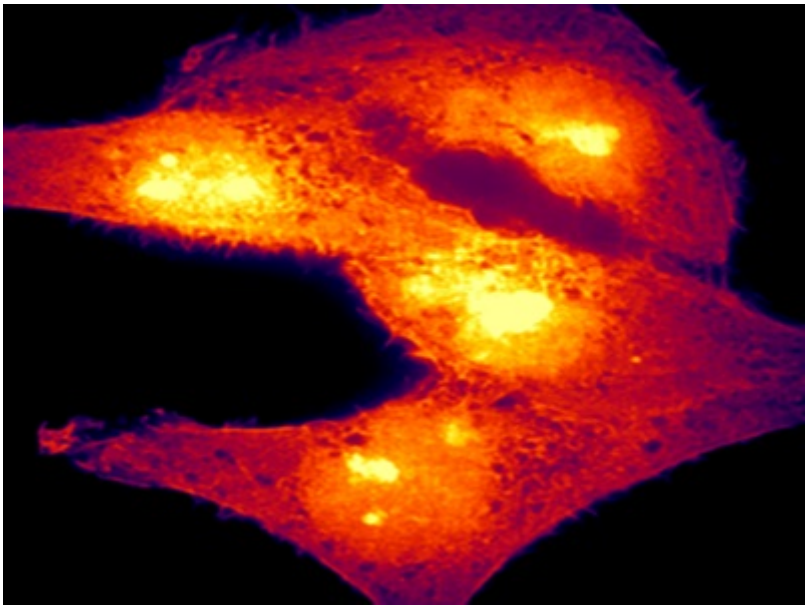
Massively Multiplexed Single-Cell Proteomics

This technology is a scalable and massively multiplexed single-cell proteomics approach that leverages combinatorial indexing by split-pooling. The innovation presented here is a novel peptide labeling strategy compatible with fixed, permeabilized cells using biorthogonal chemistry that will covalently attach chemical barcodes.



What is the Problem?

Single-cell sequencing technologies have enabled researchers to profile millions of individual cells and generate maps of accessible chromatin and gene expression. While several single-cell transcriptomic technologies have become valuable tools in biological research, there remains a need to develop high-throughput single-cell proteomics approaches. The field of proteomics lags behind in its scalability and the few existing single-cell proteomics methods are only able to profile up to 200 individual cells per day.

What is the Solution?

The solution is a scalable and massively multiplexed single-cell proteomics approach that leverages combinatorial indexing by split-pooling, a strategy used in highly multiplexed single-cell transcriptomic technologies. The combinatorial indexing approach involves barcoding individual wells of cells in a multi-well plate, pooling the cells from different wells together, and

Technology ID

BDP 8560

Category

Selection of Available Technologies

Authors

Brian Beliveau

Learn more

subsequently redistributing cells to multiple wells for a second round of labeling. This cycle can be repeated multiple times, after which the barcodes can be decoded in bulk profiling experiments. The innovation presented here is a novel peptide labeling strategy compatible with fixed, permeabilized cells using biorthogonal chemistry that will covalently attach chemical barcodes. The successful addition of barcodes can be monitored using fluorescent microscopy and the chemical barcodes can be detected and decoded through mass spectrometry.

What is the Competitive Advantage?

The competitive advantage of this technology lies in its ability to enable high-throughput single-cell proteomics profiling at orders of magnitude beyond what any current technology can achieve. This scalable technology uses inexpensive chemical barcodes, microscopy, and mass spectrometry to enable profiling the proteome of millions of individual cells. As the global proteomics market is valued at $36.8 billion in 2023 with an expected CAGR of 14.6%, there is a significant opportunity for this multiplexed proteomics approach to advance the field of proteomics and single-cell technologies.