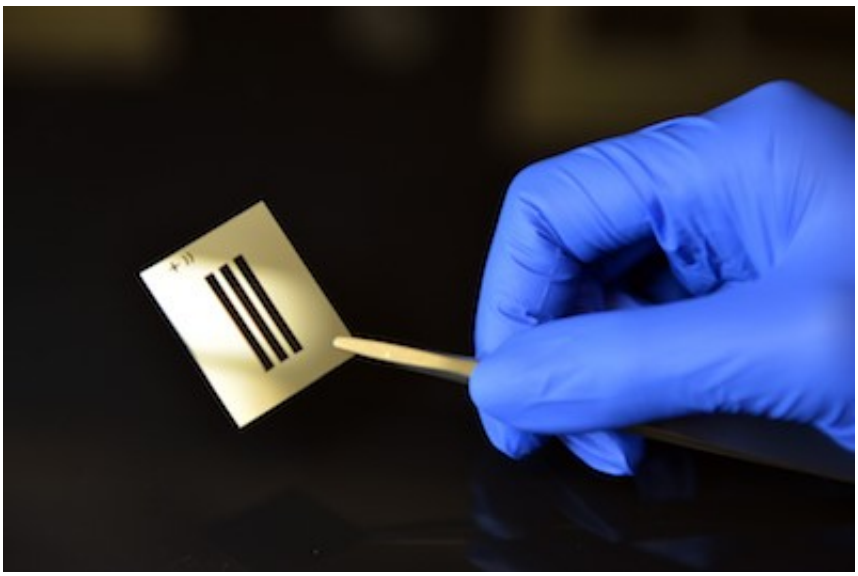
New 'blood biopsies' with experimental device may improve cancer diagnosis and follow-up

February 13 2017



A team of investigators from Cedars-Sinai and UCLA is using a new blood-analysis technique and tiny experimental device to help physicians predict which cancers are likely to spread by identifying and characterizing tumor cells circulating through the blood. The investigators are conducting "liquid biopsies" by running blood through a postage-stamp-sized chip with nanowires 1,000 times thinner than a human hair and coated with antibodies, or proteins, that recognize circulating tumor cells. The device, the NanoVelcro Chip, works by "grabbing" circulating tumor cells, which break away from tumors and travel through the bloodstream, looking for places in the body to spread. Credit: Cedars-Sinai

A team of investigators from Cedars-Sinai and UCLA is using a new blood-analysis technique and tiny experimental device to help physicians predict which cancers are likely to spread by identifying and characterizing tumor cells circulating through the blood.

The investigators are conducting "liquid biopsies" by running blood through a postage-stamp-sized chip with nanowires 1,000 times thinner than a human hair and coated with antibodies, or proteins, that recognize circulating tumor cells. The device, the NanoVelcro Chip, works by "grabbing" circulating tumor cells, which break away from tumors and travel through the bloodstream, looking for places in the body to spread.

Use of the chip in liquid biopsies could allow doctors to regularly and easily monitor cancer-related changes in patients, such as how well they're responding to treatment. The research earned the lead investigators a place on the U.S. Cancer Moonshot program, an initiative led by former Vice President Joe Biden to make available more therapies to more patients and to prevent cancer.

"It's far better to draw a tube of blood once a month to monitor cancer than to make patients undergo repeated surgical procedures," said Edwin Posadas, MD, medical director of the Urologic Oncology Program at Cedars-Sinai's Samuel Oschin Comprehensive Cancer Institute and one of the lead investigators. "The power of this technology lies in its capacity to provide information that is equal to or even superior to traditional tumor sampling by invasive procedures."

Although some forms of prostate cancer are so slow-growing that they pose little risk to patients, other forms of the disease are lethal. Identifying which patients have which type of disease has become a crucial area of study because prostate cancer is one of the leading causes of cancer death among men in the U.S. Nearly 27,000 U.S. men are expected to die from the disease in 2017, according to the American

Cancer Society.

The research team has determined that in certain cancer cells, the nucleus is smaller than in other, more typical, cancer cells. Patients with the most advanced cases of aggressive prostate cancer have cells with these very small nuclei.

The investigators' teamwork also revealed that very small nuclei are associated with metastasis, or cancer spread, to the liver and lung in patients with advanced cases of prostate cancer. Those nuclei developed before the metastases were detected. Identifying very small nuclei early in the disease progression may help pinpoint which patients have high risk of developing cancer that can spread and be fatal.

Hsian-Rong Tseng, PhD, professor, Department of Molecular and Medical Pharmacology in the David Geffen School of Medicine at UCLA and the other lead investigator, said that his work with Posadas is focused on improving the quality of life for cancer patients.

"We're on a mission to dramatically change patients' everyday lives and their long-term outcomes," Tseng said. "We now have powerful new tools to accomplish that."

Posadas and Tseng join an elite cadre of academicians, technology leaders and pharmaceutical experts as partners in the Blood Profiling Atlas in Cancer (BloodPAC) Project, a Moonshot program. Participants will collect and share data gathered from circulating tumor cells. Posadas and Tseng expect to contribute microscopic images from 1,000 circulating tumor cells that have not yet been analyzed, as well as additional data and cells they have cataloged.

For the past five years, Posadas and Tseng have collected blood samples from cancer patients to profile and analyze the circulating tumor cells

and other components. That process has helped them understand how prostate and other cancers evolve. The two investigators and their teams hope their findings will contribute to developing effective, targeted treatments for many types of cancer.

"Minimally invasive methods to both diagnose and follow cancer, through simple blood tests, offer a unique and novel approach that can lead to earlier diagnosis and treatment, leading to more cures," said Robert A. Figlin, MD, director of the Division of Hematology Oncology and deputy director of the Samuel Oschin Comprehensive Cancer Institute at Cedars- Sinai.

Provided by Cedars-Sinai Medical Center

Citation: New 'blood biopsies' with experimental device may improve cancer diagnosis and follow-up (2017, February 13) retrieved 25 April 2024 from https://medicalxpress.com/news/2017-02-blood-biopsies-experimental-device-cancer.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.