

Application Note

Growth and morphological profiling of 3D microtissues with the Cell³iMager

Rapid and robust spheroid size analysis in minutes

- Record 3D microtissue size in minutes using innovative scanning optics
- Analyzes up to four 384-well plates in one run
- Adds size and growth as additional endpoints to the 3D assay toolbox

3D Microtissue Scanning

Size and morphology are important determinants to evaluate biological behavior of 3D microtissues. The Dainippon SCREEN Cell³iMager in combination with the GravityTRAP™ 3D microtissue assay format provides a precise and fast analytical tool to perform growth and morphological profiling of microtissues.

Key Applications

- Phenotypic drug discovery
- Drug sensitivity testing
- Combinatorial drug testing
- Drug-target discovery and validation
- Quality control



3D Microtissue culture in GravityTRAP™ plates



Scan GravityTRAP™ in Cell³iMager

1-8 min / 96 well plate depending on resolution

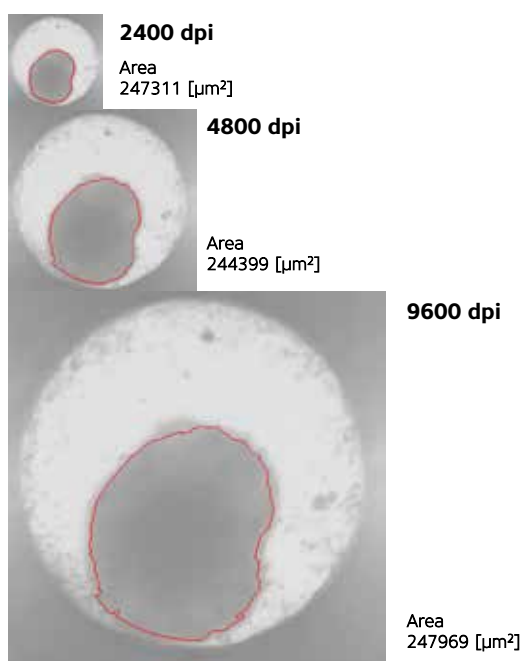


Analyze size and morphology of primary human liver micro-tissues (3D InSight™ Liver)

2-5min/96-well plate (after establishing cell type specific protocol)

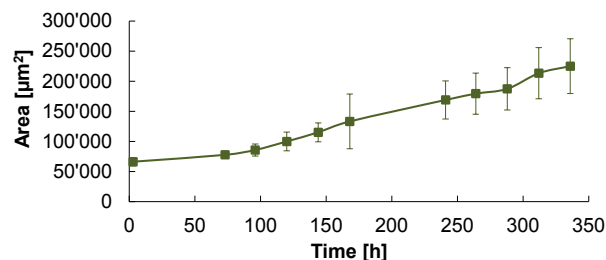
Scanning up to 9600 dpi

The Cell3iMager CC-5000 allows for scanning microtissues in the InSphero GravityTRAP™ plate up to a resolution of 9600 dpi. Already at a resolution of 2400 dpi, a precise size measurement can be performed. Scanning of a 96-well GravityTRAP™ plate requires only 1 minute at 2400 dpi and 8 min at 9600 dpi. The analysis software enables accurate discrimination of microtissues and cell debris which might occur after compound treatment.



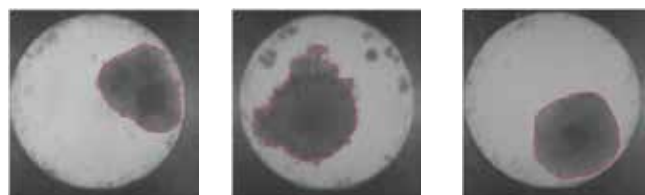
Growth Profiling

Growth is the key characteristic of tumor microtissues. Scanning technologies enable fast and label-free visualization even of small size differences. Exemplified is a growth curve of a colon-cancer microtissues composed of HCT116 cells over 14 days in culture.



Gross Morphology

Spheroids can adopt different gross morphologies depending on the cell line. Exemplified is a co-culture model under different conditions composed of the colon-cancer cell line DLD-1 and mouse fibroblasts NIH3T3. siRNA knock downs targeting different genes result in significantly different gross morphology for phenotypic target discovery and validation.



Analysis Options

The scanner software is tailored for the analysis of 3D microtissues. After establishing a protocol adjusting parameters such as focal plane, min. and max. object size, scan area and resolution for a specific tissue type, the analysis of a whole plate takes only 2 minutes.

Major endpoints calculated from images:

- Diameter (max, min)
- Area
- Pseudo-volume (based on area measurement)
- Circularity



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