

# BioLevigator™



3D Cell Culture Simplified



**HAMILTON**   
THE MEASURE OF EXCELLENCE™

# Hamilton - Innovations for the Life Sciences

## Innovations based on 50 years of experience

Hamilton has delivered quality products to the Life Sciences for more than 50 years, including products such as syringes, laboratory devices, sensors and automation platforms. In addition, Hamilton is a leading worldwide supplier of precise liquid handling devices, laboratory automation and storage system, serving customers in academic research laboratories, pharmaceutical and clinical diagnostics companies and hospitals.

In the field of cell culture, Hamilton CellHOST provides researchers with a complete automated cell culture solution validated for many cell types and for complex applications, including the culture of human embryonic stem cells. Hamilton has also recently joined forces with Global Cell Solutions to develop and deploy automated 3D cell culture globally. Bearing fruit of this collaboration, the BioLevigator™ brings the engineering and automation expertise of Hamilton together with Global Cell Solutions' unique approach to cell culture. The BioLevigator™ is the first 3D benchtop cell culture system delivering significant productivity gains to researchers in Life Sciences.



## What is the BioLevigator™?

The BioLevigator is a benchtop incubator and bioreactor hybrid capable of handling four independent and high density 3D cell cultures. It eliminates peripheral instruments, such as incubators and centrifuges, and minimizes manual handling. The BioLevigator™ utilizes the magnetic Global Eukaryotic Microcarrier (GEM™) technology from Global Cell Solutions, and integrates the relevance of 3D cell culture to the convenience of microcarrier culture.

## The BioLevigator™ is ideal for:

- Culturing difficult cells, e.g. primary and stem cells
- Revolutionizing your cell culture workflow
- Providing better cellular models for cell-based applications
- Improving consistency of cell-based assays
- Scaling-up to the drug discovery process

Convenient  
process



Relevant  
cells

Consistent  
results

# Global Eukaryotic Microcarrier: GEM™

## Why GEM™?

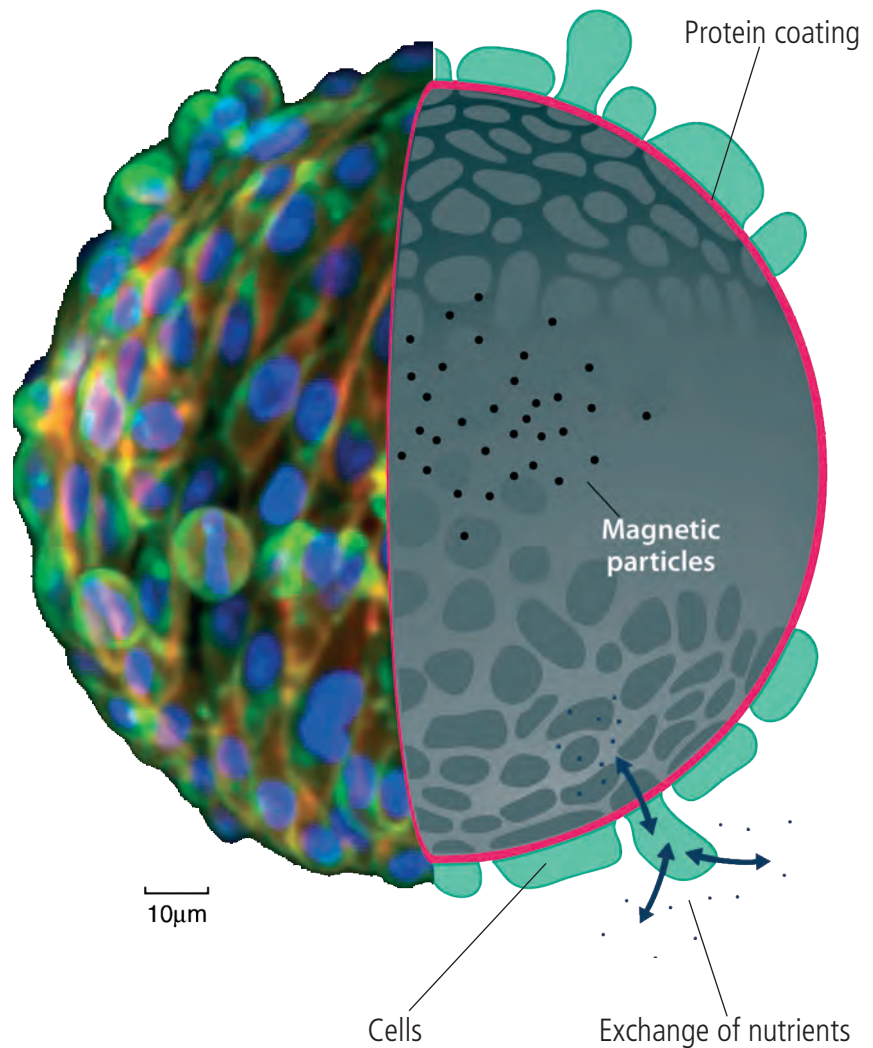
The GEM™ is designed to maintain the unique in vivo phenotype of your favourite cell line while providing a vehicle for culture transport through the drug discovery process. The GEM™ substrate supports high-density cell culture in the BioLevigator™. As a magnetic microcarrier, the GEM™ can be controlled during medium exchange and culture harvesting.

## Non-autofluorescent substrate

The GEM™ is optically clear and non-autofluorescent, allowing for 3D projection imaging, absorbance and luminescence assays directly on the microcarrier.

## Surface Area

The GEM™ has a diameter of 75 - 150 µm, providing a curved 3D surface and allowing for trouble-free pipetting. The small diameter also maximizes surface area to volume ratio enabling large-scale culture in a compact footprint.



GLOBAL CELL  
SOLUTIONS

## Working with GEMs™ and the Biolevitator™

### 1 Inoculation

#### Alginate Core

The GEM™ is composed of an alginate core which is compressible and porous. This enhances cell polarity and increases *in vivo*-like metabolism.

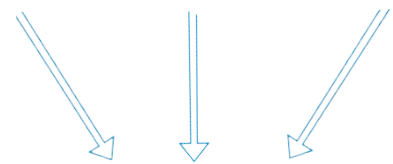
#### Protein coating

The GEM™ is uniquely coated with a thin molecular layer of gelatin to create a culture surface suitable for a wide range of cell types. Additional coatings such as laminin are employed for attachment of unique cell types, such as primary and stem cells.

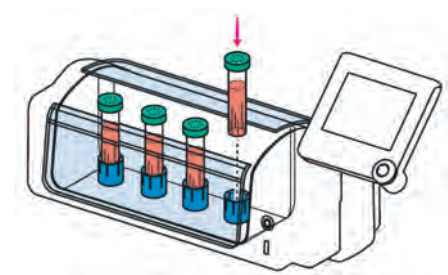
#### Magnetic particles

Magnetic particles within the alginate core simplify culture and assay procedures. The GEM™ can be gently homogenised, and easily maneuvered during media change and culture collection.

GEMs      6x10<sup>6</sup> cells      Conditioned media



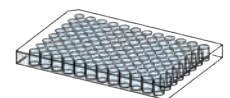
### 2 Culture



### 3 Applications



Cell harvesting

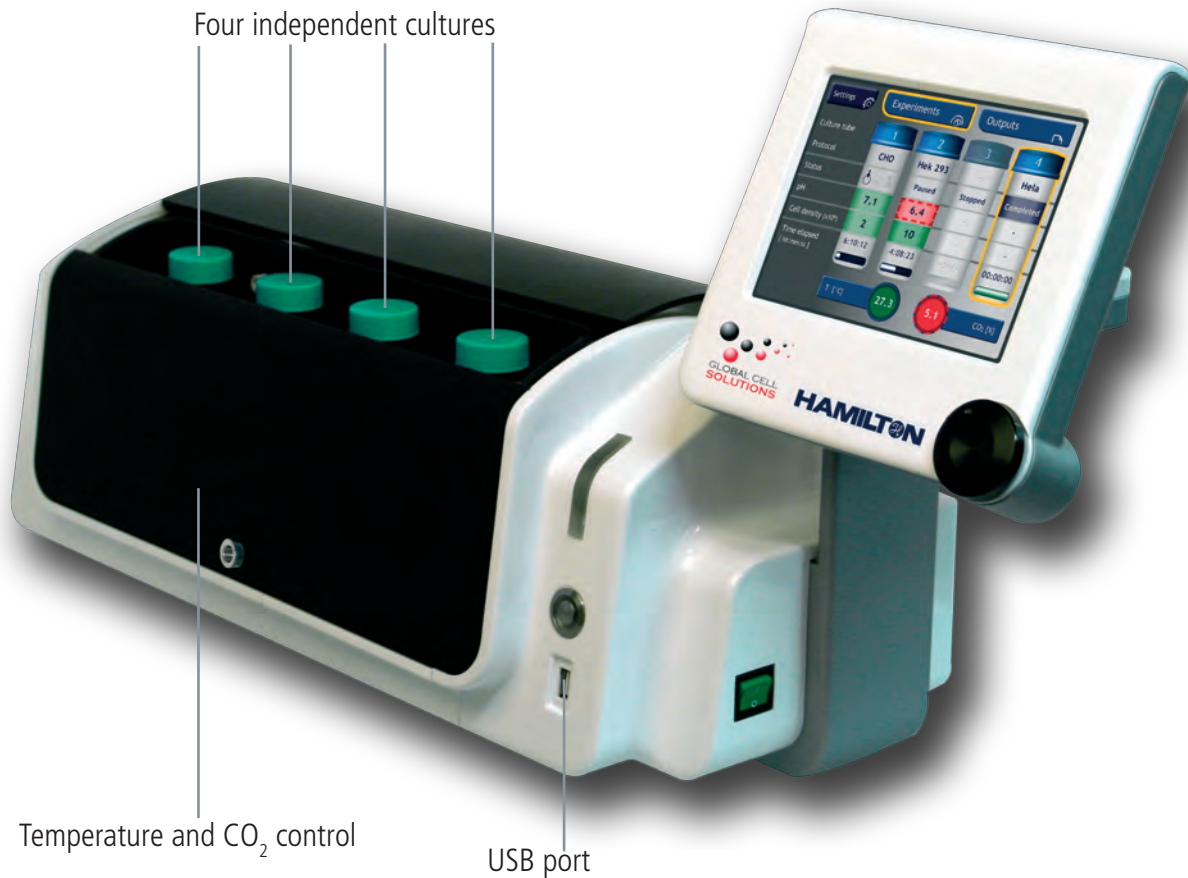


GEM™ dispensing

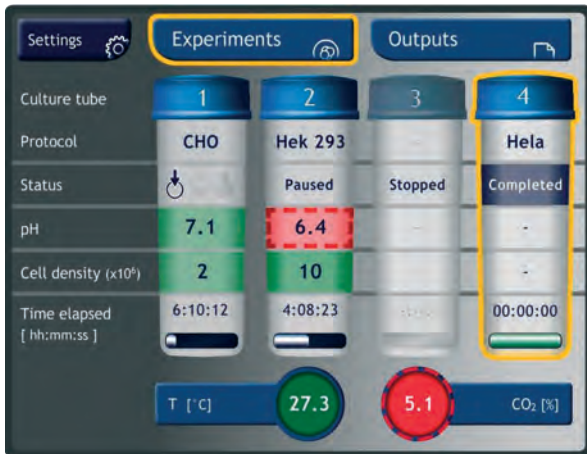
# BioLevigator™

## Why the BioLevigator™?

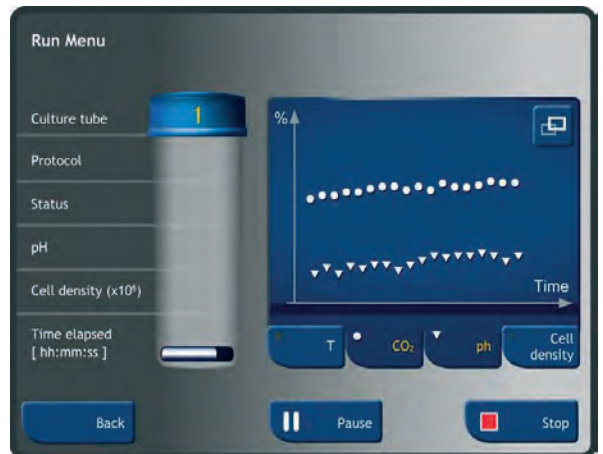
The BioLevigator™ is a scalable cell culture system that integrates the relevance of 3D cell culture to a streamlined culture process. As a walk-away benchtop device, the BioLevigator™ allows focusing on value-added research and discovery rather than cell culture.



## User-friendly software



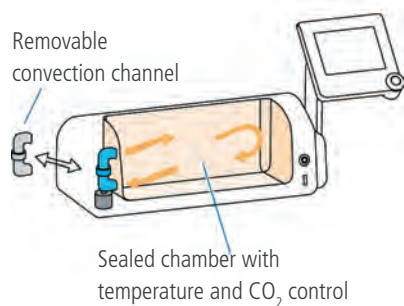
Main menu



Run menu

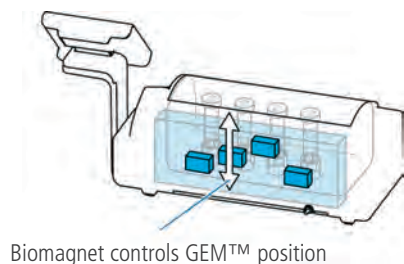
- **Controlled culture environment**

The sealed miniaturized incubator with its convection channel maintains a controlled and homogenous environment.



- **Facilitated handling**

The integrated BioMagnet™ easily manipulates the GEMs™ during medium exchange or culture collection for both manual and automated handling due to its magnetic properties.



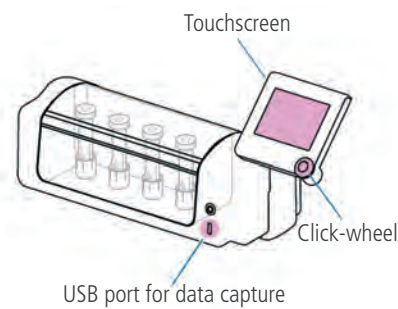
- **Environment friendly**

The BioLevigator™ allows you to drastically reduce plastic consumables used (up to 90%). On average, one LeviTube™ supports the expansion of as many cells as ten T75 flasks.



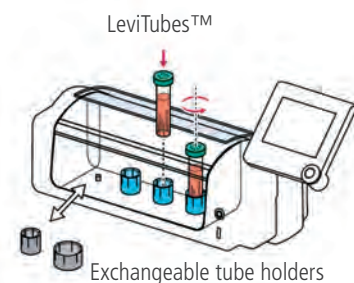
- **Intuitive user interface**

The touch-screen interface provides users with an intuitive and easy to program cell culture workflows. In addition, the ergonomic click-wheel allows for quick navigation and data collection.



- **Control of the cell suspension**

The LeviTube™ has been designed to gently homogenise the cell suspension in the BioLevigator™.



- **Increased walk-away time**

The BioLevigator™ is able to reduce your activities maintaining cell cultures, which allows for more focus on value-added research and discoveries.

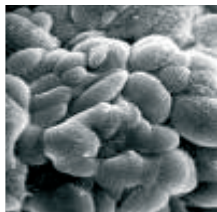


# Applications

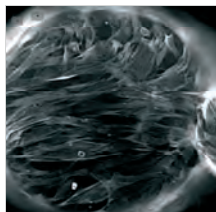
## Culturing difficult cells

A wide variety of cells have been cultured in the BioLevigator™, including primary cells and stem cells.

### Primary and stem cells

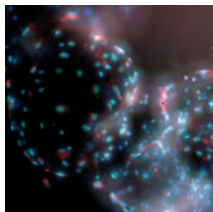


Primary human proximal tubule

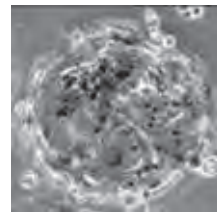


Adipose stem cell

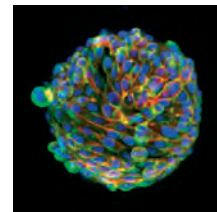
### Established cell lines



HUVEC

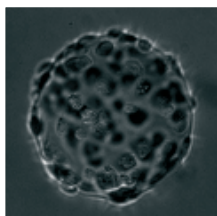


Hek 293

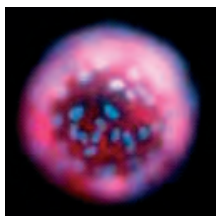


CHO

### Cancer cells

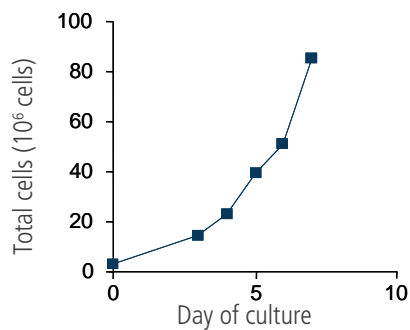


Prostate cancer cell (PC3)



Bladder cancer cells (T24)

### Typical growth (CHO)



3 Million CHO cells were loaded on 1mL GEM™, in 35 mL culture volume

## Revolutionizing your cell culture workflow

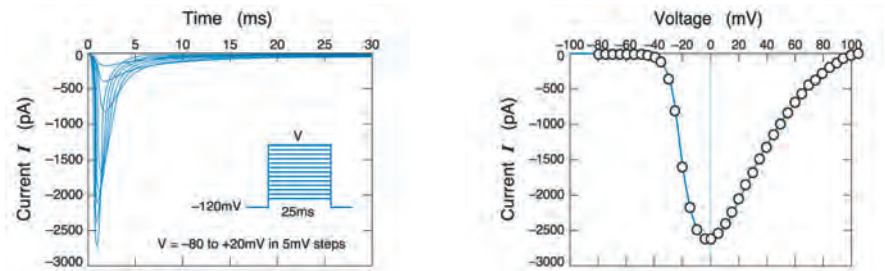
The BioLevigator™ supports all stages of the cell culture process and enables all biologists to streamline their cell culture workflow. In addition, the GEMs™ are compatible with many downstream applications and support further streamlining of cell culture to assays.



## Providing better cellular models to cell-based applications

The BioLevigator provides cells that emulates *in vivo* physiologic and biochemical responses. Cells grown on GEMs™ express better 3D structure. In addition assaying cells directly on GEM™ substrate eliminate the stress of enzymatic harvest. For example, it is possible to measure cellular voltage via patch clamp techniques with the cells attached to the GEM™.

Patch clamp recording of a HEK293 cell attached to a GEM™



## Scaling up through the drug discovery process

The liquid phase cell culture is easy to scale-up from research needs to high throughput requirements.



Pipette and GEMs™



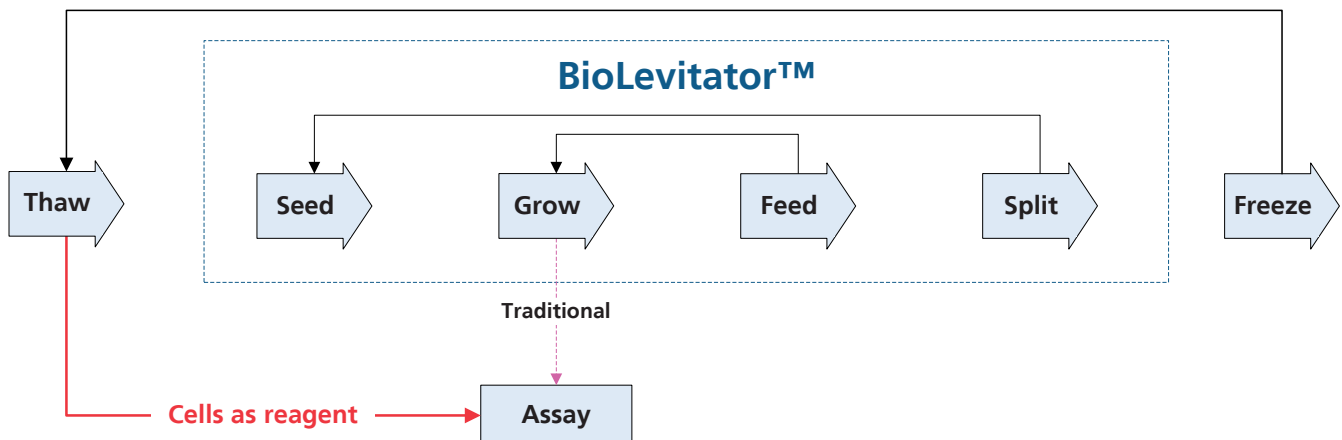
BioLevigator™



3D CellHost™

## Improving consistency of cell-based assays

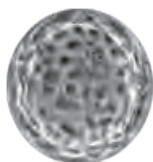
"Cells as reagents" is best understood as the uncoupling of the cell culture from downstream applications. In this paradigm, cells grown in the BioLevigator™ and frozen on the GEM™ are brought from a cryopreserved state directly into the application, on demand. In addition, using cells as reagents enable researchers to increase results consistency and multi-site reliability.



# Technical Specifications



BioLevigator™		
<b>Temperature</b>	Range	Ambient + 5°C to 45 °C
	Control	± 0.1 °C
<b>CO<sub>2</sub></b>	Laboratory-grade infrared sensor	
	Range	0 - 18 %
	Control	± 0.1 %
<b>Culture Chamber</b>	Capacity	4 x 50 mL LeviTube™
	Maintenance	Spray-wipe with laboratory grade disinfectants
<b>Communication</b>	Ethernet, RS232 and USB	
<b>Hardware</b>	Instrument Dimensions (L x H x D)	740 x 325 x 245 mm (29.1 x 12.8 x 9.6 in)
	Weight	14 kg (30.9 lb)



GEMs™		
<b>Size</b>	Diameter	75 - 150 µm
	Approximate surface area	170 cm <sup>2</sup> / mL of GEM™ at 50% slurry
<b>Core composition</b>	Alginate core	
	Magnetic particles	
	Coating	gelatin, additional coatings on request
<b>Storage conditions</b>	Storage buffer	2.5 mM CaCl <sub>2</sub> and 10 mM HEPES
	Temperature	4 °C

# Ordering information

## HAMILTON products

Product name	Description	Order number
BioLevigator (benchtop)	Integrated benchtop device for 3D cell culture	195 200
BioLevigator cell culture tube	48 cell culture tubes designed for 3D cell culture	195 281

## GCS products

Product name	Description	Order number
Early experiment kit	For manual culture of cells on GEM™	GKT-002
Early experiment kit refill	For manual culture of cells on GEM™	GKT-002R
3-D cell culture kit	Monthly supply for 3D culture in the BioLevigator™	GKT-3000
OQ kit	Operational qualification kit	GKT-2000
Global Eukaryotic Microcarriers (GEM™)	4 x 2 mL GEM™	GEM-3034
BioMagnet	For GEM™ suspension in Petri dish	GMM-1001
CubeMagnet	For handling GEM™ during media change	GMM-1002

Further products can be ordered at Global Cell Solutions, [www.globalcellsolutions.com](http://www.globalcellsolutions.com).



**HAMILTON**  
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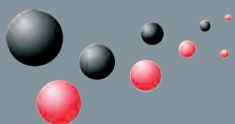
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