



# POLARIS

Imagine the Possibilities



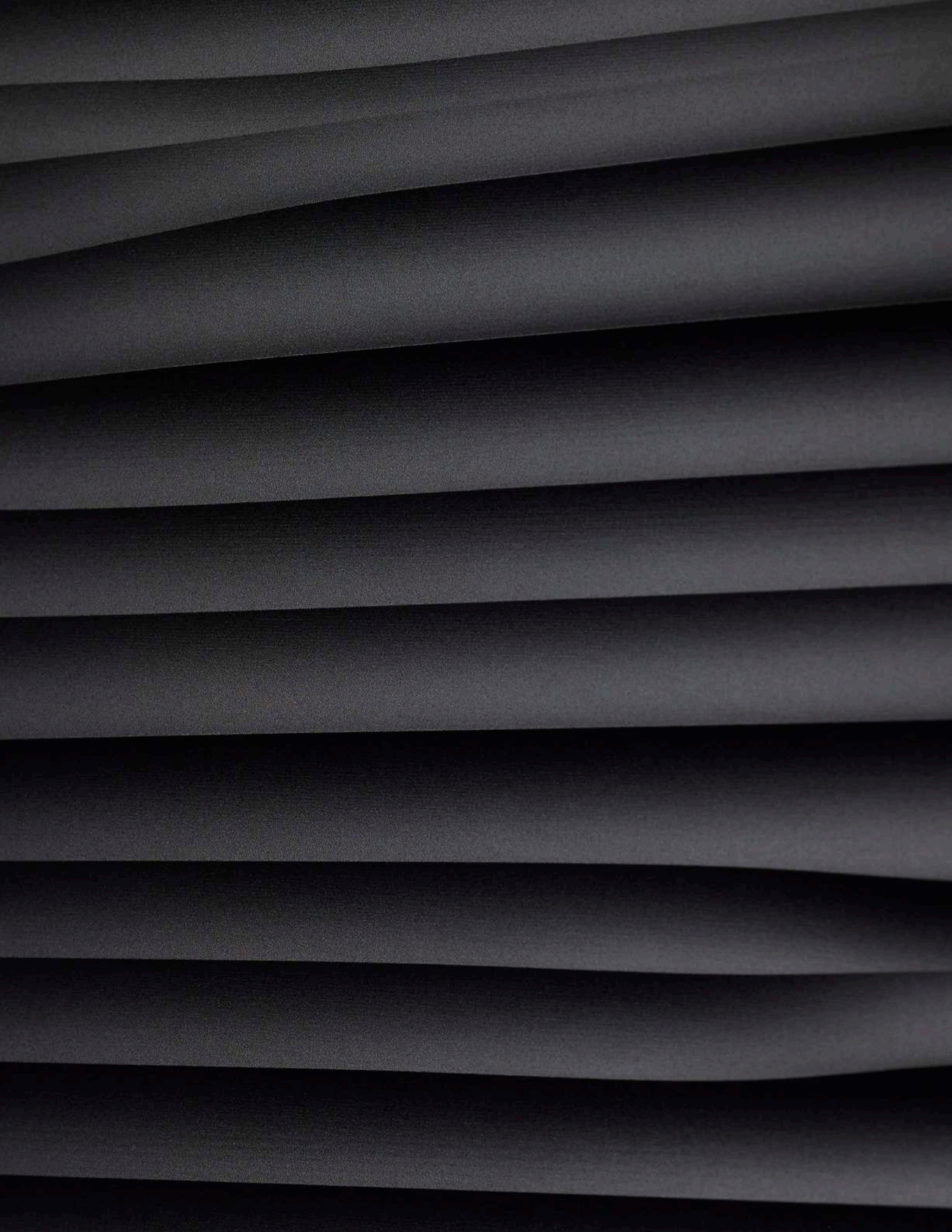
The future of single-cell biology is functional genomics.

# IMAGINE IF YOU COULD

Isolate individual cancer stem cells to explore which cells are involved in metastasis.

Study the effects of vaccines on individual dendritic cells.

Explore variation in pharmacological response of iPS-derived cardiomyocytes.



# INTRODUCING POLARIS™

## See what's never been seen before.

When each cell is unique, selecting and perturbing cells individually is the only way to find the gene networks and pathways that regulate their function.

The Polaris workflow combines acute dose-response and time-course studies with molecular readout to enable a spectrum of functional genomic applications.

**Antiviral Response**

**Cell Signaling**

**Apoptosis**

**Metabolism**

**Cell Cycle**

**Vaccine and Drug Efficacy**

**Cell Differentiation**

**Inflammatory Response**



# REVOLUTIONIZING BIOLOGY

## Select with precision.

Actively select and test individual target cells based on immunophenotype, viability or fluorescent reporter.

## Integrate the biology.

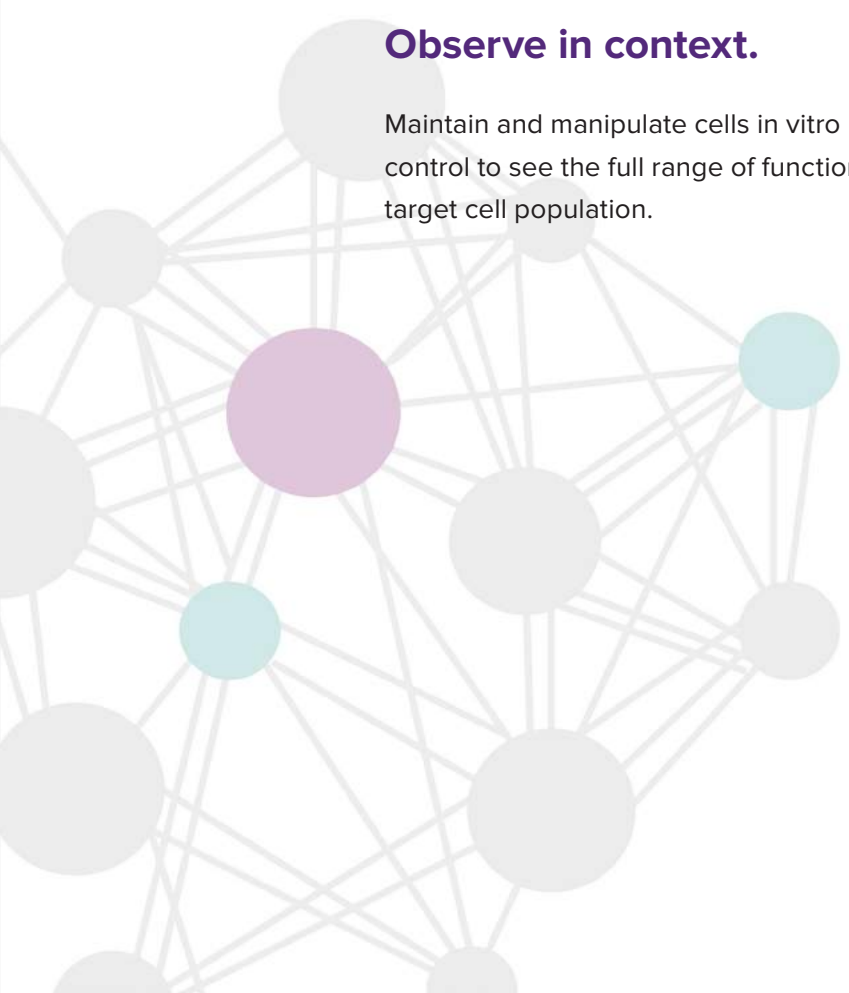
Select, dose and prepare cells for mRNA sequencing—all within Polaris—to directly correlate each cell's phenotype and physiology with its transcriptional signature.

## Design to your specifications.

Challenge each cell with transcription factors, RNA, viruses or small molecules at different combinations, dosages or time points.

## Observe in context.

Maintain and manipulate cells in vitro under tight environmental control to see the full range of functional heterogeneity in the target cell population.



# GOING STATE-OF-THE-ART

## The System

Polaris is a fully integrated benchtop system that supports cell biology, imaging and molecular analysis in one workflow. Featuring electronic and pneumatic control of sophisticated microfluidics that automates cell selection, reagent addition and processing, the platform also includes built-in environmental control of temperature, gas and humidity to sustain live cells for up to 24 hours. Its onboard optical system selects fluorescent-labeled cells based on properties such as viability, immunophenotype and transgenic reporters, enabling you to accurately isolate a specific subpopulation for your study. By integrating these critical steps into one system, Polaris becomes a natural extension of your current enrichment techniques to give you a complete solution from sample to data.





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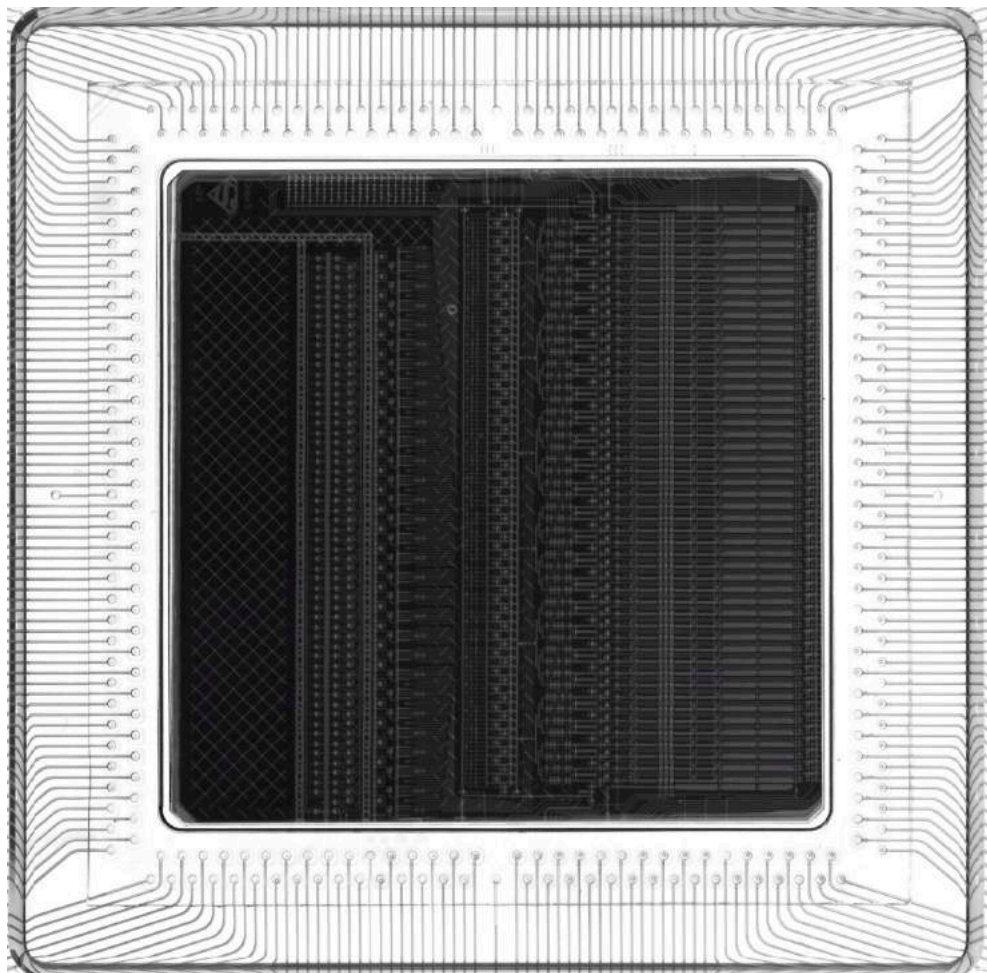
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## The Circuit

The Polaris Single-Cell mRNA Seq IFC is a sophisticated integrated fluidic circuit (IFC) that lets you select and prepare 48 individual cells based on fluorescent labels. At its core is Fluidigm's multilayer soft lithography (MSL), a patented technology that automates cell and reagent mixing into nanoliter reaction chambers. With this innovative IFC, you can run multiple experimental conditions in parallel, with several biological replicates per condition.

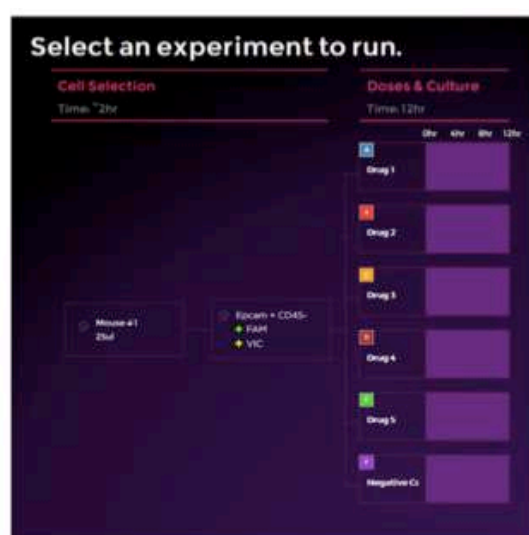




## The Software

Polaris lets you design your experiments as you envision them, with a simple touchscreen LCD display and an intuitive user interface that streamlines how you create and execute multifactorial experiments. With the Polaris software, you can prime, load, select, dose, image, lyse and harvest—all in one seamless workflow.

Polaris also works with the Singular™ Analysis Toolset, an innovative bioinformatic platform for analyzing and visualizing data. Singular offers powerful methods for identifying gene expression and mutation patterns at the single-cell level.



6-Point Dose Response



24-Hour Time Course (*available mid-2016*)

## The Reagents

The Polaris reagent kit contains optimized buffers and solutions to efficiently isolate and prepare the cells and harvest the cDNA amplicons for library preparation.

Reagents for reverse transcription and library preparation are sold separately.



# THE IDEAL WORKFLOW FOR SINGLE-CELL FUNCTIONAL STUDIES

Polaris introduces truly groundbreaking technology that seamlessly integrates cell and molecular biology at the single-cell level, letting you explore the functional dynamics of every cell in bold new ways.

## 1 SELECT

Stained cells are loaded in media, then selected based on viability, immunophenotype or fluorescent reporter.

## 2 SIMULATE

Cells are maintained in vitro for up to 24 hours with premixed gas, humidity and temperature, with or without extracellular matrix.

## 3 PERTURB

Each cell is dosed with RNA, transcription factor, virus or small molecules\* at different intervals or concentrations.

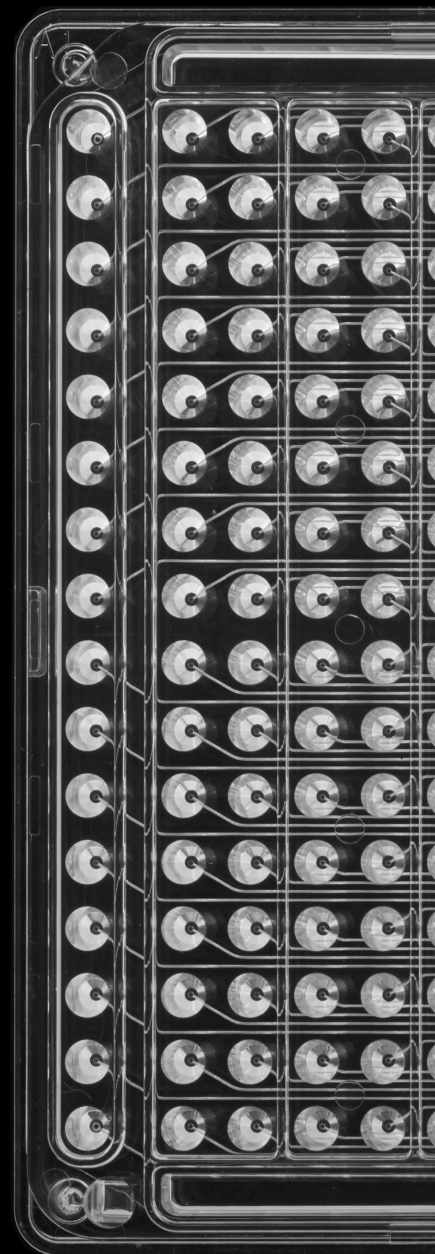
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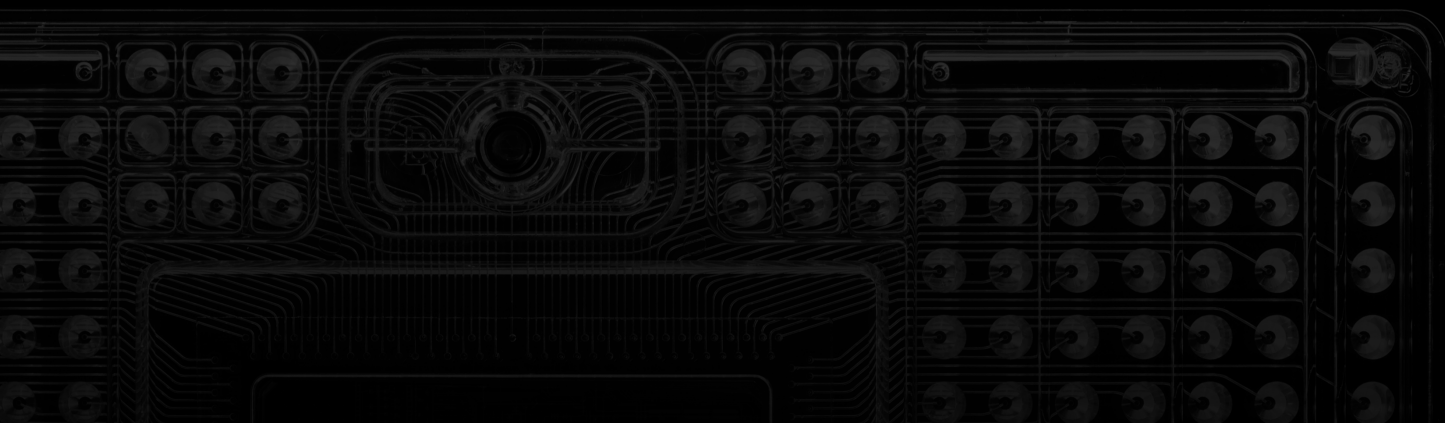
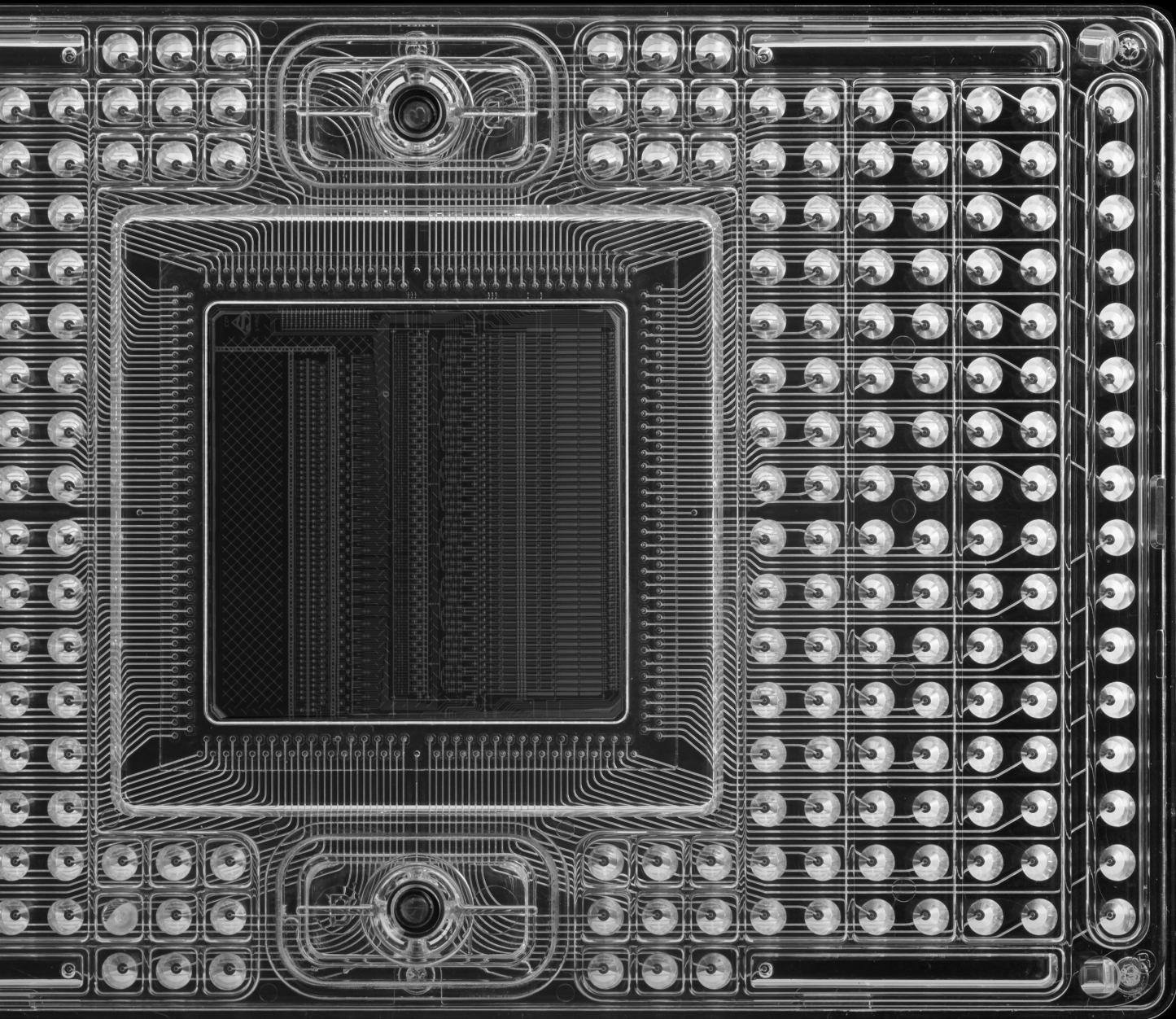
Cells are imaged to monitor viability or immunophenotype.

## 5 MEASURE

Cells are lysed, reverse-transcribed to cDNA, amplified and harvested for library prep.

\*PDMS-compatible small molecules





# SPECIFICATIONS

Type	Specification
Minimum input	500 cells total
Selection sensitivity	Cell frequency >3%
Selection time	1–4 hours
Applications	Dosage and time-course* studies with whole transcriptome readout
Experiment length	Up to 24 hours
Dosing	Fixed dosing, 4 hour intervals 5 dosing steps in a 24-hour period
Throughput	48 individual chambers containing single cells 8 conditions x 6 replicates
Color detection	Simultaneous detection of 4 different excitation/emission wavelength combinations (438–700 nm)
Cell labeling	Cells can be selected based on universal tracker, viability stain, labeled antibody to cell surface receptor or fluorescent reporter gene.

\*Enabled by mid-2016

# UNDERSTANDING CELLULAR NETWORKS

An individual cell's response to its microenvironment informs our understanding of disease onset, rational drug discovery and personalized medicine. This is where discovery begins.



## C1™ for Characterization

Start at the beginning to explore heterogeneity, estimate frequency and reveal molecular signatures of critical cell populations.

## Polaris for Function

Then go deeper by challenging target cell populations in context to identify functional relevance and the candidate mechanisms that regulate the process.



## **YOUR PARTNER IN SCIENTIFIC DISCOVERY**

At Fluidigm, we firmly believe in the power of single-cell analysis to reveal biological truth in life science. That's why we developed Polaris, an innovative technology designed specifically to move beyond characterization to begin understanding the functional role of each cell.

Breakthrough technology is only the first step. We are committed to your success and the novel discoveries you will make. Our world-class service and support team partners with you along the way, with flexible service plans to fit your budget and skilled, knowledgeable service engineers on whom you can rely to keep your Polaris system performing at its peak.

Our field applications scientists draw on their expertise in cell and molecular biology to provide in-depth, hands-on training and can advise on experimental design to help you make the most of Polaris. Our technical support specialists are available by phone or email to address your product and application questions. And you can always visit [fluidigm.com](http://fluidigm.com) to access up-to-date product information, including protocols, user guides, videos and more.



## **IMAGINING THE FUTURE**

**Already Polaris is empowering researchers to do more.**

Treat individual cancer cells with varying doses of compounds to assess their sensitivity.

Isolate tumor infiltrating lymphocytes (TILs), and assess the genes that confer their responsiveness.

Inhibit target pathways in single serotonergic cells to explore gene regulation.

**Imagine what you can do with Polaris, the next step in single-cell biology.**







# Start cell selection.

Experiment - Dose Response



Skip

Configure

Start

File: Save | Cell Selection: Save | Data Tables: Refresh | Test/Export: Run | Settings: Settings | Results: Results | 08:45:19 AM | 12/18/2015

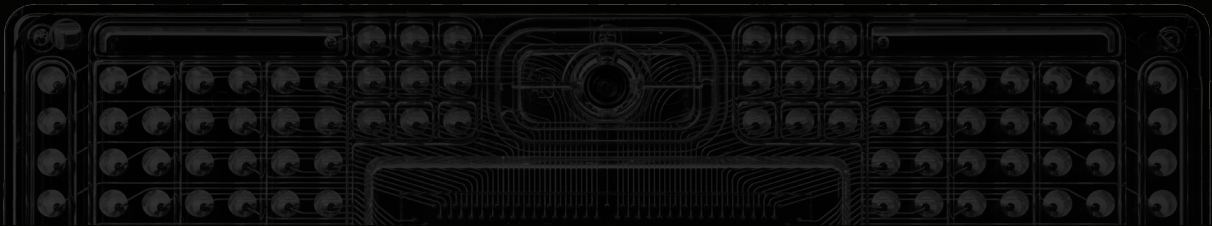
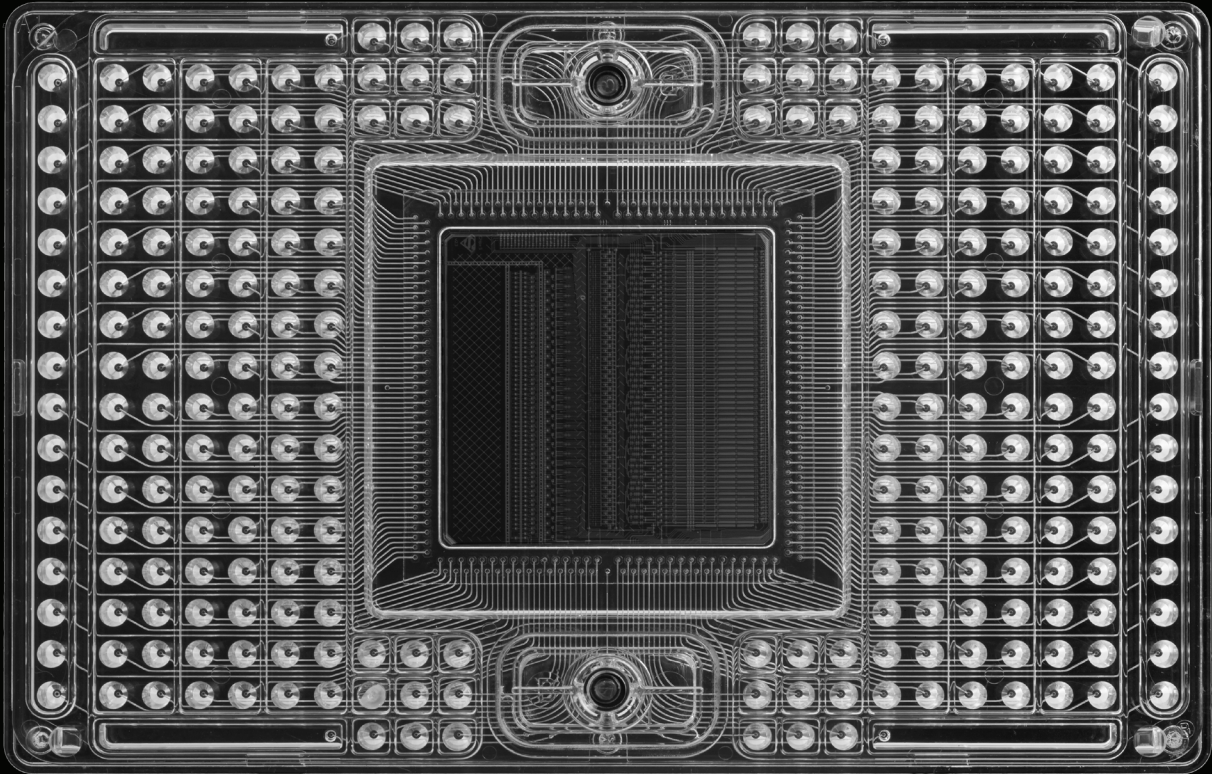








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