>> Fast and flexible live-cell imaging of 2D and 3D cultures in microfluidic chips

AXION BIOSYSTEMS
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Abstract #438

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Omni: Kinetic cell tracking

Automated, whole-vessel imaging and analysis

In vitro models are essential for studying diseases and development. While traditional 2D cell culture models have provided valuable insights, they often fail to replicate *in vivo* complexity. This has led to increased interest in 3D models such as spheroids and organoids, which better mimic *in vivo* conditions.
Live-cell provides a powerful technique for studying these 3D models, enabling real-time visualization and analysis at defined time intervals.

The Omni product family

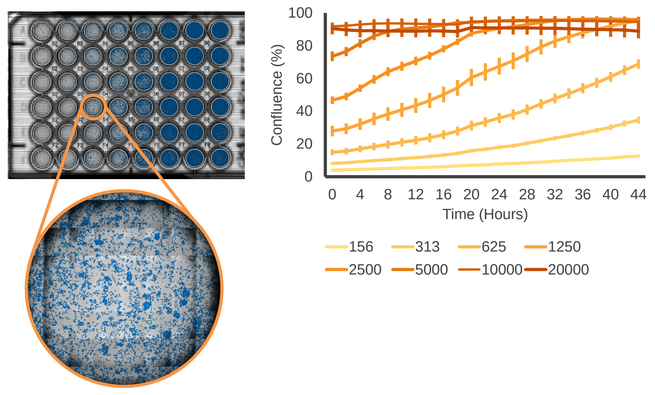
>> **Assay your cells in brightfield and fluorescence**

>> **Track every moment, straight from your incubator**

>> **See every cell by movement of the camera**

>> **Monitor and analyze your cells remotely**

>> **Get started quickly**



AI-Driven imaging software for powerful, yet simple analysis

The Omni platform software modules simplify assay setup, offer real-time cellular visualization, and enable fast analysis.

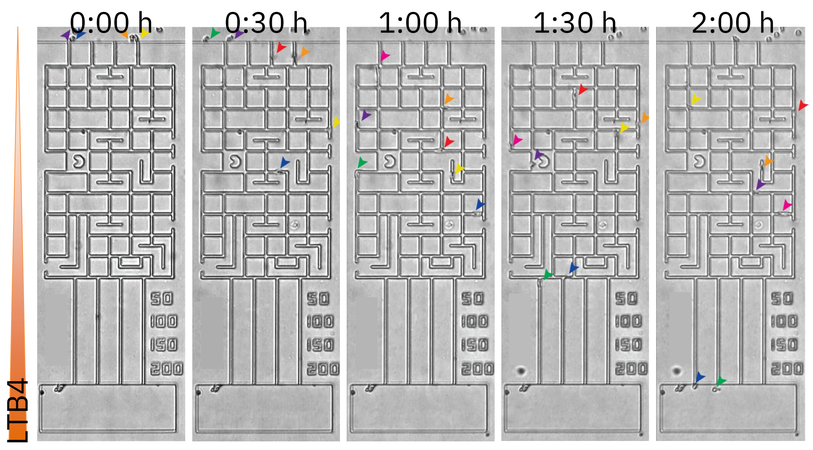
- Cell Confluence
- Clonogenic Assay
- Scratch Assay
- Organoid Analysis
- Fluorescence Analysis
- iPSC Monitoring

Chemotactic migration analysis

Kinetic imaging and tracking of neutrophil and cancer cell migration

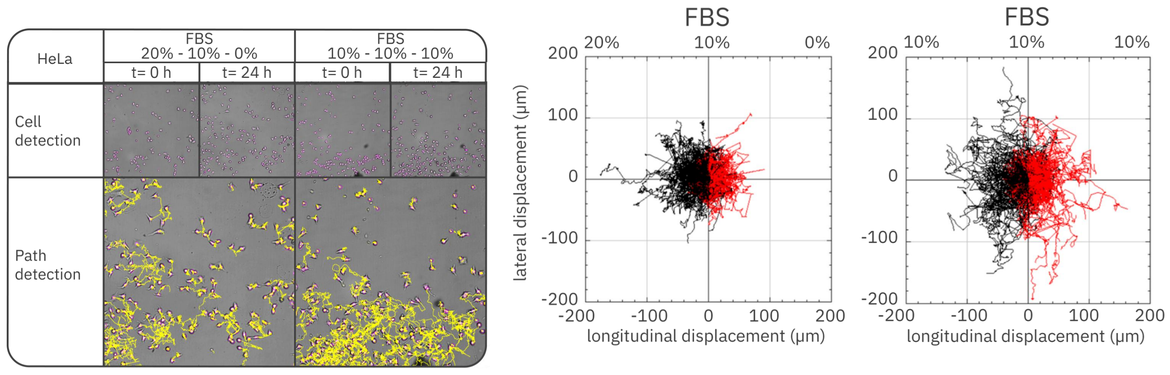
1. Neutrophil migration toward Leukotriene B4

To gain insight into sepsis (blood poisoning), research to neutrophil migration is of great importance. To investigate the effectiveness of neutrophil migration, human neutrophils were added to a microfluidic maze containing a Leukotriene B4 (LTB4) gradient. The most efficient neutrophils migrated through the channels to the LTB4 reservoir within two hours.



2. HeLa migration under an FBS gradient

In cancer metastasis, single cell migration can be affected chemotaxis. In this study, HeLa cell migration in response to a fetal bovine serum (FBS) gradient (0-20%) was monitored for 24 hours in a µ-Slide Chemotaxis (ibidi). The cells travelled greater distances in uniform FBS conditions but preferentially migrated toward higher concentrations under gradient conditions.

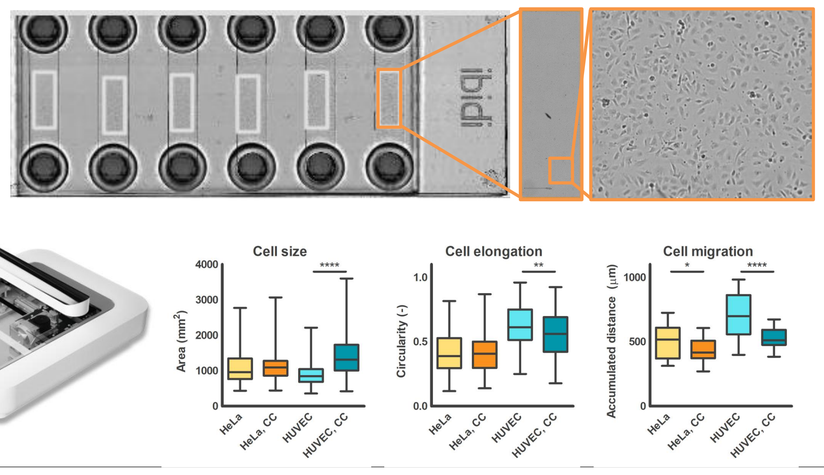


Imaging of co-cultures and 3D models

Live-cell imaging of co-cultures under flow and spheroid formation

3. Co-culture of cancer and blood vessel cells

The interaction of cancer cells and endothelial cells is of importance for metastasis. Mono- and co-cultures of HeLa cells and HUVECs were studied under flow in a µ-Slide VI (ibidi; 6 channels) using the ibidi pump system. Co-cultured (CC) HUVECs under flow were significantly larger and more elongated, with a 29% reduction in migration distance compared to mono-cultures.



4. Microfluidic chip guided spheroid formation

Spheroids are commonly used as tumor models in cancer research. HeLa and CHO-k1 spheroids were formed in a µ-Slide Spheroid Perfusion (ibidi; 21 wells). HeLa cells aggregated into spheroids within 20 hours, while CHO-k1 cells required 36-48 hours.