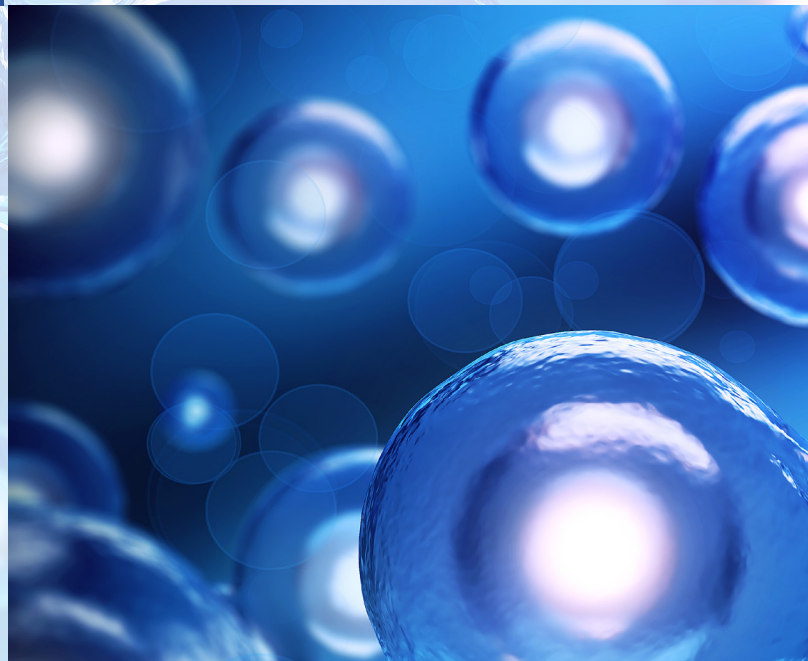
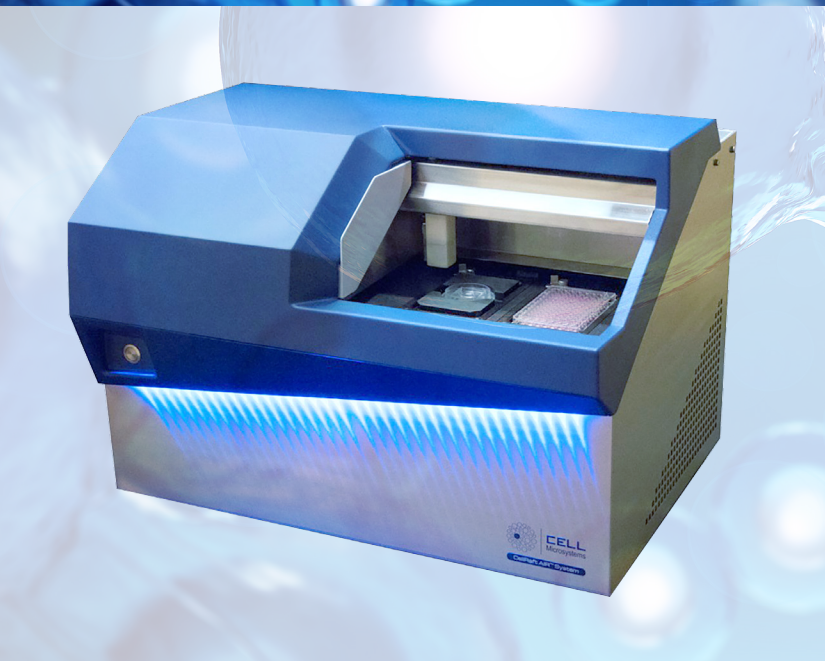
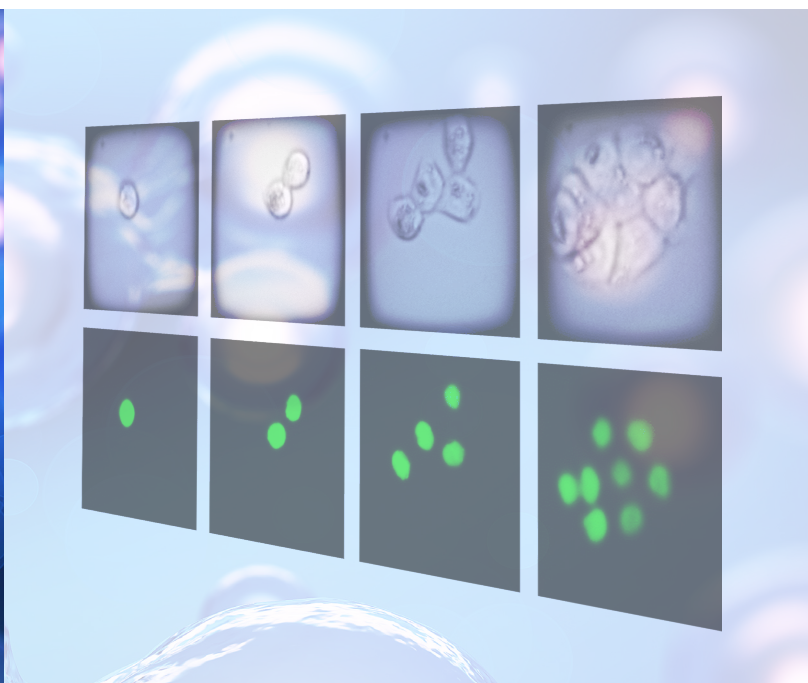
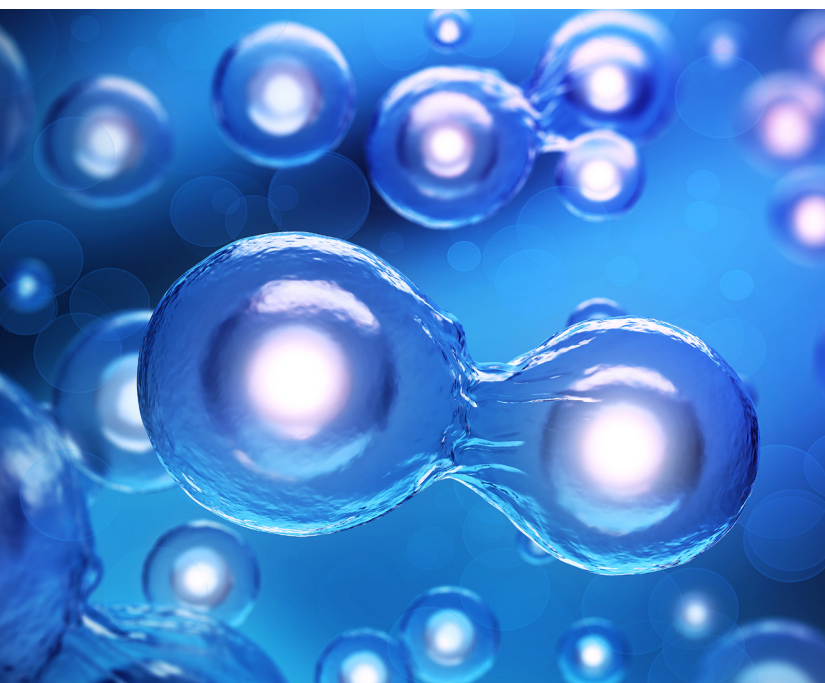


CELL
Microsystems®

CellRaft Technology



Sort cells and pick colonies on one instrument

Over 100 cell lines optimized

How We Sort and Isolate Cells with CellRaft Technology

With optimized protocols available for over 100 cell lines, the features of CellRaft Technology include:

- No fluidics are used in the system
- Single cells are maintained in shared media across microwells
- Monoclonal validation is supported by image-based analysis and records
- User-defined colonies of interest are automatically and gently isolated

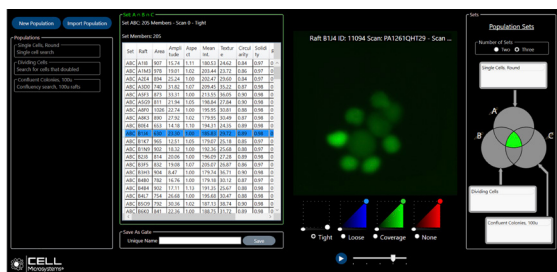
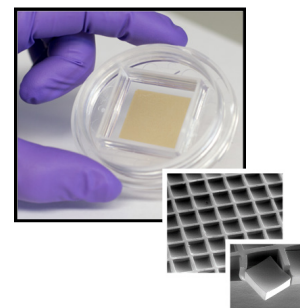
Overcome challenges with:

- Hard to grow cell lines
- Fragile stem cells
- Complex gene edits
- 3D Cell Culture
- Phenotype-linked genomics



1. Seed Cells on CellRaft Array

Seeding cells on the CellRaft Array is straightforward and comparable to seeding cells on any standard tissue culture dish. The dilute cell suspension is dispensed into the central reservoir, and cells settle into thousands of microwells by gravity. The CellRaft Arrays are designed to yield a high number of single cells with the added benefit of shared media in a flask-like environment to increase viability and monoclonal outgrowth.

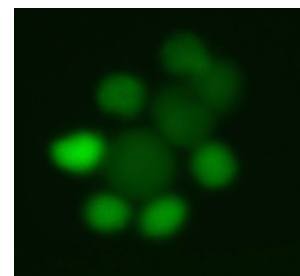


2. Image using the CellRaft AIR System

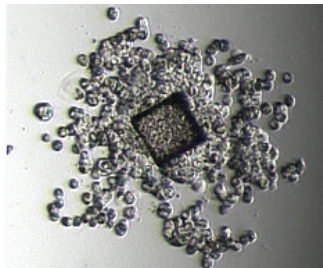
Brightfield and fluorescence scanning provides single-cell resolution imaging in as little as seven minutes. CellRafts can be scanned at different time points to identify samples of interest and create a record of growth from single cells.

3. Identify Colonies of Interest.

CellRaft Cytometry™ software allows for image-based verification of single cells to ensure monoclonality. Users can easily define the characteristics of the target cells or colonies using a variety of phenotypic parameters and map them for software-guided isolation.



4. Automated Isolation

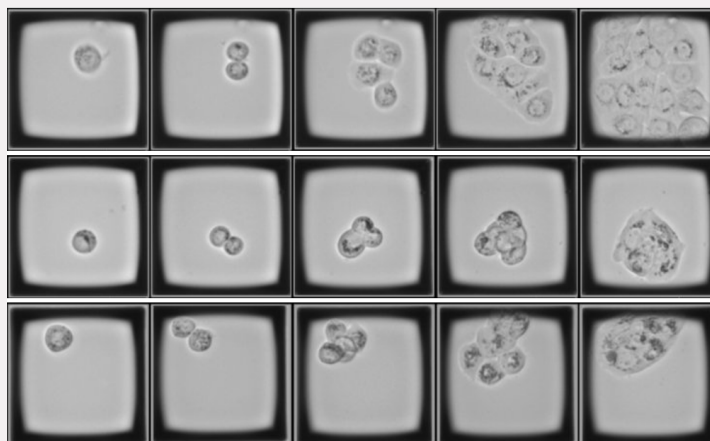


After identification, the CellRafts are gently dislodged from the CellRaft Array and retrieved from the array to transfer the CellRafts into 96-well plates for downstream analysis.

The fully automated CellRaft AIR System enables gentle, dissociation-free isolation of fully validated, intact clones for propagation **without the use of fluidics**.

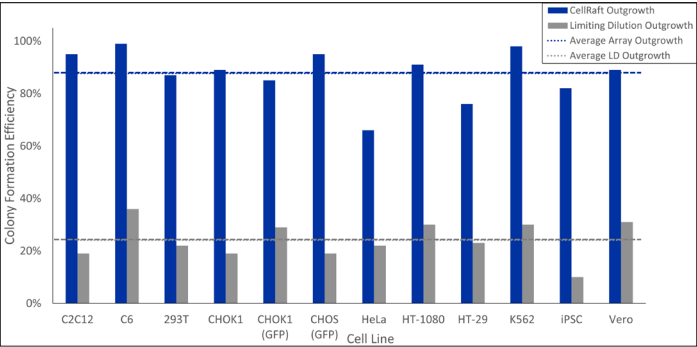
Image-based Proof of Monoclonality

Time-course imaging is a key feature of the CellRaft AIR System. After cells are seeded on the CellRaft Array, the array is serially scanned to capture complete growth records of clonal development.



Isolate Monoclonal Colonies Instead of Single Cells

Isolating colonies rather than single cells leads to successful cell line development, even for the most challenging or fragile cell lines. Using CellRaft Technology, we are able to open up the possibilities for clonal cell line development using an expansive range of cell types, including many that have been challenging for single cell culture with other methodologies.



CellRaft Array Improves Colony Growth Compared to Limiting Dilution. Isolated single cell colonies from CellRafts had a mean colony formation efficiency of **88%** in comparison to Limiting Dilution which had 24% colony growth.

Comparison of Clonal Outgrowth

Cell Line	Limiting Dilution	Cells Per CellRaft at Isolation			
		1	2	4	>4
iPSCs	10%	10%	20%	87%	98%
AHER2	ND	12%	18%	21%	34%
HT-1080	30%	22%	47%	96%	96%
HEK293T	12%	44%	64%	79%	98%
CHO-K1	9%	70%	87%	98%	99%
AVERAGE	17%	32%	47%	76%	85%

Monoclonal cell lines were derived from five different cell types using either limiting dilution or the CellRaft AIR. CellRafts with cells at the single cell-, two cell-, four cell-, and colony-stage of single cell expansion were isolated into 96-well collection plates on consecutive days. For the limiting dilution comparison, cells were seeded into 96-well plates to achieve approximately 0.5 - 1.0 cell per well. Each plate was visually examined using brightfield microscopy to monitor colony growth. Across all lines tested, the average formation of colonies from limiting dilution was 17%. However, when CellRafts with single cell derived colonies were isolated (rather than single cells), the average colony outgrowth increased up to 85%.

Save Time and Reduce the Cost per Clone

Experimental and cost analyses including hands-on time to run the protocol between limiting dilution and CellRaft Technology indicate that the latter delivers a high return on investment in terms of outgrowth efficiency, time, and cost.

Economic Advantage of CellRaft Technology vs. Limiting Dilution											
		Limiting Dilution					CellRaft Technology				
			100 Clones		500 Clones			100 Clones		500 Clones	
Cell Line	Representative Examples	Outgrowth Efficiency	Total Cost (USD)	Hands On Time (hours)	Total Cost (USD)	Hands On Time (hours)	Outgrowth Efficiency	Total Cost (USD)	Hands On Time (hours)	Total Cost (USD)	Hands On Time (hours)
Production	CHOK1; HEK293	9.4% to 30%	\$150-\$446	4 to 12	\$670-\$2086	18 to 56	96%	\$75	0.6	\$225	1.2
Standard	HeLa; C2C12; VERO	2.9% to 22%	\$187-\$1341	5 to 36	\$894-\$6075	24 to 180	66 to 90%	\$75	0.6	\$224-\$299	1.2-1.6
Cancer	HT-1080; HT-29; K562; C6	4.7% to 30%	\$150-\$900	4 to 23	\$670-\$4134	18 to 111	75 to 100%	\$75	0.6	\$224-\$261	1.2-1.4
Stem	KYOU	5%	\$1480	21	\$7409	105	96%	\$150	0.6	\$433	1.2

Side by side comparison to determine the savings in plastic, reagent, and media cost during the production of either 100 or 500 clones from Limiting Dilution versus CellRaft Technology. *Outgrowth efficiency is used to measure the number of colonies obtained from single cell deposits.

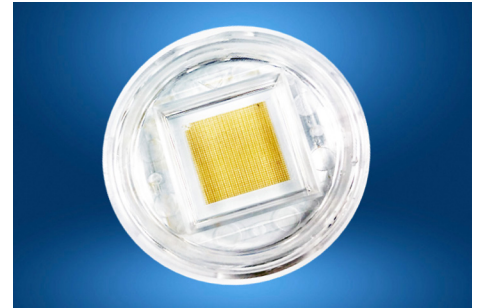
CellRaft® Arrays

CellRaft Single Array

Sizes:

100 x 100 microns microwells - 40k CellRafts Per Array

200 x 200 microns microwells - 10k CellRafts Per Array



CellRaft Quad Array

Sizes:

100 x 100 microns microwells - 25,600 CellRafts Per Array (6.4k per reservoir)

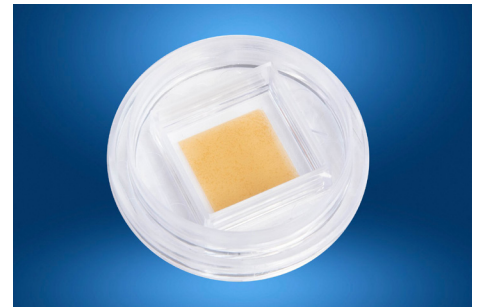
200 x 200 microns microwells - 6,400 CellRafts Per Array (1.6k per reservoir)



3D Cell Culture CellRaft Array

Size:

500 x 500 microns microwells - 2,114 CellRafts Per Array



Lab Services for Cell Line and Organoid Development

We offer lab services using CellRaft Technology to generate clonal cell lines or organoids in weeks, not months. Due to CellRaft Technology's efficiency, we can offer services for less than traditional cell line development organizations.



System Specifications

IMAGING

Fluorescence excitation-emission specifications

Channel	Representative Dyes	Excitation	Emission
Blue	DAPI, Hoechst	379 – 401 nm	412 – 453 nm
Green	FITC, GFP	461 – 489 nm	498 – 548 nm
Red	mCherry, Texas Red	559 – 591 nm	603 – 805 nm

SPECIFICATIONS

Size	20” High, 20” Deep, 27” Wide
Weight	125 lbs
Magnification	1.2 x 1.4 mm field of view 0.57 µm/pixel*
Computer and Monitor	Included
Data Storage	1 TB on computer, 0.5 TB external USB drive, network capable (ethernet, wi-fi)
Stage Top Incubator	Optional
Power	125/250 VAC, 10A, 60/50 Hz
Certification	ISO 61010, FCC emissions, CE Mark

What Customers Are Saying...

“The system is great for difficult-to-clone cell lines and has powerful imaging technology to help with our cell engineering assays.”

Jillian Pattison, Senior Scientific Researcher, Genentech

“We employed the CellRaft Technology to help isolate clones derived from verified single cells in a cell line that was very difficult to clone by regular limiting dilution. It worked beautifully, producing clones with sequencing-verified distinct genotypes quite easily. This technology is definitely a big advance for anyone trying to isolate clones from single cells!!”

W. Brian Dalton, M.D., Ph.D., Asst. Professor of Oncology, Johns Hopkins Sidney Kimmel Comprehensive Cancer Center.

