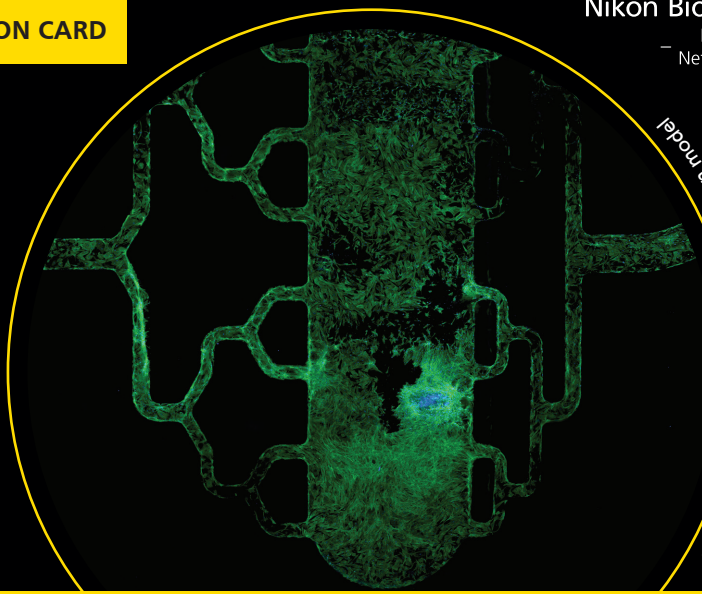
APPLICATION CARD

Nikon BioImaging Lab
Leiden
Netherlands



Micro-physiological Systems (MPS) structure imaging

In the drug discovery field, cells and biological tissues are used to evaluate the efficacy and safety of drug candidates. An enormous amount of time and cost is required to reproducibly carry out these tests. Animals are commonly used to ensure drug efficacy and safety but due to physiological differences between species, they are rarely a good indication for humans. In contrast, MPS, also commonly referred to as "organ-on-a-chip", can more closely mimic a physiologically relevant environment.

Challenges

While this revolutionary technology is extremely valuable to evaluate the efficacy and toxicity of candidate compounds with high accuracy, advanced techniques are required to culture and acquire images of MPS chips with complex structures, select analysis conditions, and acquire data. This is due to the structure of MPS systems that usually require very long working distances, coverslip corrections, and high-quality objectives to accurately image the whole chip.

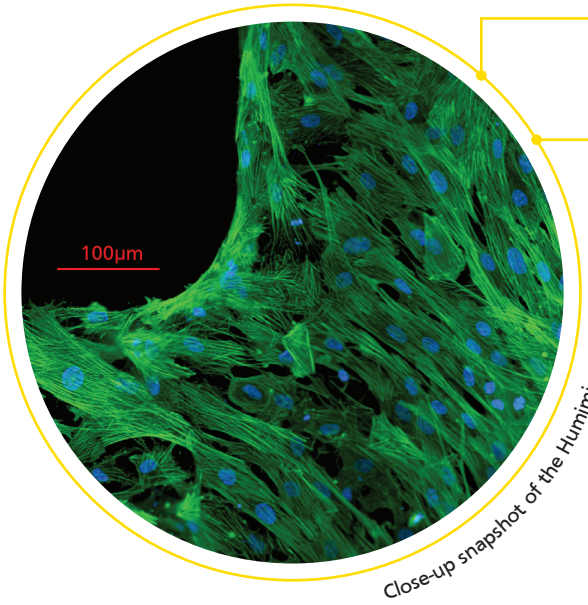
Taking the complexity out of MPS...

The Nikon BioImaging Lab (NBIL) provides MPS imaging and analysis services that capture and analyze MPS images for research and development. NBIL can select the best imaging modalities for endpoint analysis, full chip imaging in high resolution, and live imaging of distinct parts of the MPS... **in astonishing detail.**

Talk to an expert nbil.eu@nikon.com

Zooming in on organs, from a full system to the cell level

The HUMIMIC MPS system from TissUse GmbH is designed to mimic a human organ system connected to a circulatory system. This project aimed to image the system in detail, from complete overview to high-resolution close-ups where blood vessel formation can be monitored.



Close-up snapshot of the Humimic Chip2^{VASC}

METHODS

Humimic Chip2^{VASC} from TissUse GmbH

IMAGING

Nikon AX-R

Powerful instruments can perform full chip and live imaging of MPS

NBIL identifies the best modalities for endpoint analysis

A mixed 3D culture model of endothelial cells was cultured in channels to mimic vascular structures and the stem/stromal cells were placed in the overlaying matrix compartment. Culturing endothelial cells in the channel and matrix compartments can induce the vascularization of the organoids. The vascular channel system can be connected to a flow system to inject materials and view how they interact in a setting that replicates physiological conditions. For example, injecting immune cells allows live imaging of immune cell transmigration, migration in tissue, and target cell elimination.

Nikon BioImaging Lab's services:

01 Assay development › **02** Imaging › **03** Analysis › **04** Reporting