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## A Combined Microfluidic and Fluorescence Lifetime Imaging(FLIM) Platform to Identify Mammalian Circulating Cancer Cells in Whole Blood

Tech ID: 28924 / UC Case 2017-815-0

### BRIEF DESCRIPTION

Separating and classifying circulating cancer cells from whole blood using a single cell trap microfluidic platform coupled with label free fluorescence life time imaging.

### FULL DESCRIPTION

Blood-borne metastasis caused by circulating cancer cells (CTC) is the cause of 90% of cancer related deaths. It has been shown that circulating cancer cells can be detected and classified by a liquid blood biopsy. Liquid biopsy utilizes microfluidics and imaging as a way to detect single CTCs from dense whole blood. Unfortunately, these current microfluidic biopsy techniques lack the sensitivity to detect CTCs in whole blood due to non-selective cell sorting nature of these methods.

Researchers at the University of California have developed a robust sensitive lab-on-a-chip platform to detect CTCs through a combined microfluidics and label-free approach via fluorescence lifetime imaging microscopy (FLIM). FLIM is a non-invasive methodology that can differentiate innate biological fluorescent absorbers based on the time it takes for the absorber's fluorescence brightness to fall. A FLIM-Phasor plot that contains all fluorescent lifetime(s) of a sample can provide a straight forward visualization of the different biochemical compounds and their chemical state in the sample. Utilizing such a FLIM-Phasor plot has shown clear differentiation between different cancer cells providing greater diagnostic information regarding the isolated CTCs.

### SUGGESTED USES

- » Separating circulating tumor cells from whole blood
- » Diagnosing sickle cell anemia
- » Differentiate cancer and leukemia cells

### ADVANTAGES

- » Revealing molecular-level signature of tumor
- » Low cost, disposable, ease of mass production
- » Multifunctional diagnostic platform for different blood related diseases

### PATENT STATUS

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### OTHER INFORMATION

### CATEGORIZED AS

- » **Optics and Photonics**
  - » All Optics and Photonics
- » **Medical**
  - » Devices
  - » Diagnostics
  - » Disease: Blood and Lymphatic System
  - » Imaging
  - » Research Tools
  - » Screening

### RELATED CASES

2017-815-0

## STATE OF DEVELOPMENT

Invention has completed the conceptualization phase, simulation and preliminary experimental stage. Currently, the invention is undergoing design optimization to improve cell entrapment.

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