

SCITO-SEQ: SINGLE CELL COMBINATORIAL INDEXED CYTOMETRY SEQUENCING

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INVENTION NOVELTY

Researchers at UCSF have developed SCITO-seq, a new workflow for single cell sequencing-based proteomics.

VALUE PROPOSITION

- ▶ Sequencing-based proteomics can read out all antibody-derived tags with one reaction, at low sequencing depths
- ▶ All cell surface proteins with available antibodies can be targeted
- ▶ As the number of pools increases, total library and DNA-barcoded antibody construction costs drop, while the number of cells recovered increases
- ▶ Antibody-stained cell loading is tunable to the desired collision rate
- ▶ Amenable to simultaneous multimodal profiling of transcripts or chromatin accessibility

TECHNOLOGY DESCRIPTION

The use of DNA to barcode and tag antibodies has created new opportunities to use sequencing to profile the molecular properties of thousands of cells simultaneously. Furthermore, DNA-barcoded antibodies coupled with advances in microfluidics have enabled droplet-based single cell sequencing (dsc-seq) to profile the surface proteomes of cells. The major limitation of current dsc-seq workflows is the high cost associated with profiling each cell, precluding its use in applications where thousands or millions of cells are required.

APPLICATION

Cost-effective two-step single-cell combinatorial indexing (SCI) for cellular composition profiling and analysis by dsc-seq

STAGE OF DEVELOPMENT

The inventors introduce SCITO-seq, a single cell proteomics workflow that combines split-pool indexing and commercially available dsc-seq to enable cost-effective profiling of cell surface proteins, scalable to 10^5 - 10^6 cells. SCITO-seq utilizes advances in droplet-based microfluidics for combinatorial indexing of antibody-derived pool and droplet barcodes to reduce library construction and sequencing costs. Protein expression profiles for cells simultaneously encapsulated in a single drop are resolved by the combinatorial index of pool and droplet barcodes. The inventors demonstrate the feasibility and scalability of SCITO-seq in mixed species experiments and by profiling peripheral blood mononuclear cells using a panel of 28 antibodies in one microfluidic

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OTHER INFORMATION

KEYWORDS

single cell, single cell analysis, dsc-seq, proteomics, droplet-based single cell sequencing, microfluidics, antibody

CATEGORIZED AS

- ▶ Medical
- ▶ Research Tools

RELATED CASES

2020-186-0

reaction.

RELATED MATERIALS

► [SCITO-seq: single-cell combinatorial indexed cytometry sequencing](#) - 08/05/2021

PATENT STATUS

Patent Pending

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