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High Efficiency Single Cell Indexing Of Droplets Via Interfacial Shearing With Downstream Droplet Sorting

Tech ID: 32171 / UC Case 2018-839-0

BRIEF DESCRIPTION

The invention is an integrated device that provides a high efficiency single cell encapsulation solution. The two core modules of the invention are responsible for generating the cell encapsulating droplet, then sorting the generated droplets to eliminate the empty ones. Such a two-step process yields a high throughput, single cell indexed droplets, with an overall encapsulation efficiency reaching 80%, which is crucial for various applications ranging from genomics and proteomics to pharmacology.

SUGGESTED USES

- High Efficiency encapsulation of single cells
- Genomics, proteomics, Emulsion Microfluidics, Pharmacology
- Single Cell analysis
- High efficiency genome-wide expression profiling of individual cells
- Capture specific proteins and antigens from single cell using functionalized beads

FEATURES/BENEFITS

- Single cell indexing integrated device, based on an encapsulation phase followed by a sorting phase
- Removes empty/defected droplets as soon as they are generated.
- Can achieve high efficiency, up to 800 times that of the currently used encapsulation systems

TECHNOLOGY DESCRIPTION

Encapsulation of one-cell-one-bead in droplets is an essential operation for high throughput screening of single cells, which is a vital process for multiple applications in the fields of genomics, proteomics, Emulsion Microfluidics, Pharmacology ... etc. Unfortunately, current encapsulation techniques show very low efficiency (~0.1%), and suffer from challenges related to the encapsulation process itself as well as droplet sorting later on. Inventors at UCI developed a unique integrated device that carries out encapsulation at an unprecedented high efficiency (~80%). The invention has two basic blocks; an innovative high efficiency encapsulation block, followed by a droplets sorting block for maximizing the system efficiency. By combining both processes, the encapsulation process is performed at a faster and more integral fashion with almost 800 times the efficiency of the currently used solutions.

STATE OF DEVELOPMENT

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OTHER INFORMATION

CATEGORIZED AS

- » **Medical**
- » Devices
- » Gene Therapy
- » Research Tools
- » **Research Tools**
- » Cell Lines

RELATED CASES

2018-839-0

» The concept and experimental validation phases are complete for both the droplet encapsulation/indexing and the sorting platforms separately. These are both in the working prototype stage.

» The integration of these components is still in the concept stage.

PATENT STATUS

Patent Pending

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