FlexThrough: a recirculation mechanism for point of care, centrifugal disk-based microfluidic devices

Tech ID: 33240 / UC Case 2021-768-0

BRIEF DESCRIPTION

One of the key limitations for devices used in point-of-care diagnostics (POCD) is their limit of detection; patient samples used for POCD devices often contain too low of the target analyte. FlexThrough is a newly developed, centrifugal disk (CD)-based method that utilizes the entirety of a liquid sample via recirculation of the sample for efficient mixing as it iteratively passes through the system.

SUGGESTED USES

- Point of care diagnostic devices
- Lab-on-a-chip devices
- Liquid sample analysis: medical and laboratory settings

FEATURES/BENEFITS

- Recycling of single liquid sample; current methods to analyze liquid samples do not recycle sample
- Sample recycling improves detection sensitivity
- No need to collect larger samples, amplify collected molecules, or use more sensitive instruments (all of which are non-practical for POCD devices)

TECHNOLOGY DESCRIPTION

POCD utilize devices that produce rapid and reliable results to aid in the identification and/or monitoring of acute infection or chronic disease. POCD are critical to the healthcare industry because they reduce per patient cost, length of stay in hospitals, and are faster than traditional laboratory testing. One of the key limitations for devices used in POCD is their limit of detection. Traditional workarounds include collecting larger patient samples, amplifying collected analytes, or using more sensitive instruments, each of which are counterintuitive to the use of POCD.

Researchers at UC Irvine have created a new recirculation system for use within CD-based microfluidic devices that recirculates a collected sample for iterative exposure of a target molecule to the detection array. This system features a reservoir, an input channel, a recirculation channel, a detection array, and a pressure chamber that together lower sample volume requirements, thereby circumventing current limits of detection.

STATE OF DEVELOPMENT

A patent has been published for this invention.

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OTHER INFORMATION

CATEGORIZED AS

» **Medical**
  » Devices
  » Diagnostics
  » Screening
» **Sensors & Instrumentation**
  » Biosensors
  » Medical

RELATED CASES

2021-768-0

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PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12472497	11/18/2025	2021-768

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Fabricating Crystallinity Unique Carbon Nanowires (~5nm) with Ultrahigh Electrical Conductivity
- Flexthrough: A Recirculation Mechanism In Point Of Care CD Microfluidic Using Elastic Membrane

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