Nanostructured Microfluidic array power novel cancer fetection system

I-Micronews

Tests on samples obtained from 78 oral cancer patients and 49 control subjects showed that the device has a clinical sensitivity of 89% and specificity of 98% for detecting oral cancer. Dr. Rusling and his collaborators published their results in the journal Analytical Chemistry. While other groups have also developed analytical methods that produce similar promise for detecting blood-borne biomarkers of oral cancer, these methods are based on time-consuming and expensive technologies.

The microfluidic device that Dr. Rusling's team developed simultaneously detects extraordinarily low levels of four proteins that together provide a diagnostic signature for oral cancer. Magnetic beads, each coated with 120,000 antibody molecules, are used to capture even trace levels of specific biomarker proteins and remove them from a blood sample. The magnetic particles are then injected into the microfluidic device, which flows the beads over the sensor elements. Each sensor's electrical output corresponds to blood levels of a specific protein.

According to the investigators, the entire assay takes 50 minutes to perform. Each disposable carbon nanotube sensor chip costs about $9. The readout device uses available electronic components and pumps that together cost under $26,000, which "makes this approach accessible to virtually any biomedical laboratory at a small cost."

This work is detailed in a paper titled, "Ultrasensitive detection of cancer biomarkers in the clinic using a nanostructured microfluidic assay." Investigators from National Institute of Dental and Craniofacial Research, Salve Regina University, the Cancer Researcher Initiatives Foundation of Malaysia, and the University of Malaya participated in this study. An abstract of this paper is available at the journal's website.