FLUIDIGM®

Helios

A CyTOF system

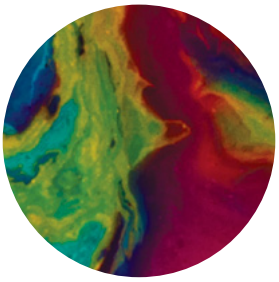
Discover your inner cell

Mass cytometry has catalyzed the revolution of single-cell proteomics, enabling the most comprehensive understanding of cell phenotypes, signaling pathways and function. Helios™ dawns as the most advanced tool for cellular exploration with streamlined workflows and multimodal capabilities. It's system-level biology at single-cell resolution, on an accessible, expandable platform designed for breakthrough discovery.

SYSTEM-LEVEL VIEW WITH SINGLE-CELL RESOLUTION

DEPTH

Analyze biomarkers inside and out at the single cell level.



BREADTH

Collect data for all cells in your system.

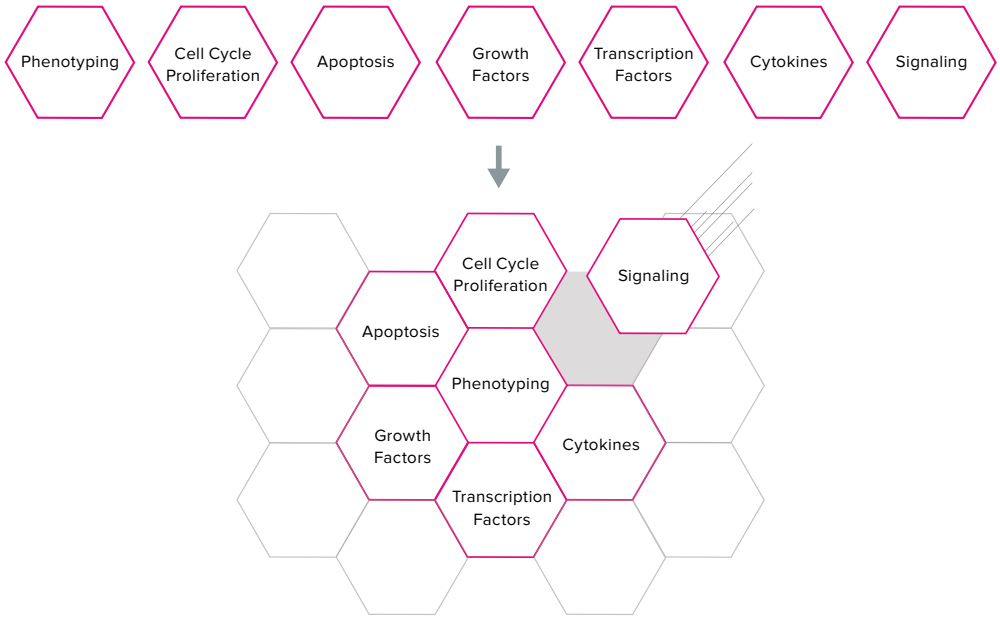
COMPREHENSION

Mass cytometry provides both breadth and depth, bringing system-level comprehension with single-cell resolution.

MORE THAN BEFORE

As our understanding of cellular heterogeneity's role in health and disease has grown, so has the need to precisely define an individual cell's phenotype, functional capabilities, signaling state and general health. Mass cytometry, or cytometry by time-of-flight (CyTOF®), enables greater comprehension to your research by letting you simultaneously measure more than 40 parameters for millions of cells.

Design truly comprehensive experiments:



PROVEN RESEARCH

Our customers' published research demonstrates transformative discovery in the life sciences.

Research areas:

- Cancer research
- Immunology
- Stem cell biology
- Vaccine research

Advancing knowledge in:

- Basic science
- Drug discovery
- Translational research

IMPACT

Approximately 40% of papers using CyTOF technology have been published in top-tier journals such as *Science, Cell, Nature* and *Proceedings of the National Academy of Sciences (PNAS)*.

Of those, 79% of the data referenced in these papers were generated using CyTOF systems.

THE ELEMENTS OF MASS CYTOMETRY

Discovery research and functional profiling require simultaneous measurement of multiple parameters per cell, for millions of cells per experiment. Mass cytometry uniquely combines five elements necessary for resolution of the functional and phenotypic complexity of biological systems at the single-cell level.

METAL ISOTOPES:

Mass cytometry employs heavy metal isotope tags to simultaneously measure multiple cellular targets. High-purity metallic isotopes ensure minimal background from signal overlap or endogenous cellular components.

CHANNELS:

Helios expands the mass cytometry range to 135 channels ensuring comprehensive studies today, and flexibility to scale in the future as new metal tags are developed.

PANELS:

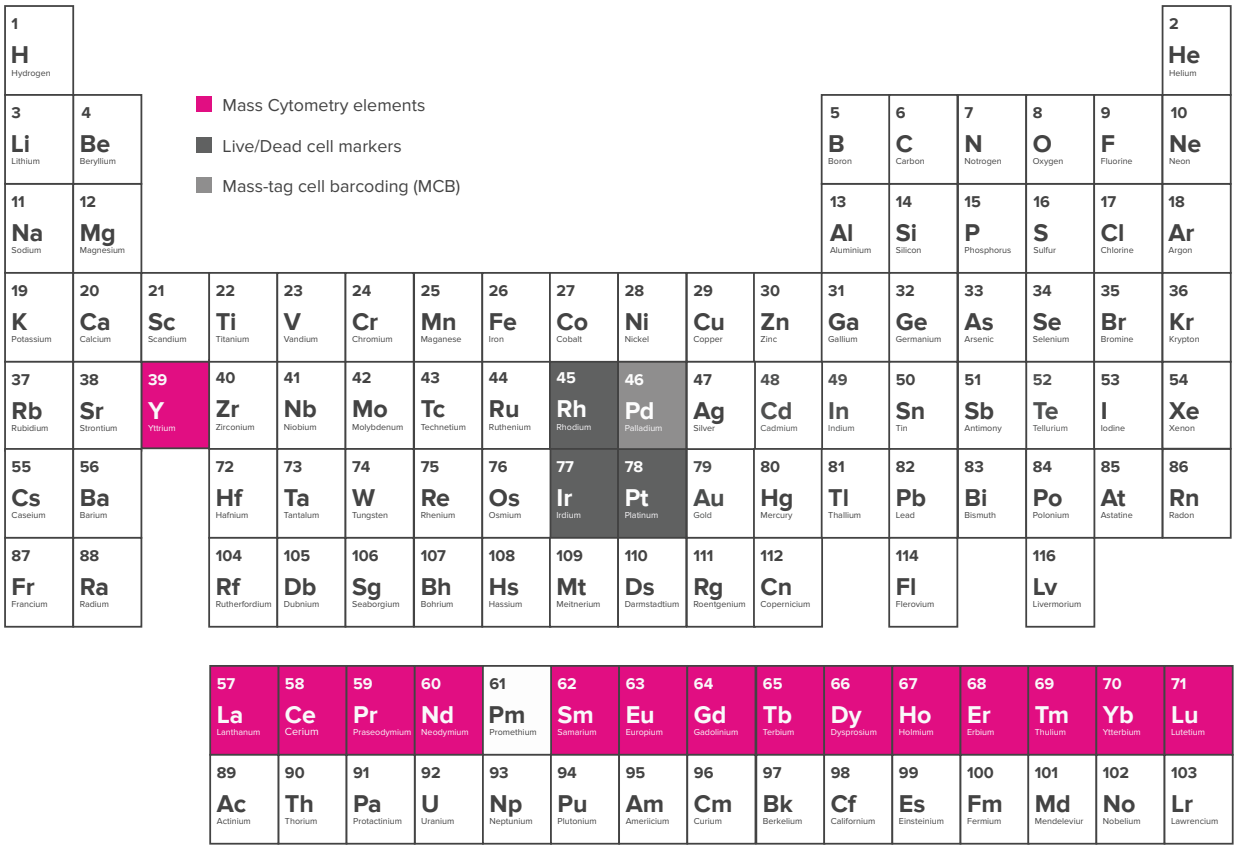
Fluidigm offers metal-tagged antibodies as individual reagents and in preassembled kits targeting specific applications, which can be combined to build high-dimensional proteomic panels for profiling cellular systems.

RESOLUTION:

Helios uses time-of-flight (TOF) technology to focus isotope tags into discrete, finely resolved bands.

THROUGHPUT:

Helios is barcoding enabled. This increases throughput while improving data quality, allowing you to analyze more experimental variables simultaneously.



Mass cytometry elements: the stable isotopes of these 24 elements provide over 50 unique tags for use in mass cytometry experiments.

DISCOVERY WORKFLOW WITH MASS CYTOMETRY

DESIGN | BUILD | STAIN | ACQUIRE | ANALYZE

DESIGN: Maxpar Panel Designer

Design high-dimensional proteomic panels with this interactive, web-based application that simplifies and optimizes panel design using metal-conjugated antibodies from the Fluidigm catalog and your custom conjugates.

BUILD: Maxpar reagent catalog

The catalog contains over 400 metal-conjugated antibodies to human and mouse targets covering a wide range of applications including phenotyping, cytokine expression, signaling responses, apoptosis and cell cycle, plus a variety of pre-validated panel kits. In addition, antibody labeling kits allow you to tag most IgG with your choice of 35 metals. Custom conjugation services are also available.

STAIN: Fluidigm-validated protocols, buffers and barcoding reagents

Maxpar™ Sample Prep Buffers and Fluidigm-validated protocols provide optimal mass cytometry staining performance for surface and intracellular targets. Use Cell-ID™ barcoding to increase throughput and decrease sample-to-sample staining variability.

ACQUIRE: Helios, a CyTOF system

The new Helios mass cytometer accelerates discovery through improved performance and a streamlined workflow, driven by a modern, intuitive user interface.

Key enhancements of this system include:

- More channels, enabling larger panels and more flexible panel design
- Increased sensitivity to improve detection of low-abundance targets
- A new tube loader that saves time and simplifies sample introduction
- A new user interface that simplifies and streamlines data acquisition
- Faster sample acquisition rates to reduce data collection time
- Automated system calibration to maintain the system's peak performance

ANALYZE: Cytobank

High-content Helios data becomes high-impact knowledge with the cloud-based Cytobank analysis platform. Cytobank provides an array of analysis tools, including dot plots, clustering and dimensionality reduction algorithms (SPADE and viSNE), and summary statistics tools like heat maps and dose-response curves. All are customized for efficiently extracting discoveries from mass cytometry data.

SUPPORT AND TRAINING

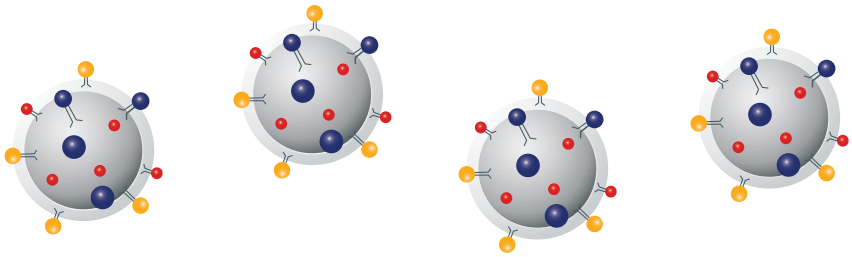
Helios is advanced mass cytometry technology, backed by the commitment of Fluidigm.

At Fluidigm, we create biotech tools that enable our customers to seek truth in life sciences—to push limits and envision ever more creative answers to “what if...?” And we consider fulfilling your order to be just the first step. That’s why we’ve designed complete training and support programs to help you make the most of your Helios purchase.

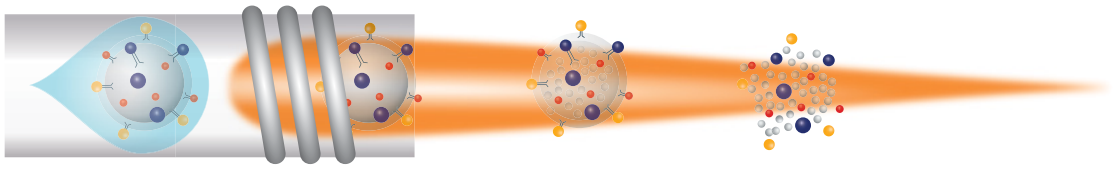
DISCOVER YOUR INNER CELL

How mass cytometry works:

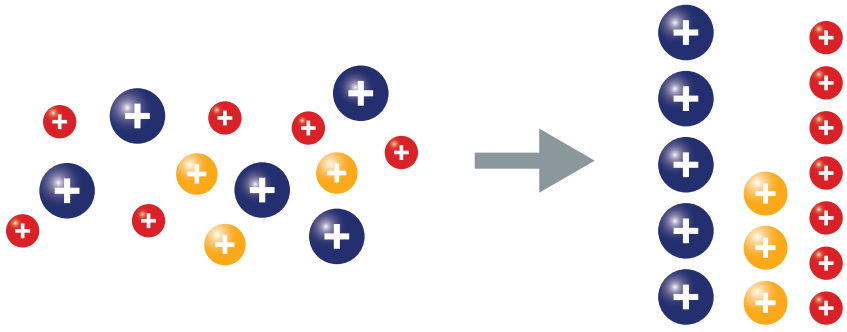
Cells are stained in suspension with a customized panel of metal-conjugated antibodies directed against surface and intracellular protein targets. High-purity metallic isotopes ensure minimal background from signal overlap or endogenous cellular components.



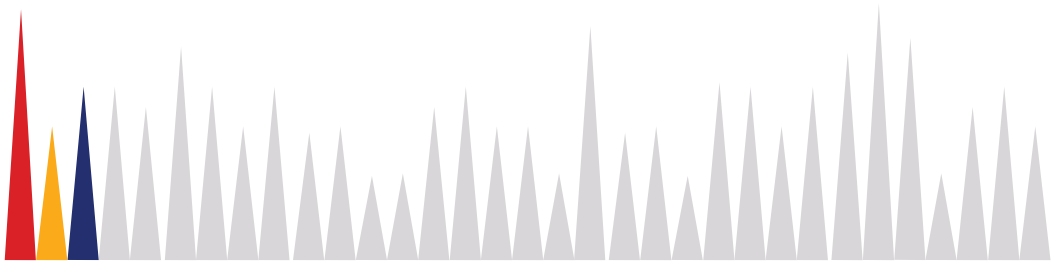
Inside Helios cells are individually atomized to release the metal ions. Ions derived from each stained cell are maintained in discrete clouds.



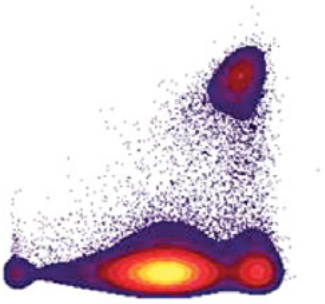
Metal ions of interest are resolved by mass in the time-of-flight (TOF) chamber.



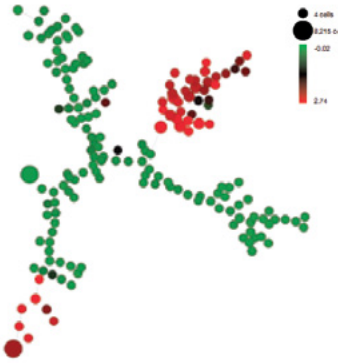
The time-resolved detector produces a mass spectrum that represents the identity and quantity of each isotopic metal tag on a per-cell basis. Quantitation of metal ions is predictable, linear and highly resolved.



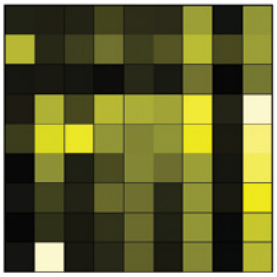
Data is generated in .fcs format and can be analyzed using Cytobank and other data analysis programs. A representative dataset including a heat map summary, SPADE clustering tree and bivariate dot-plot display from the same sample are shown below.



Bivariate plot



SPADE



Heat map

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