

spheroONE

Automated sorting and isolation of
single spheroids and organoids



About spheroONE

spheroONE is an innovative single large-particle sorter and dispenser which revolutionizes 3D cellular models handling. Using precision dispensing technology together with advanced image-based sorting capabilities, **spheroONE** is the perfect platform for the selection and isolation of single spheroids, organoids and tumoroids. It is a game-changer in drug screening and other applications where standard 3D models will gradually replace traditional animal models.



spheroONE enables

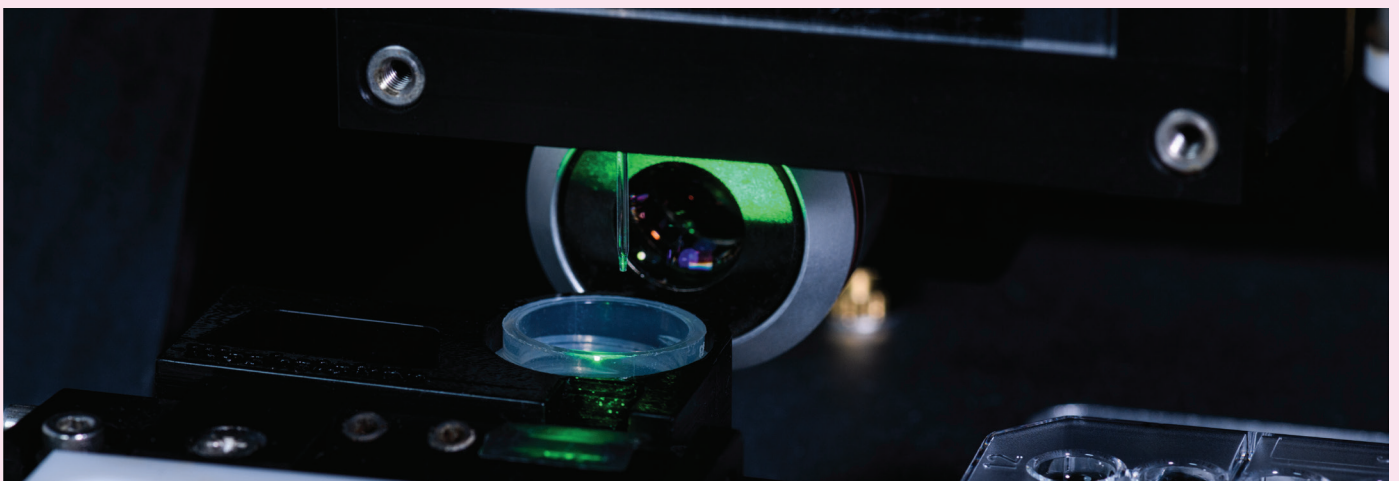
- Automated sorting and isolation of single large biological objects like spheroids, organoids and tumoroids
- Drug screening on spheroids grown in bulk, reducing labour
- Controlled biomass via user-defined number and size of spheroids per well, allowing high quality cytotoxicological assays
- Standardized 3D model-based assays

Benefits

Automated cellular aggregates sorting and dispensing

ACCURACY & HOMOGENEITY

- Up to 100% single spheroid accuracy
- Biomass per well under precise control:
 - User-defined number of spheroids per well
 - Select only the cellular aggregates of interest by setting isolation parameters based on morphology (size, shape)

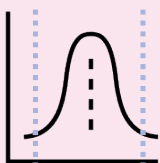


VERSATILITY

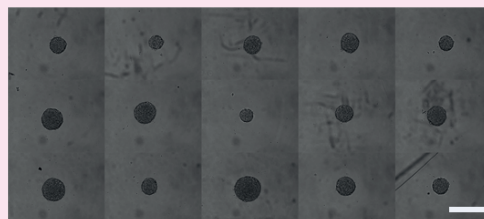
- Any cellular aggregate from 50 - 600 μm in diameter
- Open-platform, compatible with both standard well plates (i.e. 96-, 384-) and custom-designed labware
- Non-dispensed cellular aggregates can be reprocessed on account of recovery tube
- Low volume, nL to μL drop-on-demand reagent or drug dispensing
- Temperature control of target labwares enables dispensing organoids into plates pre-filled with ECM (e.g. Matrigel®)

STANDARDIZATION

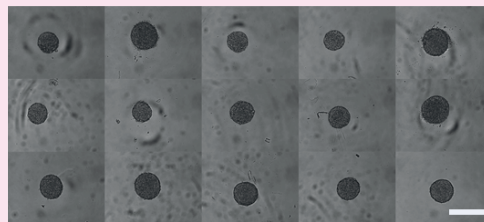
Size gating



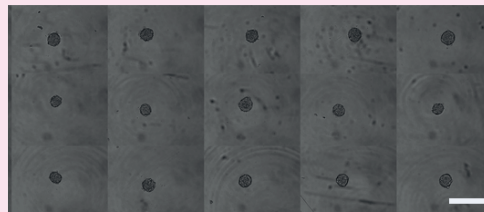
100-500 μm , $E < 1,5$



350-500 μm , $E < 1,5$



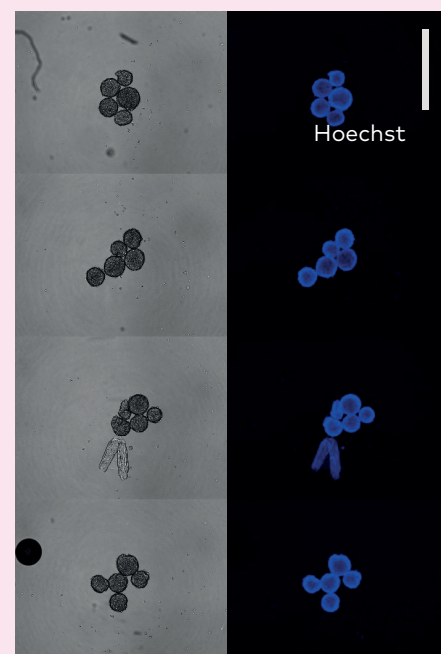
200-250 μm , $E < 1,5$



Single spheroids sorting by size

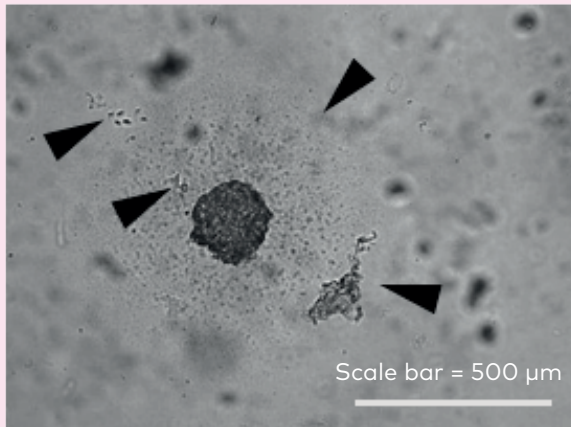
Scale bar = 500 μm

CONTROLLED BIOMASS



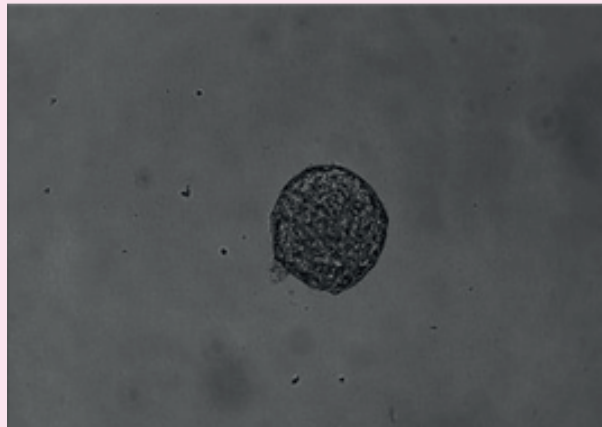
Individually sorted
spheroids (5 spheroids per well).

CONVENTIONAL



Cell suspension aggregated in U-bottom well

spheroONE



Spheroid isolated with spheroONE

Pre-straining spheroids allows removal of cellular debris (black arrows) leading to clean suspension, therefore enhancing homogeneity and reproducibility for unbiased assay results

ASSAY QUALITY

- Remove any debris to facilitate imaging and improve drug screening results
- Select homogeneous spheroids/organoids to improve assay reliability (higher Z' scores)

TIME AND COST SAVINGS

- Reduce costs and labour by preparing spheroids in bulk
- Minimize reagent consumption

VIABILITY

- Maintains integrity and viability of fragile cellular aggregates (e.g. organoids)



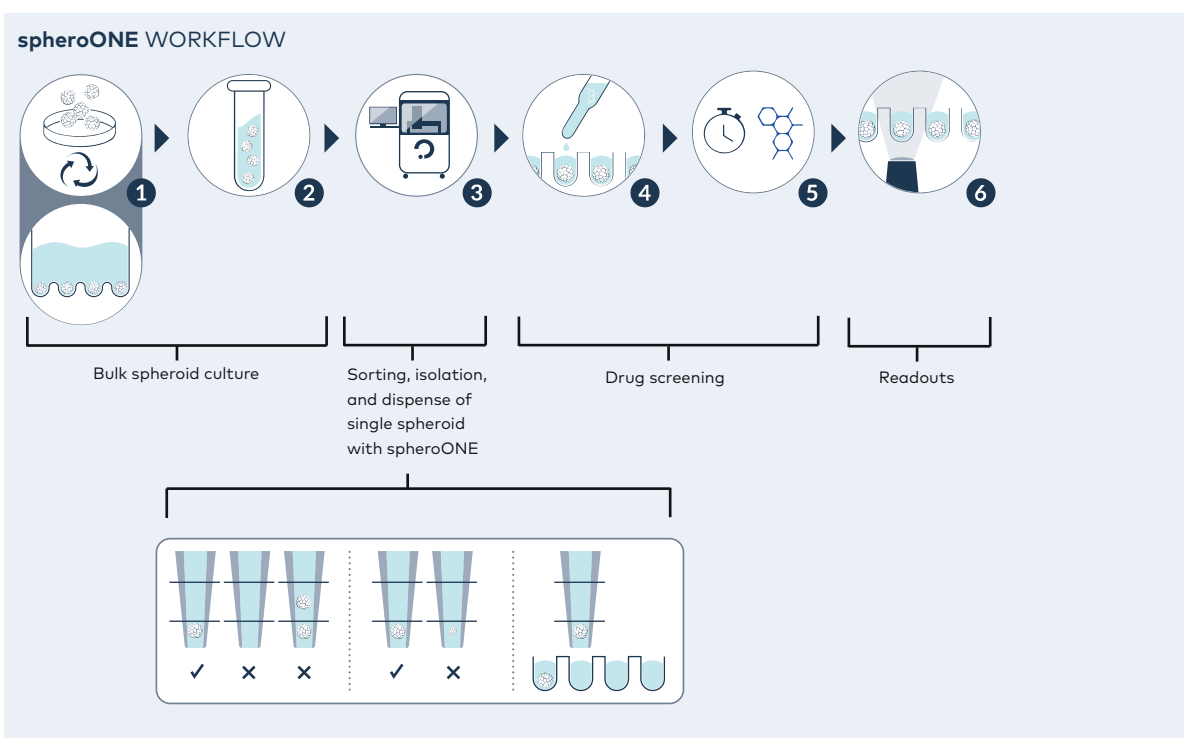
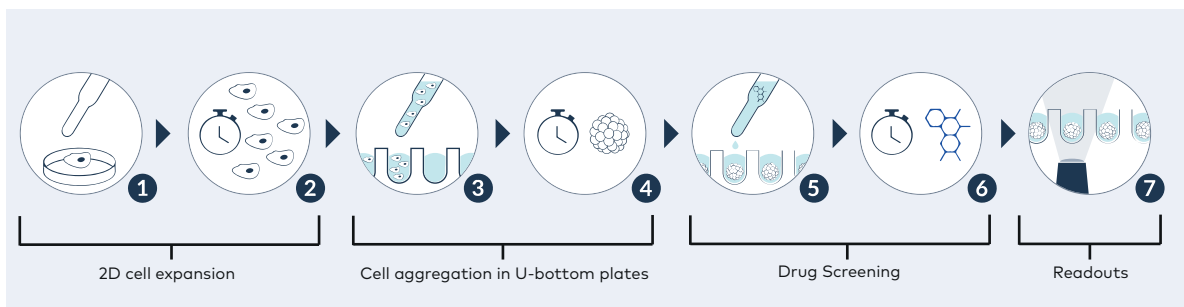
Applications

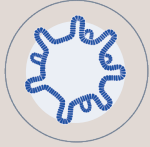




Drug discovery

- Rapid bulk culture prior to spheroid isolation for preparation of assay-ready plates
- Sorting enables isolation of homogeneous spheroids from heterogeneous starting populations, greatly improving assay results
- Accelerate drug screening workflows by minimizing time spent in incubators, i.e. isolated spheroids can directly be exposed to drugs rather than spending days in well plates
- Avoid media exchange that may lead to spheroid loss

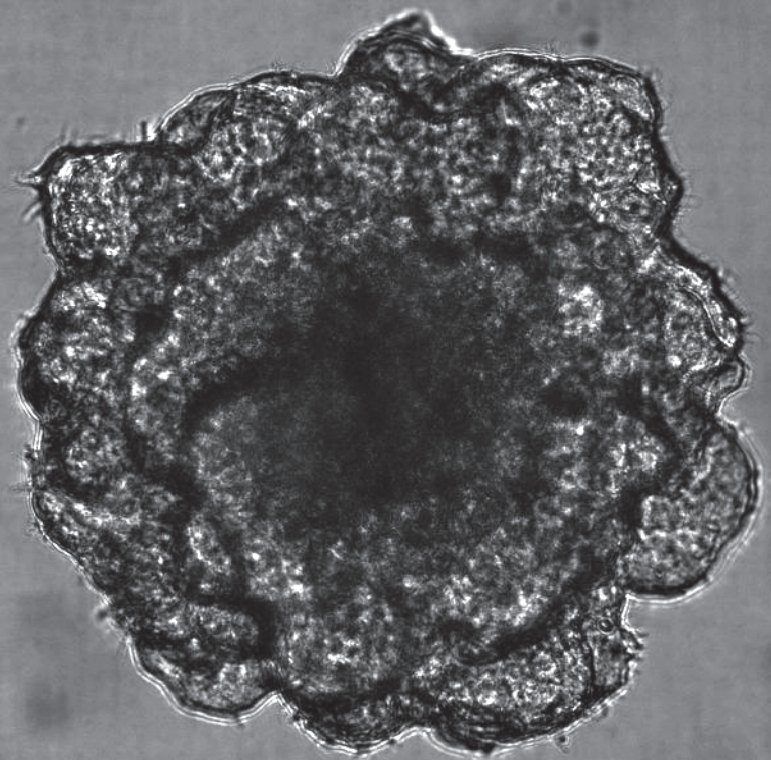




Organoids culture & manipulation

- Compartmentalization (single organoid/tumoroid)
- Work with small sized initial samples (i.e. patient-derived biopsy)
- Possibility to deposit organoids/tumoroids on lab-on-a-chip devices
- Pre-sorting of the most promising spheroids for organoid differentiation
 - Only select aggregates that have good odds of forming high quality organoids, leading to enhanced yield
- Sorting of differentiated organoids
 - Sorting organoids after differentiation in order to keep only those of interest
 - Starting material: adult stem cells, PSCs or iPSCs
- Dispense organoids directly into Matrigel®
 - Temperature control of target plate

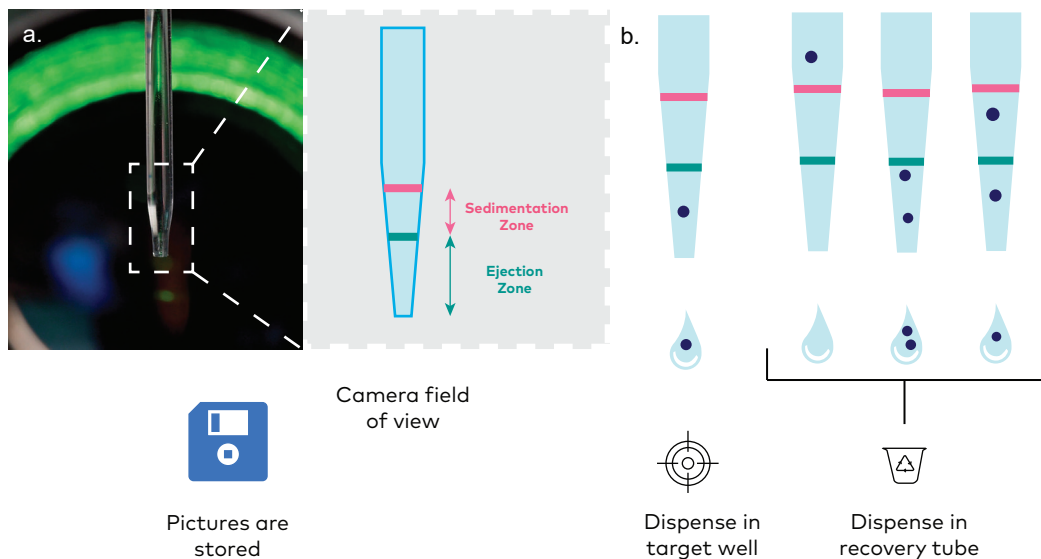
Kidney organoid
embedded in
Matrigel using
spheroONE



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Technology

Tailored dispensing technology: gentle and fast actuated electromagnetic microvalve dispensing. Smart image-based, multi-parameter detection and sorting



1. Spheroid/organoid suspension is loaded in a glass capillary
2. Glass capillary is placed in front of a camera
3. Capillary tip is segmented into two zones

Ejection Zone = what will be in the next generated droplet

Sedimentation Zone = safety zone considering possible sedimentation

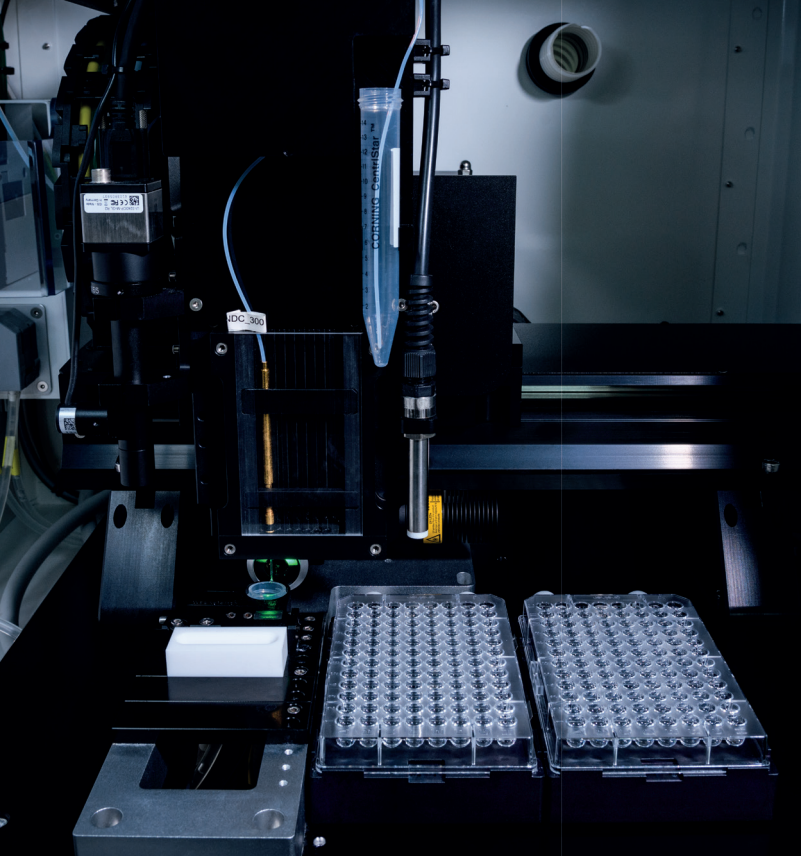
4. If the next droplet contains only a single spheroid fitting user-defined parameters (size, shape), it is dispensed into the target well. Otherwise, it is recovered in a vial for further reprocessing.

Product specifications

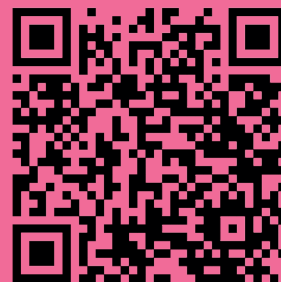
Dispensing Technology	Electromagnetic microvalve drop-on-demand
Dispense Volume	100 nL to 10 µL, CV < 3%
Drives	Linear for X/Y and spindle for Z
Resolution	1 µm
Accuracy (Absolute Position)	< 10 µm
Precision (Repeat Position)	< 3 µm
Camera	HD Vision: In-built Brightfield & Darkfield Microscope

Max Speed	100 cm/s
	650 x 700 x 1590 (L x W x H, mm)
Dimensions	-> L = 1300 mm incl. monitor arm -> H = 2050 mm with hood open
Weight	Approx. 242 kg
Voltage	110 V; 220 V





For more information:



Also, check out our
cellenONE® single cell
dispenser.



**Want to see it
in action?**

Book a demo
through our
website!

cellenion.com

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