LEVITAS BIO®

Redefining Sample Preparation

The LeviCell Systems

Accelerate Scientific Discovery With the Power of Levitation Technology

Our Mission

LevitasBio® is dedicated to advancing science and human health by providing researchers with new and powerful methods for sample preparation and characterization. The LeviCell® platform is a first-in-class cell enrichment solution powered by a proprietary, label-free, and gentle Levitation Technology. Our unique solution generates high-quality samples while preserving the cells' native states, enabling researchers across multiple scientific disciplines to uncover true biology.

| Increase sample viability up to 99% | Remove contaminating dead cells & debris | Run cell numbers as low as 8,000 | Cut sample preparation time by 80% |

LeviCell 1.0
Elevating Performance

The LeviCell 1.0 system provides breakthrough performance, elevating sample enrichment to new heights. Achieve viable cell enrichment with a 3-step workflow including a 20-minute walk-away run.

- User-defined stringency for purity or yield
- Gentle, label-free enrichment
- Real-time visualization and characterization of sample
- No run-to-run calibration

LeviCell 1.0 Cartridge

- Single-use consumable
- 100% of the sample is contained in the cartridge
- Accommodates particles up to 350 µm in size
- Sterile irradiated option available
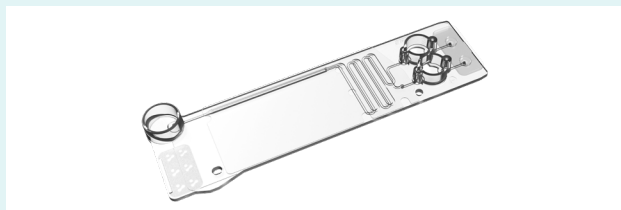
All in a Single Run

Viable Cell Enrichment
Label-free
No pressure
No cell stress

Cell-Specific Selection
Easy to multiplex
Ready-to-use kits
Label-free cells of interest

Debris Removal
Label-free
Removed automatically
No extra wash steps

Sample Analysis
Visualize the full sample
Cell characterization
Insight to upstream steps

LeviCell EOS
Parallel Processing Power

The LeviCell EOS system is the next generation in high throughput sample preparation and characterization. An enhanced optical system enables the full visualization of the separation channel during the run. Characterize samples and draw conclusions during the sample preparation process.

- Flexibility to expand up to 4 EOS modules, controlled and configured independently

- Run 4 different samples or 4x the same sample

- Examine samples in real-time during the enrichment process

- Obtain consistent and robust viability enrichment

LeviCell EOS Cartridge

- Same qualities of the LeviCell 1.0 cartridge with 4x throughput

- Full separation channel visualization

- Optically clear channels for enhanced sample characterization and visualization

- Fully sterile option, with sterile inlet well covers

Leverage Physical Forces to Obtain Native State Biology

The Workflow
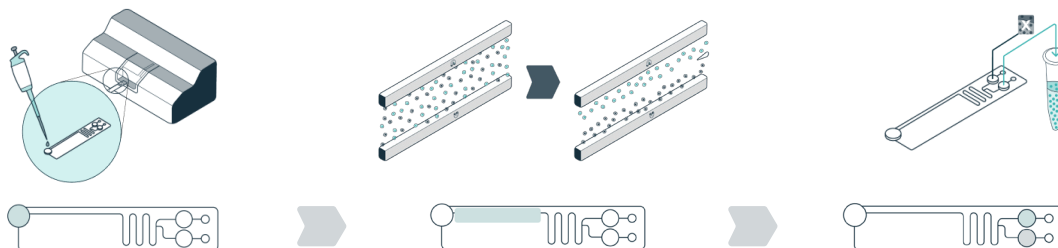
STEP 1: SAMPLE INPUT

Prepare the sample by adding the Levitation Agent, a paramagnetic solution. After inserting the cartridge into the system, dispense the sample into the inlet well.

STEP 2: SAMPLE ENRICHMENT

The system automatically loads the sample into the separation channel while the sample is imaged and levitated. The system performs automated, label-free enrichment plus debris removal via levitation.
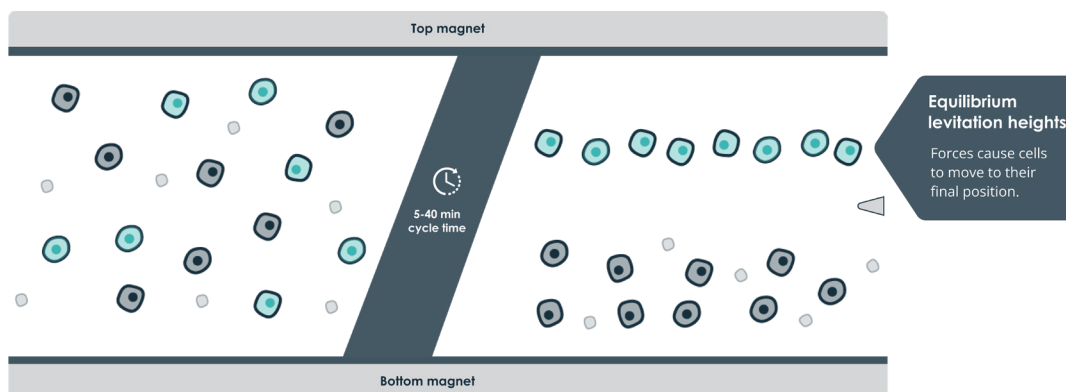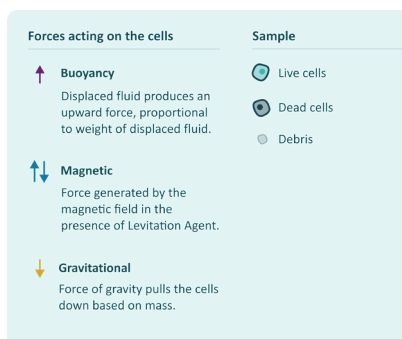
STEP 3: SAMPLE COLLECTION

Once the cells have levitated to their final equilibrium position, a live view in the software enables the user to define how the sample will be divided (fraction of interest or waste). Separated fractions are collected into the cartridge outlet wells.

How Levitation Technology Works

Levitation takes place due to forces exerted by the magnets on the fluid around the cells. Viable cells are impermeable to the Levitation Agent, resulting in strong levitation. Dead and dying cells are permeable to the Levitation Agent due to their compromised membranes, so the magnetic forces are weaker as they are more similar to the surrounding medium.

- Viable cells levitate higher and form a tight uniform band
- Dead and dying cells levitate lower and form a diffuse band

Forces acting on the cells

↑ **Buoyancy**
Displaced fluid produces an upward force, proportional to weight of displaced fluid.

↑↓ **Magnetic**
Force generated by the magnetic field in the presence of Levitation Agent.

↓ **Gravitational**
Force of gravity pulls the cells down based on mass.

Sample
- Live cells
- Dead cells
- Debris

Top magnet

5-40 min cycle time

Equilibrium levitation heights:
Forces cause cells to move to their final position.

Bottom magnet

Enable Diverse Starting Samples

Low viability samples	Low quality samples	Sensitive cell types	Large fragile samples	Complex samples
archived, frozen	FNA, core biopsies	microglia, neutrophils	organoids, cardiomyocytes	dissociated tumor cells

Streamlined & Simplified Workflow for Faster Results

Combine several steps from several different platforms into one simplified and streamlined workflow with the Levitation Technology and LeviCell systems.

CURRENT STATE

Starting sample → Debris removal → Dead cell removal → Target cell enrichment → Cell analysis → Output

INTEGRATED PROTOCOL

Starting sample → [or] → Output

Real-Time Visualization

The LeviCell systems' onboard camera provides the ability to see cells levitating during the run. This offers added capabilities that are unmatched by any other sample preparation technology available.
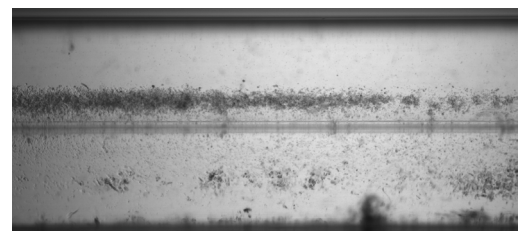
- Inspect sample quality by observing the presence of debris, cell clumps, and tissue chunks
- Use red and green fluorescence during levitation (optional)
- Observe cell population heterogeneity, behavior, or extract quantifiable metrics
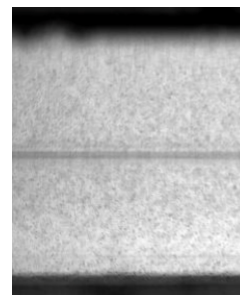
Beginning equilibration
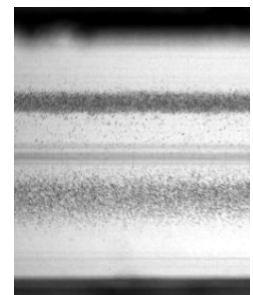
Ending equilibration

Lung dissociated tumor cells with debris

Start With Debris-Free, Highly Viable Samples Every Time

## Gain Deeper Insights With More Viable Single Cells

Dissociated tumor cells (DTC) are precious and critical to understanding disease biology and are also often challenging samples to work with. Achieving high-quality scRNA-seq data from DTCs can be difficult. The LeviCell systems can overcome these hurdles by enriching viable cells with minimal loss and avoiding perturbation to cell profiles. Enable the best samples to acquire the best results.

Lung Cancer Dissociated Tumor Cells

Primary Challenges

- Low viability
- Low cell number
- High debris
- Hard to obtain

No enrichment — 39%

With LeviCell — 87%

Viability

cDNA Amplification

UMAP Clustering
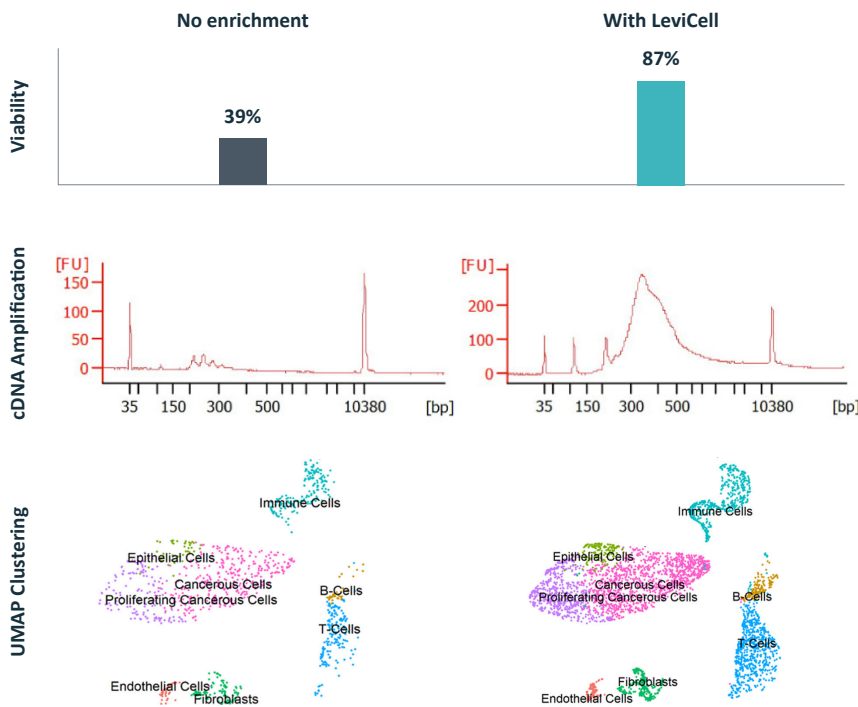
Start with the highest quality DTC sample using the LeviCell

↓

**Produce efficient single-cell sequencing libraries**

↓

Obtain 3.5x more high-quality single cell data

↓

Enrich 6x higher cancer cell representation using LeviSelect CD45+ Depletion Kit

Viable & Cell-Specific Enrichment

The LeviSelect™ Depletion and Enrichment Kits empowers gentle enrichment of viable and cell-specific populations, which remain untouched. On the LeviCell systems, achieve dead cell and debris removal with simultaneous cell-specific enrichment in a single run.
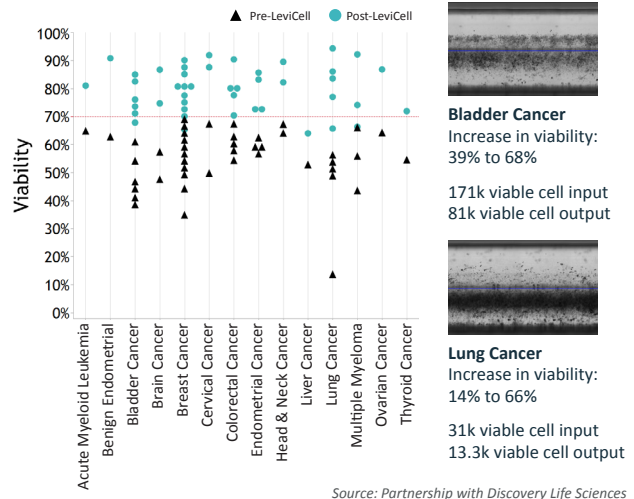
- Integrate cell viability and cell-specific enrichment with Levitation Technology
- Enrich specific cells of interest easily and quickly
- Use custom enrichment kits for workflow flexibility
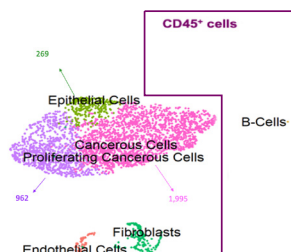
Transform Low Quality Samples Into Sequencing Success

The LeviCell systems rescue challenging samples at low cell numbers and at low viability when other methods fail. Poor-quality samples lead to lost sequencing reads that negatively impact scRNA-seq data.
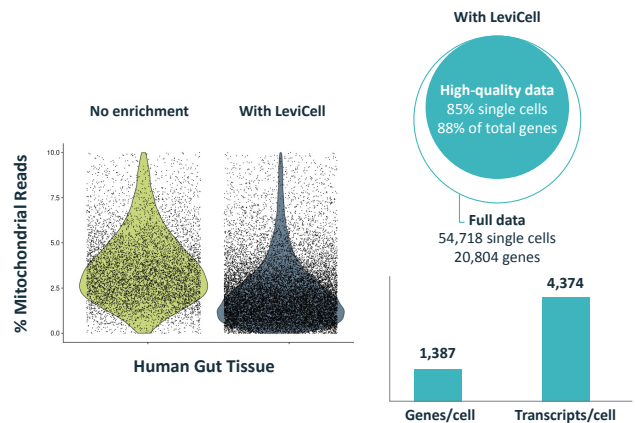
- Increase viability across multiple tissue types
- Enrich viable cells from low starting cell numbers
- Remove unaccounted-for debris

Bladder Cancer
Increase in viability:
39% to 68%

171k viable cell input
81k viable cell output

Lung Cancer
Increase in viability:
14% to 66%

31k viable cell input
13.3k viable cell output

Source: Partnership with Discovery Life Sciences

Acquire High-Quality Data From Native-State Cells

Stressed cells are not representative of true biology. High % of mitochondrial reads per single cell indicates cells are undergoing oxidative stress. Cells enriched on the LeviCell systems have lower % of mitochondrial reads mapped.
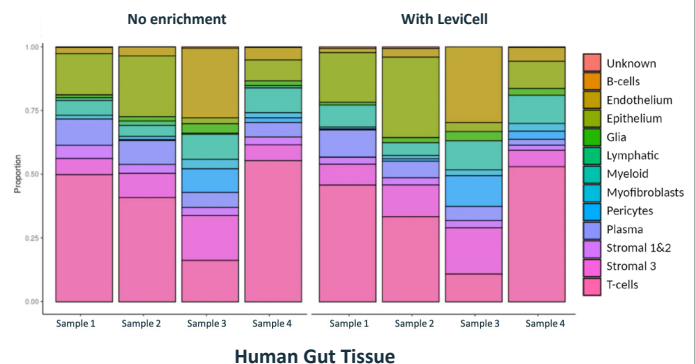
- Preserve native-state cells
- Reduce data filtering for higher data quality, capture more relevant biological information
- Reflect true biology with more cells, genes, and transcripts

With LeviCell

High-quality data
85% single cells
88% of total genes

Full data
54,718 single cells
20,804 genes

Genes/cell: 1,387
Transcripts/cell: 4,374

Source: (Left) GEN Webinar 2023, Agne Antanaviciute, PhD;
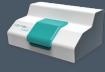*(Right) GenomeWeb Webinar 2023, Jan Remsik, PharmD, PhD*

Preserve All Cell Subtypes & Frequencies

Make efficient use of precious samples from diseased human tissue to obtain high-quality scRNA-seq results. The LeviCell systems perform viability enrichment and debris removal while preserving all cell types and cell frequencies within even the most fragile or complex samples.

- Gentle enrichment of fragile cell types
- Generate data that represents true biology
- Consistent across samples

Source: GEN Webinar 2023, Agne Antanaviciute, PhD

Instrument Specifications	LeviCell 1.0	LeviCell EOS
Number of samples/run	1	4
Temperature control	No	Optional**
Visualization	Fixed position	Full separation channel
Fractionation analysis	From image collection	From lane 1 image collection
Cartridge	S2.3, S2.3 Sterile	EOS-4, EOS-4 Sterile
Sterile inlet covers	No	Yes
Magnetic core	Fixed	User exchangeable
Illumination	Brightfield (transmitted illumination) Ex470 nm, Em524/29 nm (eg Calcein) Ex560 nm, Em 628/33 nm (e.g. PI)	Brightfield (transmitted illumination) Ex470 nm, Em524/43 nm (eg Calcein) Ex560 nm, Em 628/65 nm (e.g. PI)
Instrument software	Experiment Manager	EOS Manager
Analysis software	Experiment Analyzer	LeviMetrics™**
Biosafety cabinet compatibility	Standard size	Large footprint or custom
Footprint (W x D x H)	47 cm x 34 cm x 24 cm 19" x 13" x 9"	44 cm x 63 cm x 46 cm 17.3" x 24.8" x 18.1"
Weight	15.3 kg (33.6 pounds)	45.4 kg (100 pounds)

*Dependent on cell size, density
** Not yet available

Part Numbers	Product Description
Instruments	
1000001	LeviCell 1.0 with 1 year warranty
1000021	LeviCell EOS System with 1 year warranty
1000025	LeviCell EOS-4 TEC Core with 1 year warranty
1000026	LeviCell EOS-4 TEC Core with 1 year warranty
Consumables	
1002010	LeviCell Cartridge S2.3 (10 pack)
1002012	LeviCell Cartridge S2.3, sterile (10 pack)
1002101	LeviCell EOS-4 Cartridge (10 pack)
1002102	LeviCell EOS-4 Cartridge, sterile (10 pack)
Reagents	
1003001	Levitation Agent (10 Reaction Kit)
1003002	Levitation Agent (40 Reaction Kit)

Part Numbers	Product Description
LeviSelect Kits	
1004001	LeviSelect Human CD45 Depletion Kit (10 rxn)
1004003	LeviSelect Mouse CD45 Depletion Kit (10 rxn)
1004005	LeviSelect Human CD3 T Cell Enrichment Kit (10 rxn)
1004007	LeviSelect Human CD4 T Cell Enrichment Kit (10 rxn)
1004009	LeviSelect Human CD8 T Cell Enrichment Kit (10 rxn)
1004011	LeviSelect Human B Cell Enrichment Kit (10 rxn)
1004019	LeviSelect Mouse B Cell Enrichment Kit A (10 rxn)
LeviPrep Kits	
1005001	LeviPrep™ Mouse Tissue Dissociation Kit

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