GRADIENTECH

CELLDIRECTOR® 3D

PRODUCT NOTE

CELLDIRECTOR® 3D

Advanced Chemotaxis and Morphogenesis Experiments in 3D

Excellent *in vivo*-like conditions

CellDirector 3D is a cell-based assay optimised for the analysis of cell migration, cell behavior and cell differentiation in response to stable chemotactic concentration gradients. Single cells, as well as complex tissues, can be studied in three-dimensional gel matrices. Excellent cell culture conditions allow for time-lapse imaging of cell behavior during experiments exceeding days.

MAR007-01 Product Note CellDirector 3D

Stable gradients in 3D cell culture mimics *in vivo*

As most life science researchers know, gradients of signaling molecules control fundamental biological processes. Cell behaviors such as migration, survival and differentiation are affected by gradients of growth factors and other signaling proteins. The ability of cells to respond to gradients is thus essential to most aspects of animal development and disease progression. CellDirector 3D is the first commercially available assay for generation of controlled concentration gradients in true three-dimensional (3D) cell cultures.

How it works

CellDirector 3D utilises precise fluid flows to generate controllable gradients in a 3D gel matrix. Individual cells, spheroids or small tissue samples are injected together with the matrix into the cell culture chamber, flanked by two fluidic channels. The **gradient is generated by diffusion** of the factor of interest (often a protein), **through the gel** between the two channels. Linear steady-state gradients are thus established.

CellDirector 3D is easy to operate. The plug-and-play like system is connected to a syringe pump that continuously provides the cell culture with fresh media. The cell response is preferably recorded by time-lapse imaging.

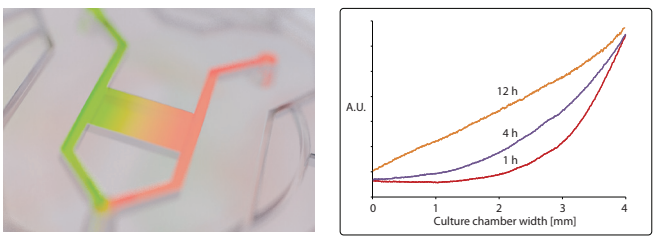

Figure 1. Left panel: Gradient generation within CellDirector 3D.
Right panel: Gradient profile of typical growth factor through the cell culture chamber over time – the steady-state profile is linear.

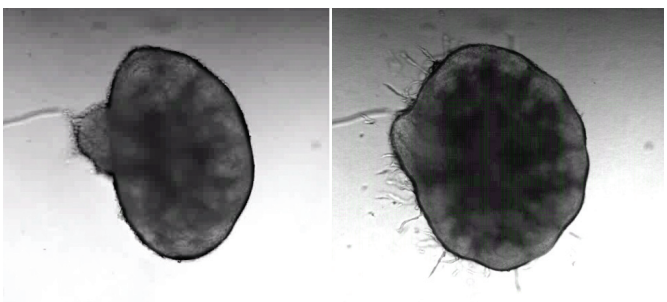

Figure 2. An embryonic mouse kidney (E13.5) grown for 48 h in a gradient of VEGFA (0-20 ng/ml) increasing to the left. Angiogenesis was predominantly induced on the side of the kidney facing higher levels of growth factor.
Left panel: t=0 h. Right panel: t=48 h. (Ref.1)

REFERENCES
1. Barkefors et al. Lab on a Chip, 9 (4), pp 529-535, (2009)

Benefits

- Stable and highly reproducible gradients
- Bridges the gap between *in vitro* and *in vivo*
- Allows culture of small tissue samples and spheroids
- Excellent cell culture conditions
- Compatible with both upright and inverted microscopes
- Quick set-up for new users

Example of research applications

- Organ morphogenesis
- Initiation and suppression of angiogenesis
- Axon guidance
- Determination of MIC for micoorganisms
- Stem cell migration and differentiation

Get started

- Start-Kit 3D (REF 20-001), includes 20 assays
- Fusion 100 (REF 90-001) or equal syringe pump

Technical information

Outer dimensions	Ø 42 mm x14 mm (height)
Cell-matrix mix volume	8 µl
Time to steady-state gradient	12 h for e.g. VEGFA 2 h for e.g. Ampicillin
Max. run time (using included syringes)	32 h
Min. working distance of objective	0.17 mm
Transmission wave lengths	300-1200 nm
	Delivered sterile
Catalogue # (10 assays/box)	REF 10-001-10