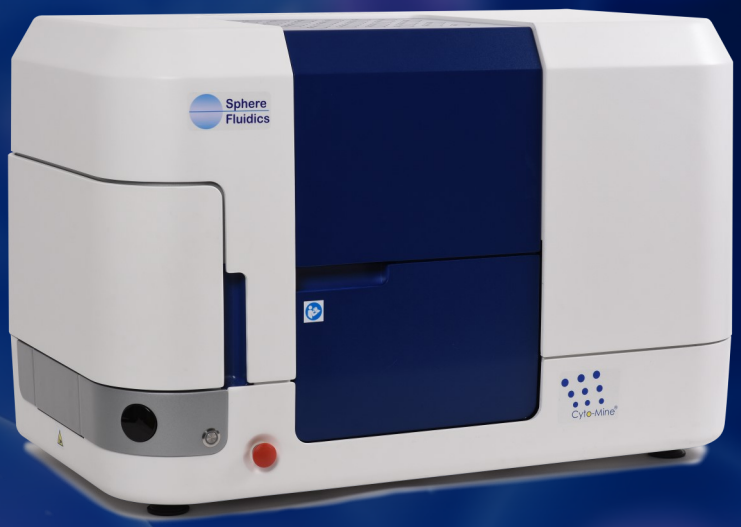
Sphere Fluidics

Cyto-Mine®

Cyto-Mine®

The Single Cell Analysis and Monoclonality Assurance System

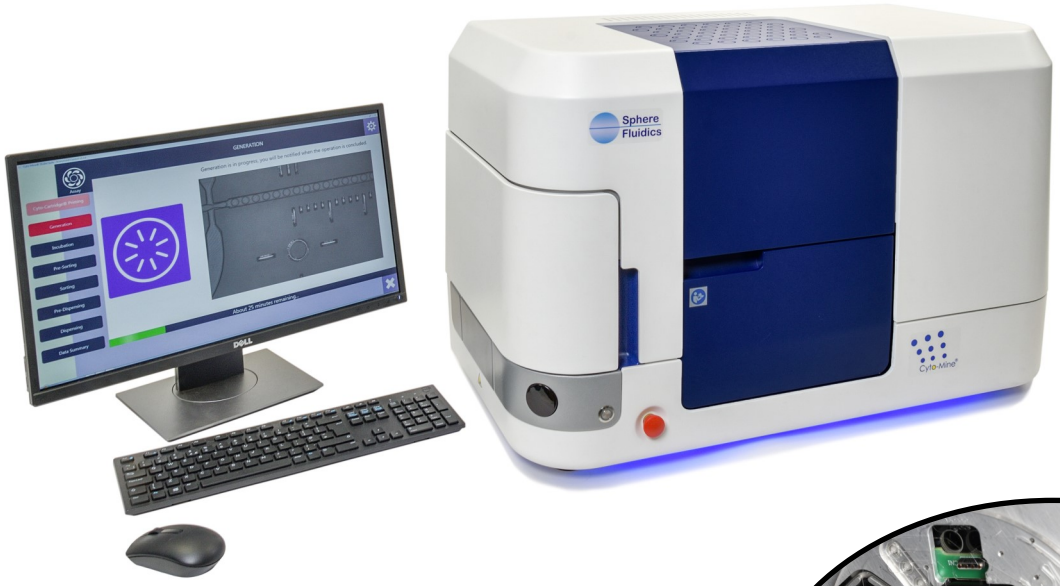


Biopharmaceutical discovery and cell line development workflows streamlined like never before

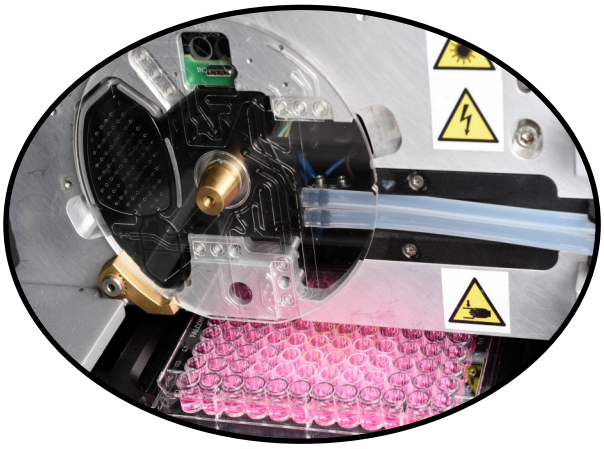
www.spherefluidics.com

The future is now...

Selective screening, cell isolation and clone verification integrated into a single platform



Cyto-Mine®



Cyto-Cartridge® and microplate loading bay

Key Benefits:

- High throughput cell screening
- Dramatic cost and time reduction
- Every cell assayed for secreted target protein specificity and/or productivity
- Collects the high value positives
- Generates images as proof of monoclonality
- Gentle and sterile process
- Animal Origin Free reagents

'We determined that Cyto-Mine® can generate cell lines with high productivity and a strong assurance of monoclonality after a single round of screening without compromising product quality.'

Thomas Kelly, Janssen R&D

Let Cyto-Mine® simplify your workflow

Less than 1 working day

Complex cell population

Cyto-Mine®

High value cells collected to 96- or 384-well microplates

The challenge in biopharma is to screen large cell populations for antigen-specificity, productivity or other parameters, and then isolate rare cells with confidence of clonality.

Cyto-Mine® has been developed to condense the whole cell screening and cloning process into a single system to accelerate and simplify your workflow.

Sample preparation

- Cell count
- Resuspend in fresh cell culture medium
- Add assay reagents
- Load to Cyto-Cartridge® and into Cyto-Mine®

0.5 hour

Cyto-Mine®

- Picodroplet generation and cell encapsulation
- Picodroplet incubation and antibody secretion assay
- Picodroplet sorting
- Picodroplet imaging and cell dispensing

4-7 hours

Post-run processing

- Reverse transcription
- PCR
- Expression
- Sequencing

or

- Clone outgrowth
- Expansion
- Titer measurements

1-2 weeks

Accelerate your biologics discovery a

Reduce timelines. Increase screening

Antibody Discovery

Cyto-Mine® Studio
User-friendly software

B cells

Hybridomas

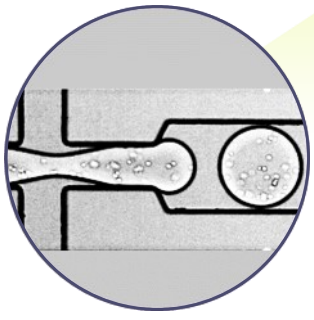
Other cells

Select workflow

Target specific DNA or cells

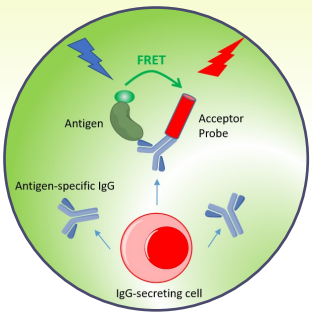
Dedicated
Animal Origin Free
encapsulation and assay reagents

Cyto-Cartridge®
Single-use disposable



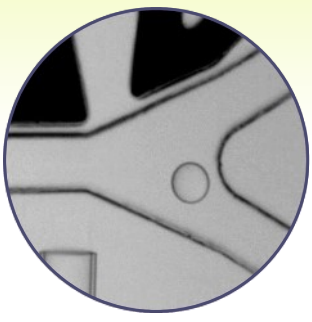
ENCAPSULATE

Encapsulate up to 200,000 single cells or up to 40 million cells in pools.



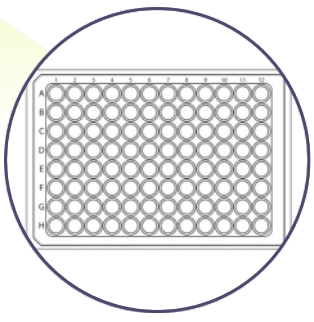
ASSAY

Screen your cell populations by antigen specificity or immunoglobulin class.



SORT

Sort based on fluorescence to find your positive “hit” cells.



DISPENSE

Dispense your cells of interest into individual wells of a 96- or 384-well microplate.

nd cell line development workflows

capability. Deliver monoclonality.

Cell Line Development

CHO cells

Other cells

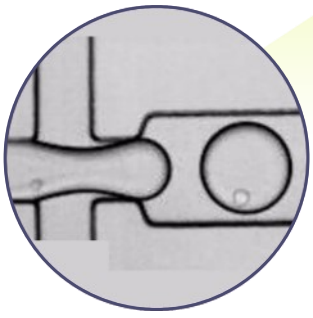
Select workflow

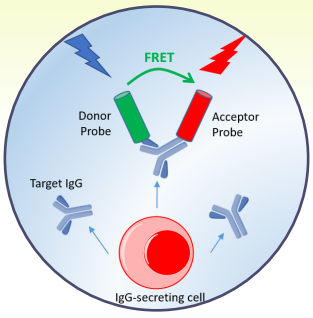
Cyto-Mine® Studio
User-friendly software

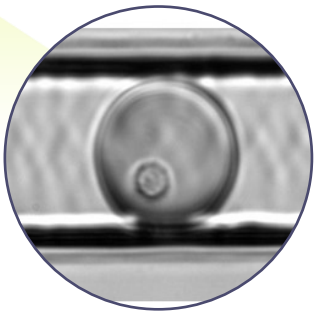
Dedicated
Animal Origin Free
encapsulation and assay reagents

Cyto-Cartridge®
Single-use disposable

High producing candidate clones







ENCAPSULATE

Encapsulate up to 100,000 transfected single cells.

ASSAY

Screen transfected pools for target antibody titer or analyse cell banks for the earliest sign of genetic drift.

SORT

Sort based on fluorescence to find your high producing candidate clones.

DISPENSE

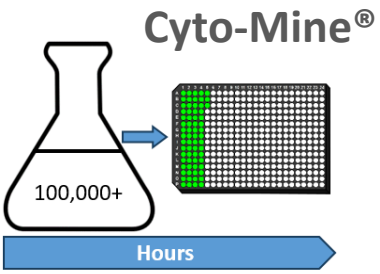
Image your single cells during dispensing into a 96- or 384– well microplate to obtain proof of monoclonality.

Screen more clones in less time

Cyto-Mine® picodroplet encapsulation technology provides a powerful new way to screen hundreds of thousands, or even millions, of cells for secreted proteins in a high-throughput manner.

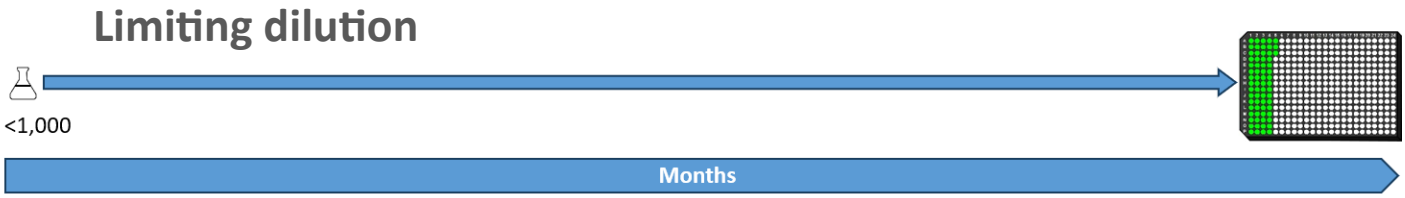
This overcomes both the inability of FACS to readily measure secreted proteins, and the limitation of current secreted protein screening methods to handle large numbers of cells.

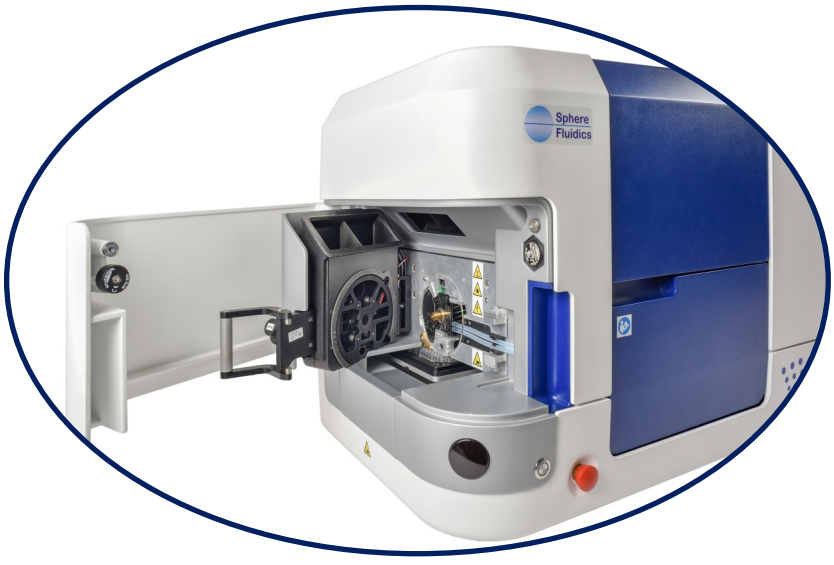
Cyto-Mine® versus other secreted protein screening methods:



Cyto-Mine® benefits:

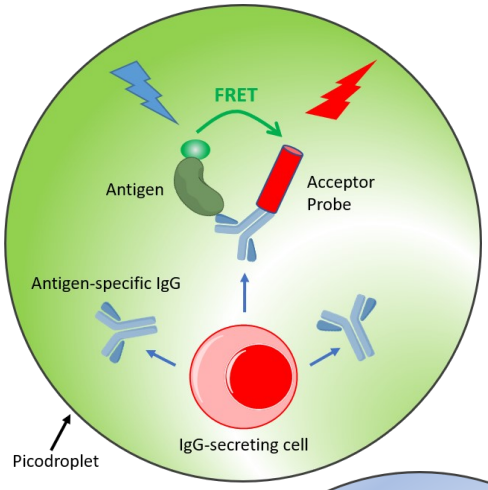
- ◊ Screens up to 1,000 times more cells than by colony picking
- ◊ Failed immunizations, fusions and transfections identified and eliminated in less than 1 day





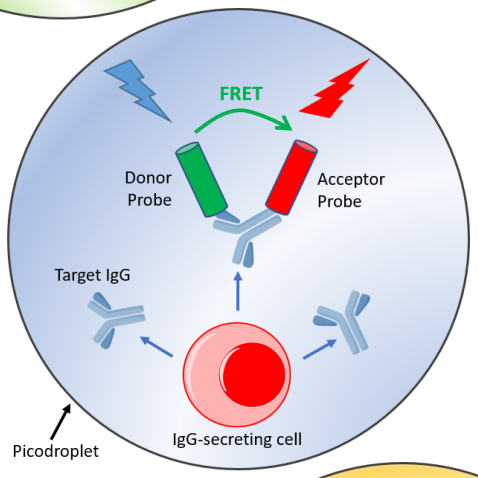
Measure protein secreted from every cell

Cyto-Mine® picodroplet incubation technology enables rapid miniaturized assays of target protein secreted from hundreds of thousands of individual cells.



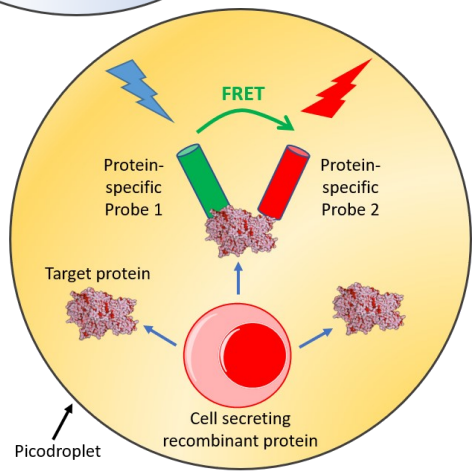
Antigen-specific assay:

- Hybridoma fusion screen
- B cell mining



IgG secretion assay:

- Productivity screen



Customized assays:

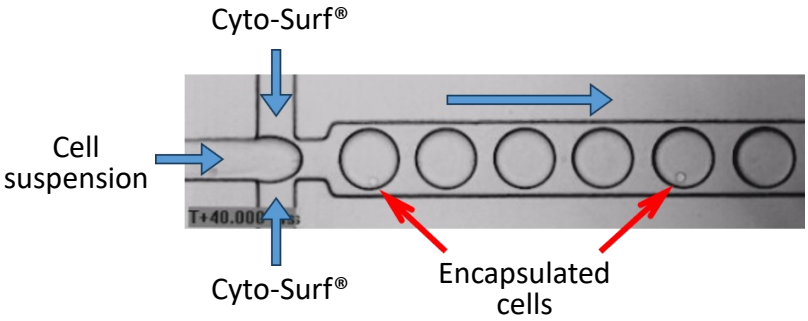
- Functional
- Post-translational modifications
- Reporter assays

Cyto-Mine® benefits:

- ◊ Detection reagent simply added to cells by operator prior to run
- ◊ FRET-based homogenous assay
- ◊ Assay time of just 30 mins to 2 hours
- ◊ Cyto-Mine® automatically incubates, assays, sorts and dispenses

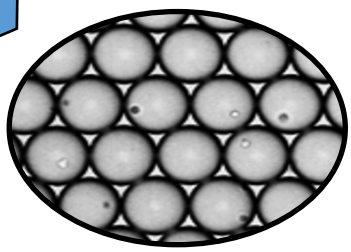
The confidence of a single-cell progenitor

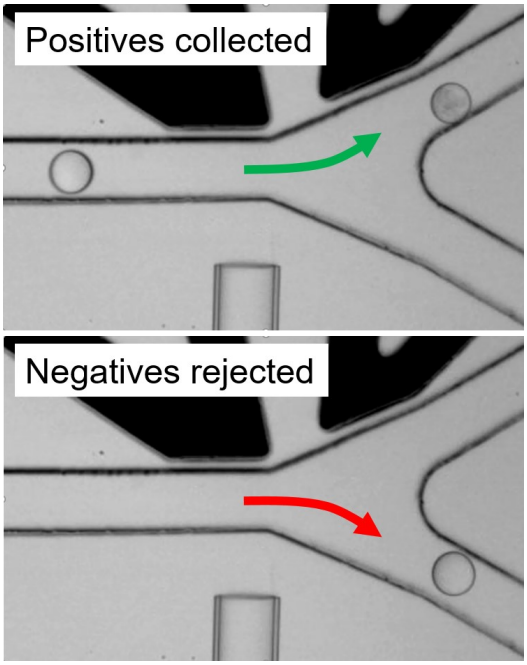
Cyto-Mine® monoclonality assurance technology enables single cells to be isolated and collected to microplates with visual proof of single cell status.



Cells encapsulated at high dilution so that the probability of 2 or more cells per picodroplet is ~0.1%

Cells incubated or stored

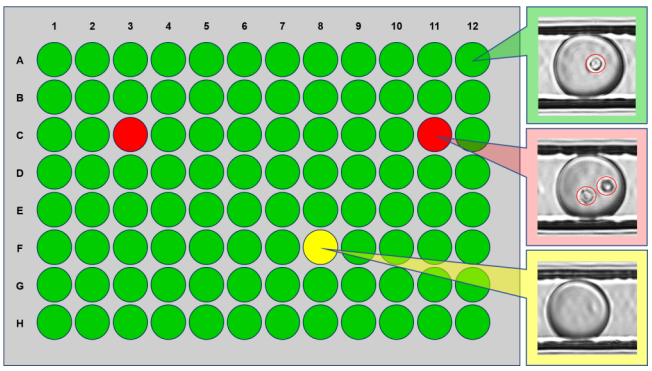




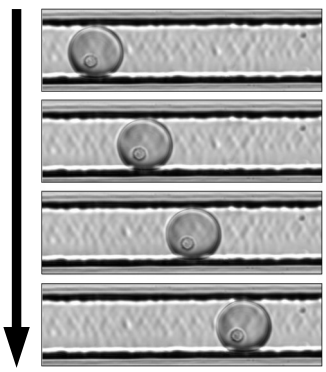
Cells sorted to divert all empty picodroplets to waste

Cyto-Mine® benefits:

- ◊ Automated isolation of verified single cells
- ◊ Documented visual evidence of monoclonality
- ◊ Interactive tracking of cells and assay data from picodroplet encapsulation to microplate
- ◊ High fidelity system



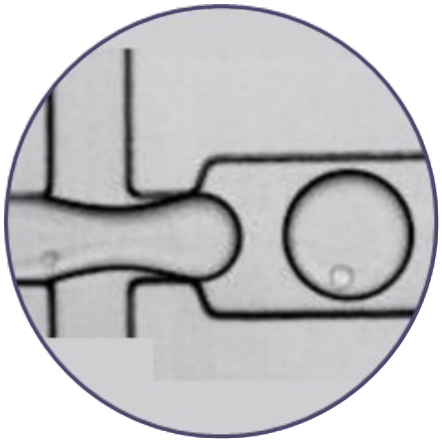
Cells gently dispensed to pre-filled 96- or 384-well microplates, and detected cell number annotated on interactive well map in Cyto-Mine® Studio software.



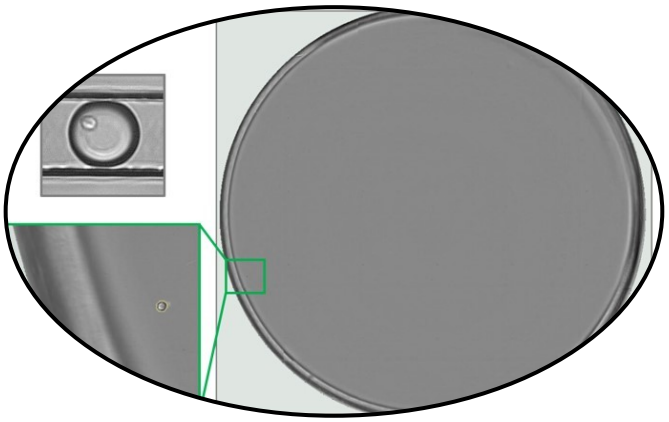
Visual verification by ultra-high speed, multi-frame optical imaging immediately prior to dispense confirms the presence of a single cell per picodroplet

Sort without compromising cell integrity

Cyto-Mine® encapsulation of cells into picodroplets of preferred cell culture medium provides a uniquely protective environment throughout the automated process ensuring unrivalled cell viability from sample loading through to dispensing into microplates.



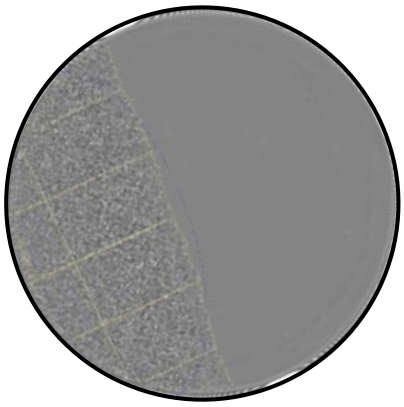
Gentle cell encapsulation in picodroplets of cell culture medium



Single cell in picodroplet prior to dispensing and offline image of the same cell post dispensing

Cyto-Mine® benefits:

- ◊ Cell integrity protected through gentle encapsulation and processing
- ◊ Cells maintained in preferred medium throughout run
- ◊ All processing steps undertaken at low temperature
- ◊ End to end sterility with disposable consumables
- ◊ Animal Origin Free reagents eliminates contamination risk
- ◊ Robust outgrowth of clones in wells post-dispensing



Strong outgrowth of dispensed high-value clones

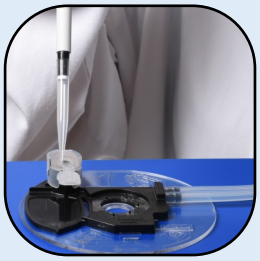
Cell viability data:

Cell Type	Post-dispense viability %	Outgrowth %
B Cells	62	N/A
Hybridomas	90	85
CHO	95	63

Integrated screening, sorting, isolation and clonality verification at the click of a button

Cyto-Mine® Studio software has an intuitive user interface to guide the user seamlessly through the set-up process.

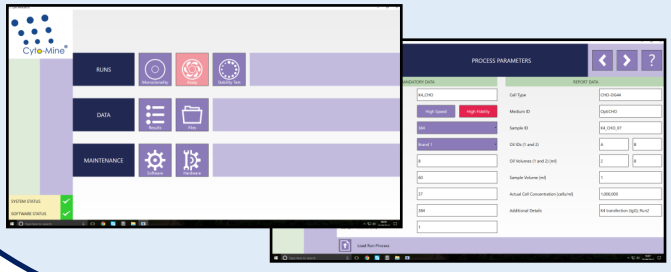
Load cell sample to Cyto-Mine®



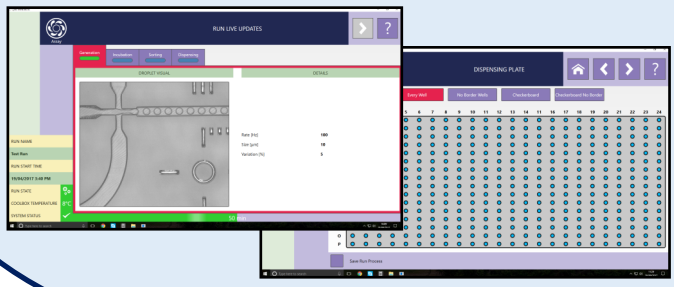
Sample to Cyto-Cartridge®

Cyto-Cartridge® to Cyto-Mine®

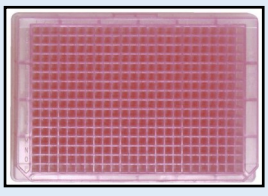
Set up Cyto-Mine® or load existing process

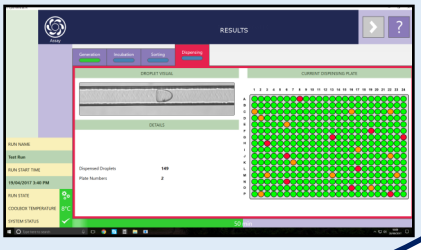


Click to run Cyto-Mine®



Collect plates of high value cells and review data generated by Cyto-Mine® Studio





Specifications

SYSTEM SPECIFICATIONS	
Weight	85 kg (187 lbs) - Boxed 110 kg (242 lbs)
Dimensions	860 mm x 566 mm x 463 mm (34 x 23 x 19 inches (w x h x d))
Voltage [frequency]	100 V (min) to 240 V (max) [@ 50 Hz / 60 Hz] 500W (max)
RUN SPECIFICATIONS	
Sample input method	Loaded into single-use disposable Cyto-Cartridge®
Sample input format	Mammalian cells in cell culture medium
Workflows (operation modes)	Monoclonality Assurance; Direct Assay; Cell Line Stability
Destination plate capacity	Plate-by-plate or stacker option (available upon enquiry)
Dispensing speed	1 well per second
Run time	2-7 hours (protocol dependent)
Containment and sterility	Requires biological safety cabinet
DETECTION	
Detection system	Laser-Induced Fluorescence (*e.g.* fluorophores, FRET)
Excitation wavelengths	488 nm
Detection wavelengths *	520nm & 620nm (peak detection wavelengths)
Camera	High-speed CMOS
PC	
Computer	Embedded internally as part of Cyto-Mine®
PC operating system	Microsoft Windows 7 Professional
Monitor	Colour LCD (21”)
External connections	4 USB; 1 Ethernet
Cyto-Mine® data formats	.XLS; .BMP; .PDF; .XML (database integration, upon enquiry)
SOFTWARE SPECIFICATIONS	
System control software	Cyto-Mine® Studio software suite
Monoclonality verification	Image capture and processing
Data tracking	On screen data point hyperlinking
Data fidelity	Locked run data with time stamp editing
WORK ENVIRONMENT	
Clearance	30 cm
Humidity	30 - 80%
Operating temperature	$21^{o}C \pm 5^{o}C$
Site preparation	See the Cyto-Mine® System Site Requirements Guide
CONSUMABLES	
Microfluidic biochips	Cyto-Cartridge®
Specialist chemicals	Cyto-Surf® Solutions (250ml bottles)
Microplate compatibility	96- and 384-well. All major SBS format plates.

* Custom filter configurations are available; please note these must be specified at the point of purchase. Contact us at ***Sales@spherefluidics.com*** for further information.

Cyto-Mine®

The Single Cell Analysis and Monoclonality Assurance System

Code	Product Ordering Information
S003	Cyto-Mine® System
C301	Cyto-Mine® Consumables Suite
C302	Cyto-Cartridge® Pack of 5
C303	Cyto-Surf® A (250ml)
C304	Cyto-Surf® B (250ml)

For further Cyto-Mine® reading:

- Application Note 01: IgG Secretion Assay
- Application Note 02: B Cell & Hybridoma Mining
- Application Note 03: Monoclonality Assurance

Notes:

Sphere Fluidics Ltd is an ISO 9001 accredited company (Certificate: GB2004755).

Cyto-Mine®, Cyto-Cartridge® and Cyto-Surf® are registered trademarks and patented technologies of Sphere Fluidics Ltd.

All Cyto-Mine® components, the Cyto-Cartridge® and Sphere Fluidics' supplied chemicals and bioreagents are Animal Origin Free and GLP-compliant.

For research and development purposes only.

Product specifications subject to change without notice.

CE

ISO 9001
Certificate No. GB2004755

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