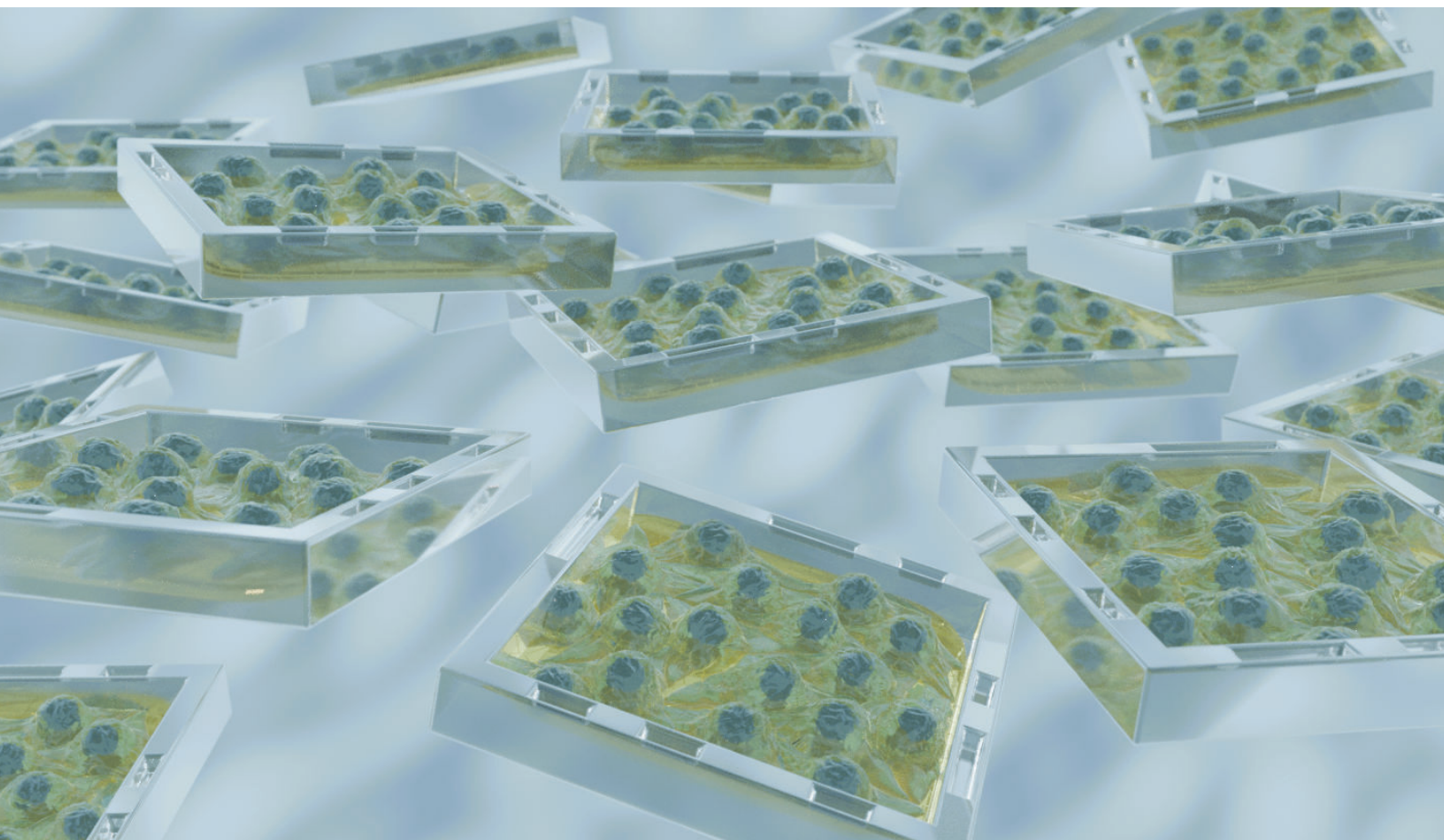




semarion

Revolutionising Adherent Cell Assays



SemaCyte[®] Microcarriers *for More Powerful Assaying Workflows*

The SemaCyte[®] microcarrier platform uses advanced materials to barcode, move, and cryopreserve cells while preserving their adherent morphology. SemaCytel integrates seamlessly with microplate workflows, increasing throughput, flexibility, and efficiency. This unique approach enables you to unlock better data faster from your cell assays.

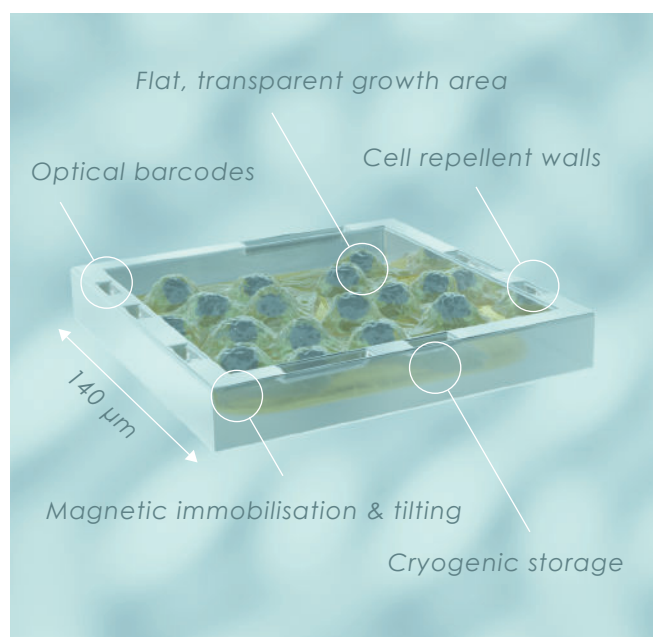
SemaCyte® assaying microcarriers function as ultra-miniaturised, mobile, and barcoded wells which carry small groups of adherent cells.

These flat cell carriers can be moved with liquid handling tools and their orientation can be controlled magnetically.

Cells are seeded onto immobilised arrays of SemaCyte® microcarriers before they are released into suspension.

Fully adherent cells can now be frozen, multiplexed, and dispensed into microplates for plate reader or imaging assays.

SemaCyte® microcarriers are compatible with standard assay types and slot into automated workflows to further boost data throughput.

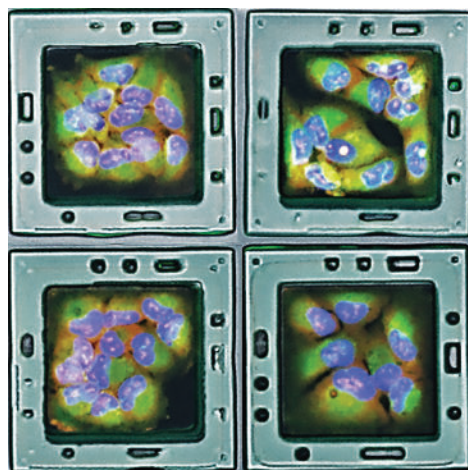
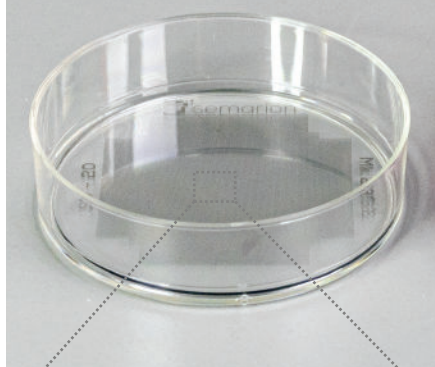


Move cells while retaining their adherent morphology



Optically barcode and pool various cell models together

SemaCyte® Seeding Dish 20

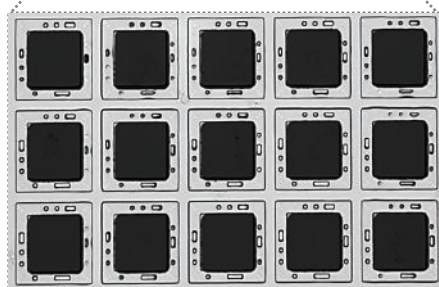


A 20 sq. cm Seeding Dish (SD20) contains an array of 50,000 immobilised SemaCyte® microcarriers with one barcode.

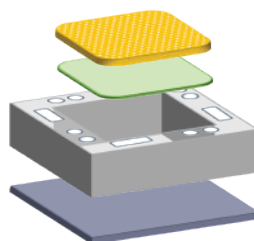
SemaCyte® microcarriers are made using microchip fabrication techniques, allowing for a high degree of control over their shape, properties, and features.

Our standard SemaCyte® microcarriers have a 100 x 100 µm² growth area to capture 1-30 cells. Surfaces can be coated with cell attachment polymers.

Magnetic immobilisation and orientation is performed with our peripherals.



SemaCyte®
Microcarrier
Composition



Cell attachment surface

Magnetic actuator

Structural polymer with barcode

Smart release polymer



SemaCyte® Products

Each 20 sq. cm Seeding Dish (SD20) produces enough microcarriers for 2-10 multiwell plates worth of experiments.

The recommended density of SemaCytes per well ranges from 40-800 for 96-well plates and 10-200 for 384-well plates.

The SemaPure15 purifies SemaCytes after cell attachment. The SemaPlate orientates and immobilises SemaCytes inside microplates.

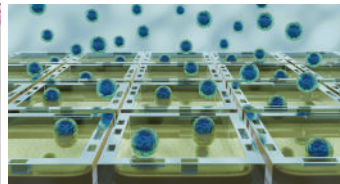
Barcode deconvolution is performed with Semalyse or built-in tools from microscopy providers.

Freeze batches of adhered assay-ready cells in cryovials

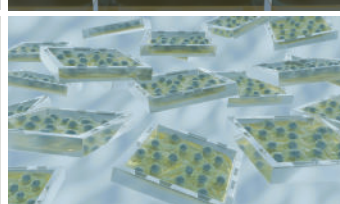
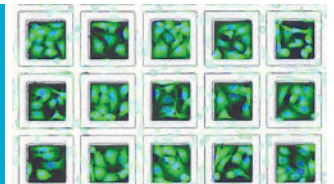


Integrate seamlessly with existing assaying workflows

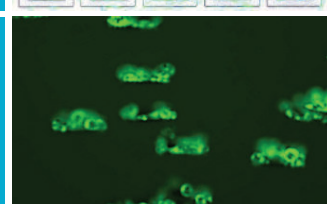
Batch Preparation



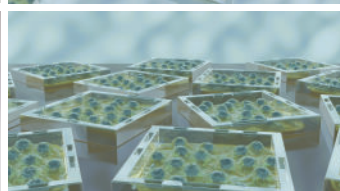
Cells are seeded and grown using standard culturing procedures for a desired confluency & morphology.



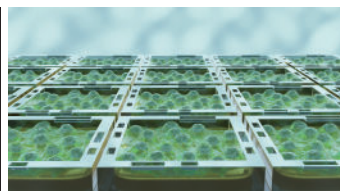
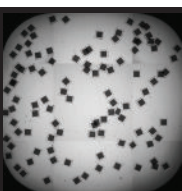
SemaCytes with cells are released from the dish by agitation, purified, aliquoted, and cryopreserved.



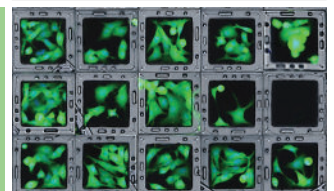
Assaying



SemaCytes are pooled, diluted, dispensed, and magnetically orientated for microplate assays.



Software identifies microcarriers, deconvolutes barcodes, and digitally tiles SemaCytes together.



Multiplex Cell Models

Pool various cell models within one well to accelerate cell panel or donor screenings. Multiplex 10 cells inside 384-well plates.

Increased Throughput

- 10x less time, 6x less cost
- Reduce plasticware

Adherent Cryopreservation

Freeze batches of adhered, transfected, and matured cells inside cryovials. Cells are assay-ready 1 hour after thawing.

Enhanced Flexibility

- Decouple culture from assays
- Reduce biological variability

Ultra-Miniaturise Assays

Reduce the number of cells per well without affecting local confluency and morphology, e.g. 200 cells per 384-well.

Resource Efficiency

- 100x fewer cells per assay
- More data from scarce cells

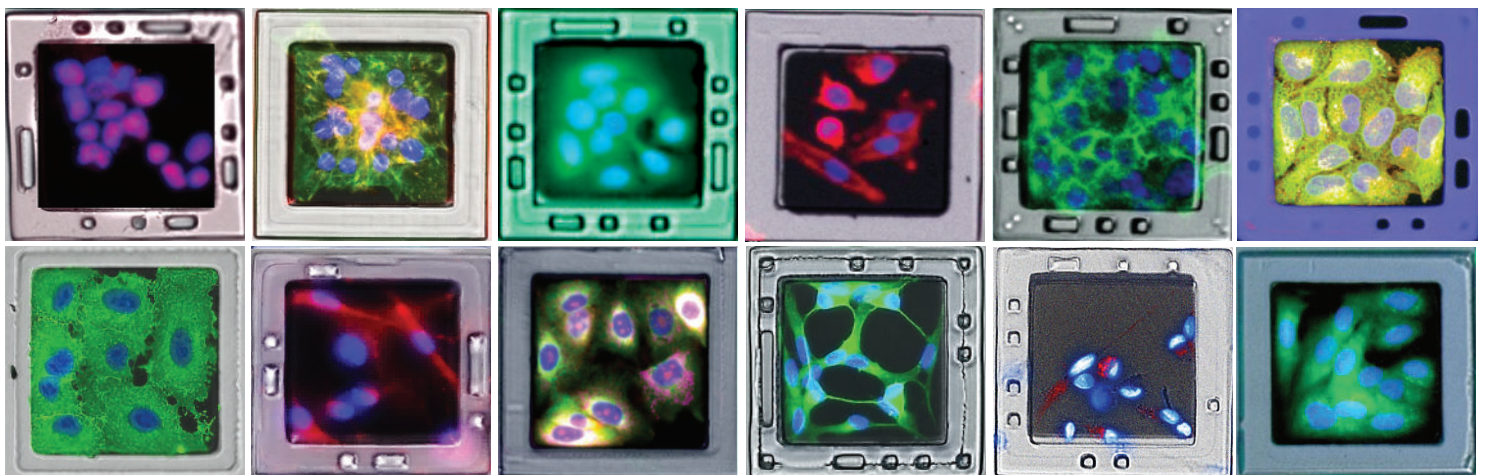
Produce better data faster from your existing tools and equipment.

SemaCyte® microcarriers plug into microplate workflows to boost data generation across drug discovery. They seamlessly integrate with your research infrastructure.

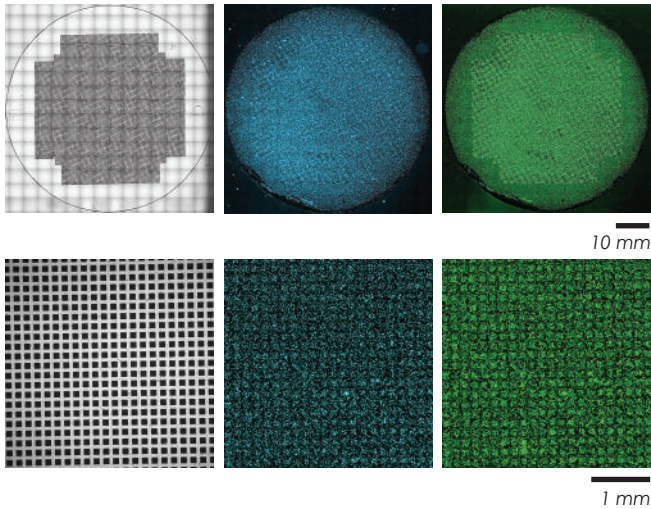


SemaCyte® microcarriers harmonize with various data analytics tools, assay types, read-out equipment, and lab automation tools, ensuring broad compatibility.

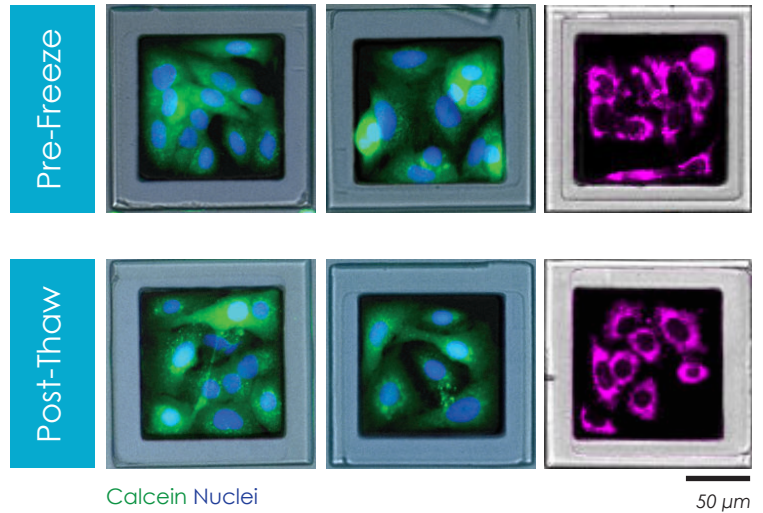
Validated across numerous cell models, including cell lines, patient-derived cells, and iPSC-derived cells.



SemaCytes Arrayed on SD20

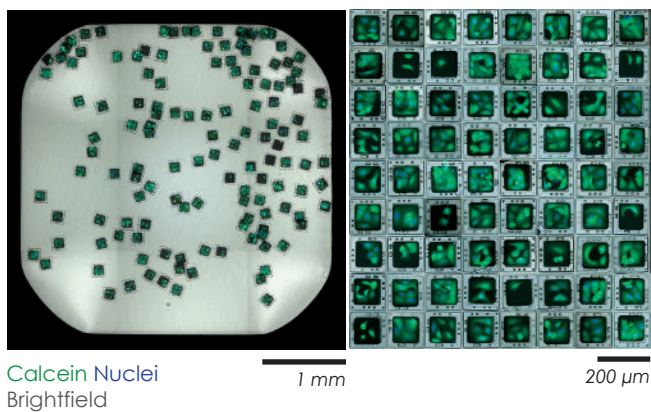


SemaCytes Frozen in Cryovials

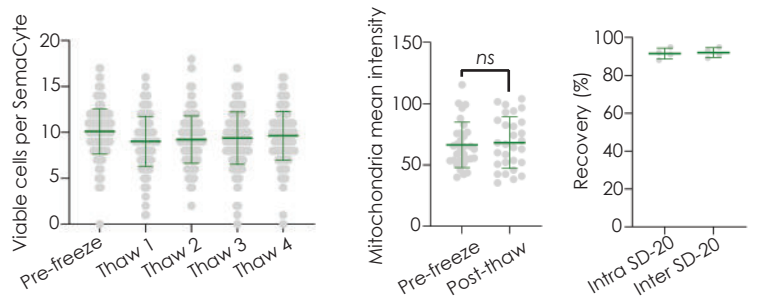


Calcein Nuclei
Mitochondrial Health
Brightfield

SemaCytes Dispensed into 384-Well

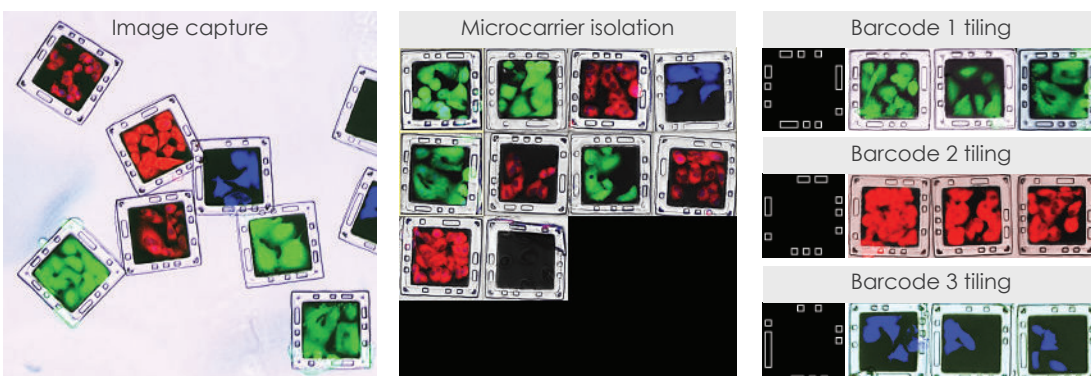


Calcein Nuclei
Brightfield



A549 pulmonary adenocarcinoma cells were seeded onto SemaCyte® SD20 Seeding Dishes at 40,000 cells/cm². After 24 hours, the SemaCytes were released into suspension, purified, and cryopreserved. Upon thawing, they were dispensed into 384-well plates at 150 microcarriers per well. Cells were stained with calcein AM, HCS NuclearMask Blue, and PhenoVue 64 to assess viability and health. Semalyse software isolated the microcarriers for downstream analysis using ImageJ and CellProfiler. Thawed A549 cells on SemaCytes retain their adherent morphology, achieve over 85% viability across vials, and maintain high mitochondrial integrity 1 hour post-thaw.

SemaCyte Barcode Deconvolution

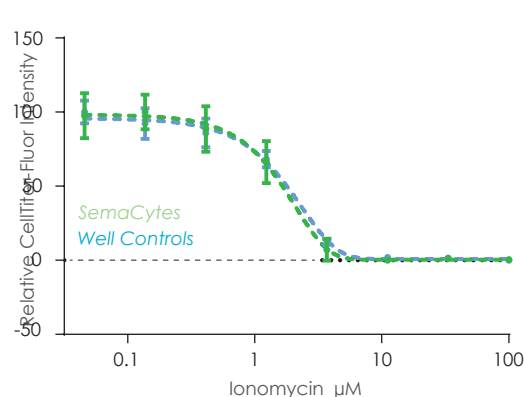


Barcode deconvolution is performed using Semalyse software or microscopy providers' built-in tools. The process involves identifying and isolating single microcarriers, decoding optical barcodes in the brightfield channel by matching them to a reference, and generating image sets for each barcode or cell type. These images can then be analysed using standard image processing workflows.

SemaCytes allow for dispensing of fewer cells per well, while retaining high local confluency. These microcarriers enable instant assay-ready cells where confluency and phenotype are retained during freezing and thawing in cryovials.

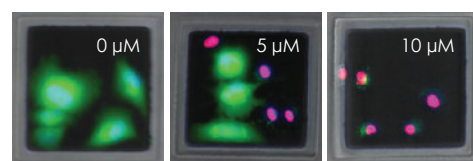
Below are examples of workflows with SemaCyte® Assay-Ready Cells compared to freshly plated cells.

Toxicity - 24 h Viability Assays



	Centre 1	Centre 2	Centre 3	
SemaCytes	2.21	3.15	1.67	IC50 (μM)
	0.89	0.57	0.51	Z-prime
Well Ctrl	2.26	3.15	1.82	IC50 (μM)
	0.76	0.83	0.76	Z-prime

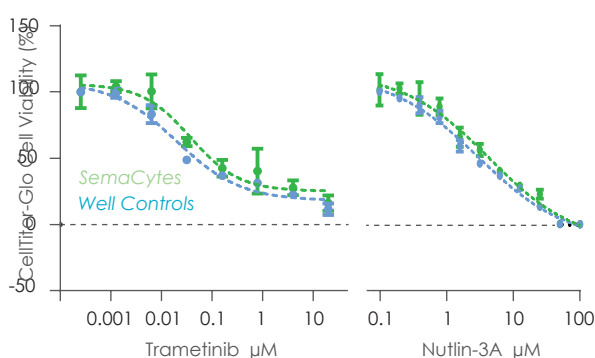
Assays performed by three research centres



Live (calcein AM) Dead (Ethidium)

Cell types: RCC-FG2 renal cells
Assay: CellTiter-Fluor™
Benefits: 2x faster data, 2x less cells

Drug Sensitivity - 72 h Proliferation Assays

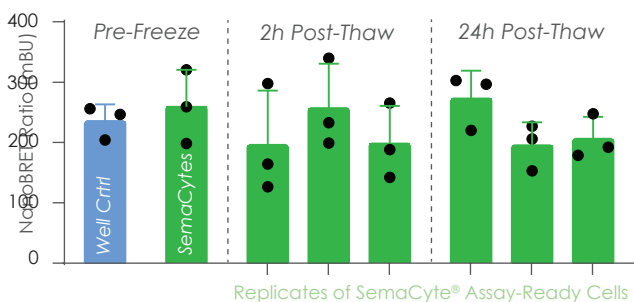


	Trametinib	Nutlin-3A	
SemaCytes	0.04	4.35	IC50 (μM)
	0.62	0.84	Z-prime
Well Ctrl	0.02	3.02	IC50 (μM)
	0.62	0.85	Z-prime

For timepoints of over 72h, the assay can be designed to let cells grow off SemaCytes onto the plate, akin to colony assays.

Cell types: A549 lung cancer cells
Assay: CellTiter-Glo™
Benefits: no 24h cell attachment

Protein-Protein Interaction - 3 h Mechanistic Assays



56% GFP
transfection
efficiency

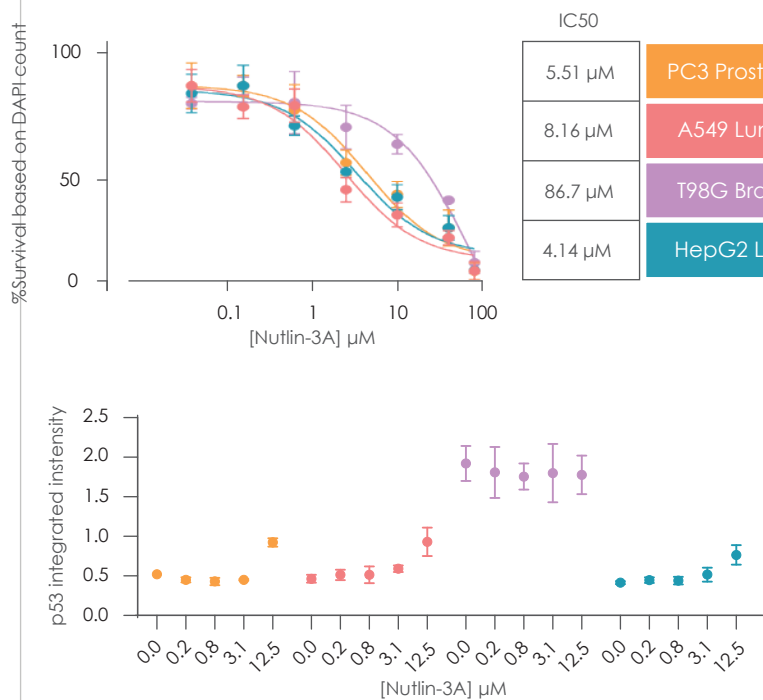
Cells were transfected using Lipofectamine 3,000 while attached to SemaCytes. After 48 h, microcarriers were aliquoted and batch frozen for on-demand deployment.

Cell types: A549 lung cancer cells
Assay: Live NanoBRET™
Benefits: 20x faster data, flexible

SemaCytes enable multiplexed high-content screening by allowing multiple cell types to be analysed in a single well. Their optical barcodes ensure distinct identification of each cell type, streamlining phenotypic analysis.

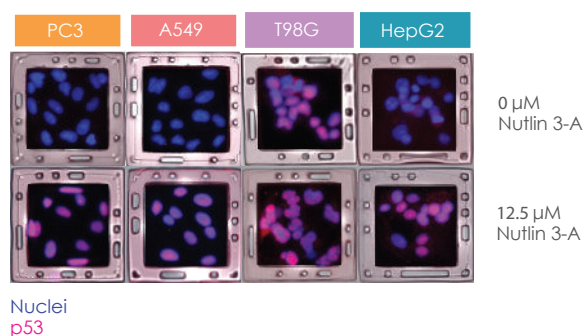
Below are examples of workflows with SemaCyte® Cell Multiplexing for high-content screening.

Drug Sensitivity - 72 h Proliferation & 16 h Mechanistic Assays

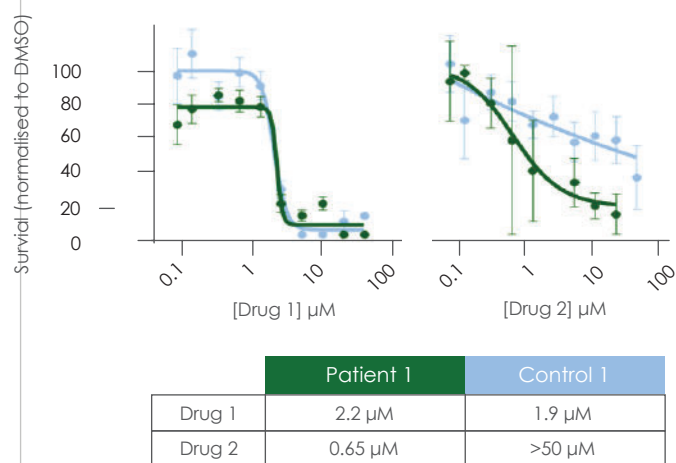


4 cell models were pooled together to measure differential drug sensitivity. p53 activation and cell viability were measured after 16 and 72 h, respectively.

Cell types: PC3, A549, T98G, HepG2
Assay: p53 & nuclear stain
Benefits: 4x less reagents, 3x faster



Drug Sensitivity - 72 h Proliferation

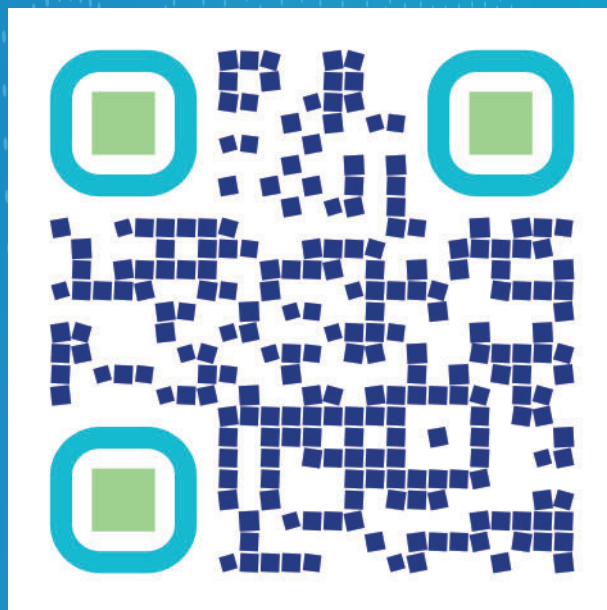


Neural stem cells from glioma patients and healthy controls were grown on laminin-coated SemaCyte® microcarries. They were pooled together and treated with a drug library.

Cell types: Glioma, Neural Stem Cells
Assay: p53 & nuclear stain
Benefits: 2x less reagents, 3x faster



Learn More About How We can
Enhance Your Assay Workflows



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