

# DROPBLOT DESIGN INTEGRATES DROPLET MICROFLUIDICS WITH SINGLE-CELL ELECTROPHORESIS

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## PATENT STATUS

Patent Pending

## BRIEF DESCRIPTION

Single-cell analyses are revolutionizing biomedicine and biology, with genomics (DNA) and transcriptomics (RNA) tools leading the way. At the protein-level, single-cell analyses are limited to mass spectrometry and immunoassays. Neither assay provides comprehensive coverage of proteome for single cells, missing key protein forms (called isoforms).

UC Berkeley researchers have developed a hybrid droplet-electrophoresis device, termed “DropBlot”, to detect proteins from patient-derived tissue biospecimens relevant to clinical medicine and pathology. The DropBlot takes advantage of water-in-oil (W/O) droplets to encapsulate single cells derived from chemically fixed tissues, thus providing a picoliter-volume reaction chamber in which said cells are lysed and subjected to harsh lysis conditions (100°C, 2 hours), as needed for fixed cells. We report an all-in-one microdevice to facilitate cell-laden droplet loading with >98% microwell occupancy. Droplets remain intact under the electric field and protein isoforms are shown to electromigrate out of the droplet and into a microfluidic separation channel where protein sizing takes place via the action of electrophoresis in a photoactive polyacrylamide (PA) gel. DropBlot has been successfully applied to live and fixed cancer cell lines and resolved proteins with high sensitivity.

## SUGGESTED USES

- » single-cell protein analysis device
- » protein isoform detection

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Simultaneous Detection Of Protein Isoforms And Nucleic Acids From Low Starting Cell Numbers
- Automated Two-Dimensional Electrophoresis In Microfluidic Chamber
- Microfluidic Chip For Rapid Multi-Analyte Detection
- Single-Cell Isoelectric Focusing and pH Gradient Arrays

## CONTACT

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## INVENTORS

- » Herr, Amy E.

## OTHER INFORMATION

### CATEGORIZED AS

- » **Biotechnology**
- » Proteomics
- » **Materials & Chemicals**
- » Biological
- » **Research Tools**
- » Other

### RELATED CASES

2023-043-0