



Engineered-Microparticle-Based Cell Carriers For Culture And Adhesive Flow Cytometry

Tech ID: 25824 / UC Case 2016-219-0

SUMMARY

The Di Carlo group at UCLA has invented a microparticle that enables the analysis of adherent cells by flow cytometry. In addition, they have developed a high-throughput method to fabricate these microparticles.

BACKGROUND

Traditional flow cytometry is a fluorescence-based technique used to characterize cells in a suspension state, or cells not attached to a surface, on a molecular level. Given that many cells are inherently attached to a surface in vivo, a high-throughput technique that allows for molecular characterization of adherent state cells would give great insight into a number of biological questions, and would be of great value to both scientific research and medicine.

INNOVATION

The Di Carlo group at UCLA has developed a microparticle that enables the molecular analysis of a large number of cells in the adherent state. This novel particle, which acts as a “cell carrier”, is loaded with single cells and run through a flow cytometry instrument. As the particles are passed through the flow cytometer, the attached cells can be analyzed using scatter and fluorescence or and imaging cytometer for brightfield- and fluorescence-based imaging. Various cell parameters, including protein localization and cytoskeletal organization, can be measured and quantified. The flexible designability of microparticles also allows altering the loading area size for cells, broadening the study using flow cytometry from single-cells to tissue level structures. The use of this microparticle in cellular analysis will provide rich data that is unattainable with traditional flow cytometry. In addition to the microparticle itself, the inventors have developed an innovative stop-flow lithography technique, which they call optical Transient Liquid Molding, that allows for the fabrication of over 1000 microparticles per hour.

APPLICATIONS

- ▶ High-throughput cellular analysis when cells are in an adherent state
- ▶ Measurable parameters include:
 - ▶ Cell morphology
 - ▶ Protein localization
 - ▶ Cytoskeleton and structural characterization
 - ▶ Cell force measurements

ADVANTAGES

- ▶ Adherent state analysis (current methods only allow for high-throughput suspension state analysis)
- ▶ Analysis of a wide spectrum of cell or microtissue sizes
- ▶ High-throughput
- ▶ May be compatible with existing flow cytometry models

STATE OF DEVELOPMENT

The Di Carlo group has published the fabrication method in a peer reviewed journal.

PATENT STATUS

Country	Type	Number	Dated	Case
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CONTACT

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OTHER INFORMATION

KEYWORDS

Imaging flow cytometry, adherent cell analysis, research tools, microparticle fabrication, microparticles, optical transient liquid molding, lithography

CATEGORIZED AS

- ▶ **Medical**
 - ▶ Imaging
 - ▶ Other
 - ▶ Research Tools
- ▶ **Sensors & Instrumentation**
 - ▶ Scientific/Research

RELATED CASES

2016-219-0

United States Of America	Issued Patent	11060541	07/13/2021	2016-219
Additional Patent Pending				

RELATED MATERIALS

► [Adv Mater Weinheim. 2015; 27\(48\):7970-8](#)

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