

Picodroplet Single Cell Assay and Isolation System



Key Features

- Semi-automated, modular system for analysis of single cells or biomolecules in picodroplets.
- High-speed processing, detection and sorting of picodroplets (up to 12,000 per minute).
- Enables sensitive detection of secreted proteins (*e.g.* antibodies, growth factors, cytokines, enzymes, *etc.*).
- User-defined microfluidic flow rates.
- Range of optical detection methods (fluorescence, luminescence and scatter).
- Wide range of picodroplet sizes and volumes.



Figure 1: Pico-Gen™ biochip for picodroplet generation.

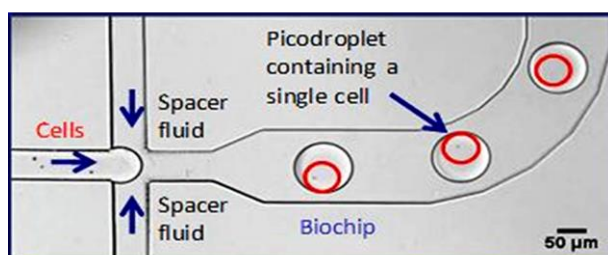


Figure 2: Production of picodroplets containing single cells.



Figure 3: Novel biocompatible surfactants (Pico-Surf™) stabilise picodroplets for many days.

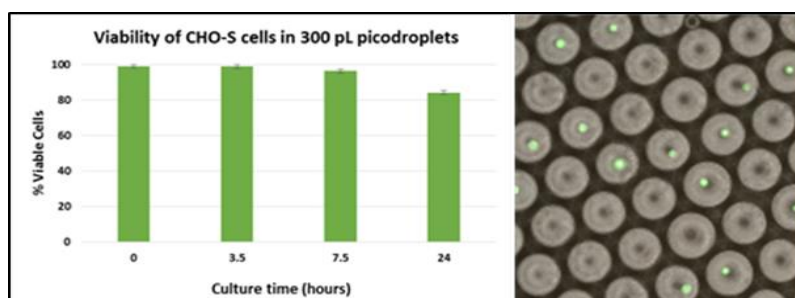


Figure 4: Viability of CHO-S cells in picodroplets incubated over a 24 hour period.

Example Applications

Biopharmaceutical discovery:

Antibody (transcript) discovery from primary plasma cells, B-cells or hybridomas.

Bioprocessing:

Rapidly identify and isolate high expressing clones.

Diagnostics:

Detect and assay circulating tumour and other disease-related cells.

Drug-resistance studies:

Identify and isolate rare drug-resistant cells from large microbial or cancer cell populations.

Enzyme evolution:

Screen millions of enzyme constructs to select the most efficient variant.

Synthetic biology:

Study vast numbers of valuable molecules produced by libraries of engineered microbes.

NOTE: This system is for research applications only

SPECIFICATIONS	
Sample input format	Syringe pumps
Sample input volume	50 µL – 1 mL
Workflows	Picodroplet fusion, assay and sorting
Detection system	Laser-induced fluorescence (e.g. autofluorescence, fluorophores, FRET), luminescence and scatter
Throughput	100 - 1,000 picodroplets per second (picodroplet volume of 700 pL)
OPERATING CONDITIONS	
Continuous oil phase	50 µL/hr - 2000 µL/hr
Aqueous phase	5 µL/hr - 2000 µL/hr
Picodroplet volumes	0.2 pL - 1.7 nL
Picodroplet production rate	60 – 70,000 per second
SYSTEM SPECIFICATIONS	
Biochip compatibility	Pico-Gen™, Pico-Fuse™ and Pico-Sort™ biochips (these both require a Sphere Fluidics' Pico-Safe™ biochip holder). Contact us regarding use with other biochips
Weight (approx.)	150 kg (330 lbs)
Dimensions (approx.)	230 cm x 170 cm x 80 cm (width x height x depth)
Voltage [frequency]	110 V (min) to 240 V (max) [@ 50 Hz / 60 Hz]
Consumption	500 W (max)
OPTICS	
Laser Excitation Wavelengths	491 nm (additional lasers available for purchase – e.g. 405 nm, 561 nm, 635 nm)
Detection Filters	FITC (additional filters available for purchase, e.g. DAPI, Cy3, Cy5)
Detection Wavelengths	Filter-dependent
PMT Spectral Sensitivity	230 nm – 920 nm
Camera	High-speed CMOS (640 pixels x 480 pixels) (1,240 fps at full resolution, up to 105,200 fps at reduced resolution)
Camera Spectral Sensitivity	400 nm – 900 nm
PC	
Computer	Dell Optiplex 7020 (8 GB RAM; 500 GB hard drive) or equivalent
PC Operating System	Microsoft Windows 7 Professional SP1
Monitor	Colour LCD (21")
External connections	4 USB; 1 Ethernet
System Control Software	Sphere Fluidics' Picodroplet Single Cell Assay System Control Software (LabVIEW™), neMESYS pump software, Mikrotron MotionBLITZ Camera software
Data Format	.txt (ASCII text file)
WORK ENVIRONMENT	
Clearance	30 cm
Operating Temperature	21°C ± 5°C
Site preparation	See our Picodroplet SCA and Isolation System Site Requirements Guide
SPHERE FLUIDICS' CONSUMABLES	
Microfluidic biochips	*Pico-Gen™ picodroplet production biochips Pico-Fuse™ picodroplet fusion biochips (available directly from Sphere Fluidics) Pico-Sort™ picodroplet sorting biochips (available directly from Sphere Fluidics)
Specialist chemicals*	*Pico-Surf™ surfactants for high quality and stable picodroplet formation *Pico-Glide™ enables lower non-specific binding and improved microfluidic flows *Pico-Break™ for rapid separation of cells or molecules from picodroplets

Ordering Information	
Description	Part number
Picodroplet Single Cell Assay and Isolation System	SF-2014-200
Picodroplet Single Cell Assay and Isolation System Installation	SF-2014-200i
Picodroplet Single Cell Assay and Isolation System (1 year) Warranty	SF-2014-200w