Award ID:
RP180862

Project Title:
Microfluidic Cancer Assay for Liquid Biopsies and Early Detection

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
Texas Tech University

Lay Summary:

There is a growing need to detect cancer early. In leukemias, the presence of cancer cells in the blood is indicative of poor outcomes. In solid tumors, cancer cells shed from the tumor enter the blood stream and spread to other parts of the body. The presence of cancer cells in blood, and other bodily fluids, can be used as a diagnostic called a "liquid biopsy." Currently, detection of cancer cells in blood requires extensive knowledge of the cancer type prior to detection. Physical methods to isolate cancer cells cannot distinguish clearly between cancer and normal cells. Methods involving antibody capture of cells often miss key groups of cancer cells, as there is currently no single, specific antibody that recognizes a particular cancer type.

The goal of this work is to develop a new fluid microchip for early cancer detection. This chip uses an innovative antibody strategy to capture cancer cells from liquid biopsy samples, such as blood. The novelty of this work is that the antibody used to capture cells recognizes all cancer types, and can be used to screen for any cancer cells that enter blood or other body fluid samples. Unlike other methods, our microchip does not require prior knowledge of the cancer cell type. In this High Impact, High Risk project, we will isolate leukemia, lymphoma, and prostate cancer cells from blood samples. We will determine the minimum number of cancer cells needed to detect these cancers in blood and determine the cancer type after the initial screen. The impact of this work is that we will be able to screen for any cancer in an inexpensive test that can detect low levels of cancer cells. This project could therefore be used for initial screening, as well as for monitoring cancer patients for minimum residual disease and relapse.