SINGLE-CELL ANALYSIS
Defy the Law of Averages
An entirely new approach
SINGLE-CELL ANALYSIS THAT DEFIES THE LAW OF AVERAGES

GET ACCURATE, RELIABLE GENE EXPRESSION DATA WITH THE FLUIDIGM SINGLE-CELL WORKFLOW

- Achieve greater accuracy to measure differences in gene expression profiles between individual cells
- Avoid the hazards of taking averages of all cells in your sample
- Identify previously unrecognized subpopulations and dissect new regulatory networks

Individual cells can differ by size, protein levels, and expressed mRNA transcripts, even within nominally homogeneous cell populations. Therefore, the tacit assumption that every cell in your sample behaves exactly the same way is a dangerous gamble; taking averages of pooled cells can mask the dramatic variations in gene expression among cells. Recognizing cellular variations in what appear to be homogenous populations has become crucial to advancing stem cell research, understanding cancer cells, identifying immune responses, studying the effectiveness of biological therapies, and discovering the mechanisms of neurodegenerative diseases.

Geneticists and clinical researchers have been looking for a complete workflow that can examine and differentiate individual cells and group them according to unique genomes and transcriptomes while minimizing technical noise.

Fluidigm has developed an entirely new approach to single-cell gene expression, based on microfluidic technology that enables you to rapidly and reliably isolate, process, and profile individual cells for genomic analysis. Our family of instruments, arrays, assays, software, and kits are designed to take you from cellular isolation and extraction, through reverse transcription and preamplification and ultimately to detection and analysis of cell activity using just one technology.

Our single-cell workflow enables hundreds of individual cells to be tested for the expression of hundreds of genes in just a few hours versus experiments that normally take days using traditional systems. It provides an easy-to-use workflow and flexible assay configuration. With an automated workflow, ready-to-use reagents, and optimized arrays, you can eliminate tedious pipetting steps and sample mixing to achieve “load and go” productivity.

DECREASE REAGENT USE WITH THE POWER OF MICROFLUIDICS

The Fluidigm microfluidic architecture does the work of automatically combining samples, reagents and primer-probe sets into thousands of PCR reactions using significantly smaller reagent volumes as compared to traditional systems. Each microfluidic plate generates 24-fold more data than that produced by a standard 384-well plate.

The new Fluidigm single-cell workflow opens the door to studying cell differentiation, measuring individual cell responses to specific stimuli, verifying critical disease biomarkers, validating RNAi knockdown, and conducting candidate drug screens.
**C1™ SINGLE-CELL AUTO PREP SYSTEM**

- Single-cell precision—greater accuracy to measure differences in gene expression profiles between individual cells
- Easy to use—simplifies isolation and preparation of single cells
- Fast—cell input to data in less than a day
- All in one—comprehensive, automated workflow generates reproducible and reliable results
- Flexible—powerful platform to expand into whole transcriptome and variant discovery

The new C1 Single-Cell Auto Prep System simplifies your gene expression studies by providing a simple “plug and play” workflow to isolate and prepare 96 single cells in about one hour of hands-on time. The simple user interface and comprehensive workflow lets you:

- Capture cells—batches of cells are loaded in a single pipetting step and rapidly separated into 96 individual chambers for preparation
- Verify data integrity—a quality control check point verifies the number of captured cells and distinguishes live and dead cells
- Lyse—a rapid direct cell lysis method saves time and cost without RNA purification steps
- Reverse transcribe and preamplify—cDNA synthesis and specific target amplification occur on the same sample without reagent mixing and sample transfer
- Harvest—all preamplified products are pooled, harvested, and transferred to the BioMark™ HD System for real-time PCR analysis.

**FAST AND EASY WORKFLOW**

1. Select cells
2. Pipette into C1 Single-Cell Auto Prep Array IFC

**BIOMARK HD SYSTEM**

- The BioMark HD System provides fast and flexible throughput for real-time PCR experiments
- Quantitative PCR—preamplified products from the C1 System are diluted, pipetted into the Dynamic Array IFC, loaded, and thermal-cycled
- Analyze—use the Fluidigm Real-Time PCR Analysis Software to view and interact with amplification curves, color-coded heat maps, and Ct data for each run

The C1 Single-Cell Auto Prep System, coupled with the BioMark HD System, streamlines gene expression analysis seamlessly and efficiently to support up to 96 individual cells across 96 transcripts. The C1 Single-Cell Auto Prep System dramatically increases productivity to further accelerate expression profiling studies.
The new C1 Single-Cell Auto Prep System simplifies your gene expression studies by providing a simple “plug and play” workflow.

3 Load and stain cells in the C1 Single-Cell Auto Prep System

4 Isolate single cells

The C1 Single-Cell Auto Prep System, coupled with the BioMark HD System, streamlines gene expression analysis seamlessly and efficiently.
**C1 SINGLE-CELL AUTO PREP REAGENT KIT**

These kits contain buffers and wash solutions in a ready-to-use format for automated prime, capture, lyse, dilution, and harvest in the C1 Single-Cell Auto Prep System. Reagent mixing is not required, minimizing tube mix-ups and providing a convenient automated method for single-cell processing. Reagents for reverse transcription and preamplification must be purchased separately; recommendations are provided.

**C1 SINGLE-CELL AUTO PREP ARRAY IFC**

- Specifically captures and prepares cells for genomic analysis
- Newest microfluidic circuit design
- Easy to load your bulk samples and reagents

Using integrated thermal and pneumatic control at nanoliter scale, all steps of the workflow, from capture to preamplification, can be contained and completed reproducibly within the Auto Prep Array IFC without intervention. No reagent mixing, transfer or addition is required. It is easy to load, requires minimal hands-on time, reduces the risk of carryover contamination, and provides highly reliable data quality.

**DYNAMIC ARRAY IFCs**

- Sensitive, high-throughput, simple tool for quantitative analysis of mRNA from single cells
- Data quality comparable with DELTAgene™ or TaqMan® Gene Expression assays

Dynamic Array IFCs have an on-chip network of microfluidic channels, chambers, and valves that automatically assemble individual PCR reactions, decreasing the number of pipetting steps up to 100-fold over traditional methods.
DELTAGENE™ ASSAYS

- High quality—sensitivity and linearity similar to probe-based assays
- MIQE compliant—assay primer sequences provided
- Custom panels/pathways designed upon request
- Cost savings—low startup and running costs

Take full advantage of your BioMark HD System with Fluidigm DELTAgene Assays. Flexible groups of biologically-related genes are available for your specific requirements; there is no need to use fixed content. Simply provide us with your genes of interest (via RefSeq IDs) and the target species. All assays are ready to use using Fluidigm standard protocols.

REAL-TIME PCR ANALYSIS SOFTWARE

- Standard curve view—allows you to easily calculate the standard curve by identifying dilution samples
- Delta delta C<sub>t</sub> calculation—you can get delta delta C<sub>t</sub> in just three easy steps
- Automated threshold setting—automatically determine the ideal threshold setting for each chip run
- Automatic curve quality score—quickly and efficiently sorts through the real-time PCR curves and excludes those that do not meet your criteria

Each software application was designed to be intuitive and easy to use, with the industry’s best graphical user interface. The Fluidigm software features include pipetting templates, easy import/export functionality, predefined experiment layouts, and multiple data viewing options.