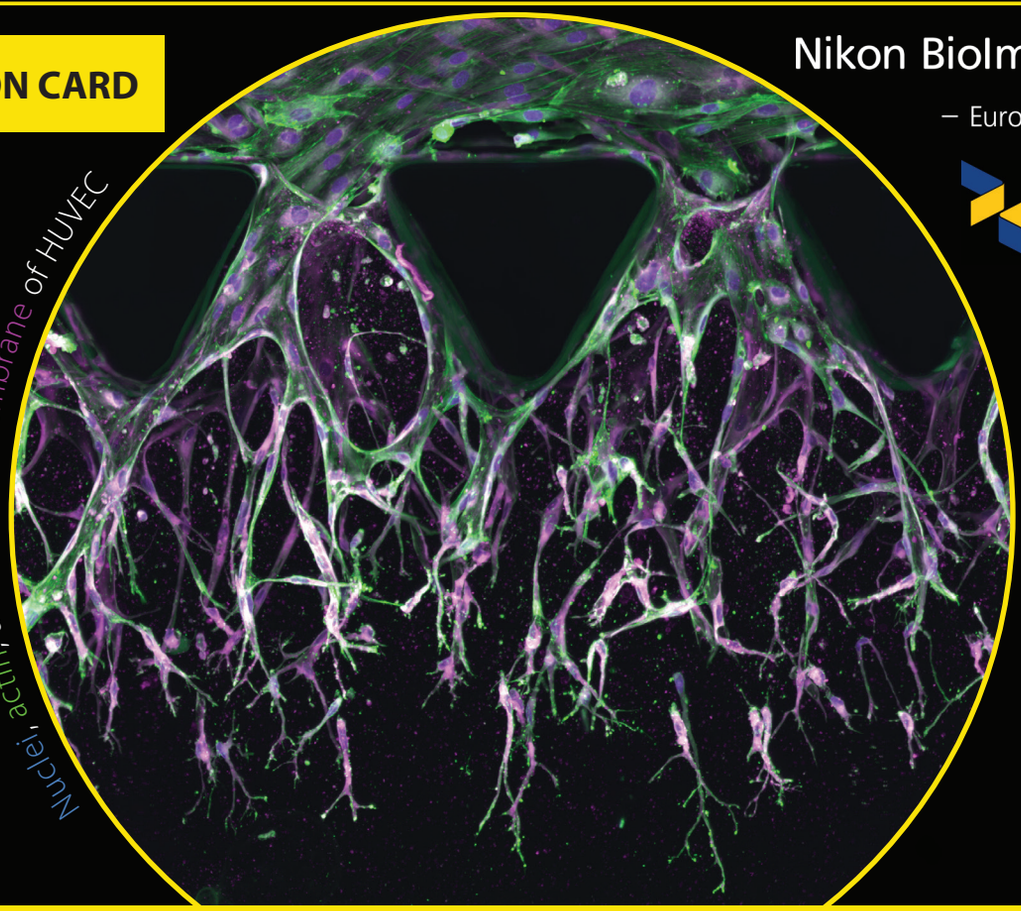
APPLICATION CARD

Nikon BioImaging Lab

– Europe –

aimbiotech



Nikon

Smarter, Faster Angiogenesis Assessment with Automated 3D Organ-on-Chip Analysis

Three-dimensional organ-on-chip (OoC) platforms provide physiologically relevant models for angiogenesis research, enabling clearer insights into vessel formation and drug responses. Yet their intricate microfluidic architecture requires specialized imaging for reliable, high-quality data. A dedicated, automated imaging workflow ensures consistent, high-resolution data that accelerate and strengthen your drug-development decisions.

CHALLENGES

Manual microfluidic channel identification is time-consuming and introduces user-dependent variability. Predefined templates often misalign due to variations in chip positioning or fabrication, leading to inconsistent imaging across experiments. In addition, the lack of standardized workflows and cell sources can further undermine reproducibility and limit scalability in angiogenesis assays. Capturing complete 3D vessel networks requires extensive Z-stack acquisition and stitching, while extracting metrics from these complex structures demands sophisticated, often slow analysis workflows.

Altogether, these bottlenecks limit throughput in target identification and intervention studies, ultimately slowing progression in drug-discovery efforts.

APPLICATIONS

- ✓ Pre-seeded blood vessels with standardized cell sources, ready to sprout
- ✓ Automated chip identification and autofocus for OoC imaging
- ✓ Rapid plate overview with automated high-resolution 3D acquisition
- ✓ End-to-end- automated OoC imaging and analysis

Talk to an expert

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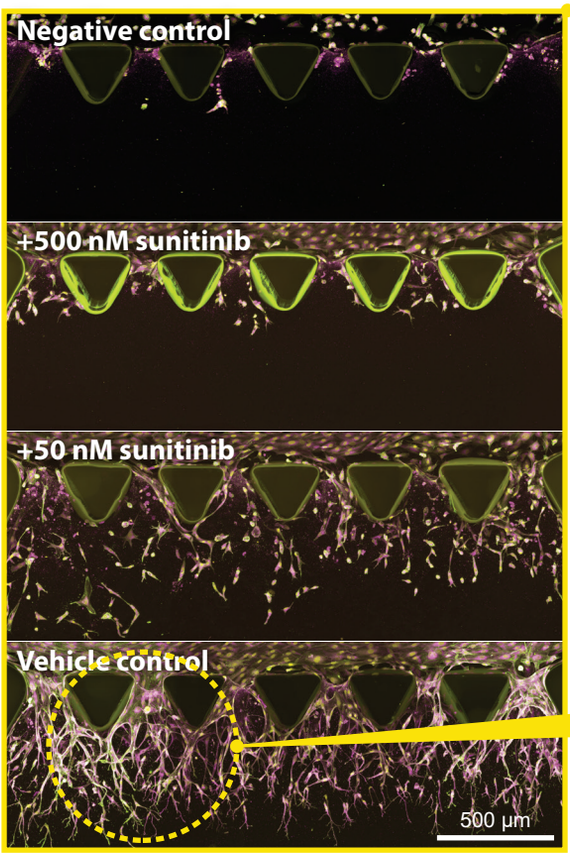
Automated 3D Imaging and Analysis of Angiogenesis

In this assay, AIM Biotech's AngioPrime plate pre-seeded with hTERT-immortalized HUVECs was treated with control medium, angiogenesis-promoting medium, or the anti-angiogenic compound sunitinib at 50 nM and 500 nM concentrations. Over time, endothelial cells form complex 3D angiogenic sprouts that extend into the gel channel, creating vessel-like structures. To visualize this, cells were labeled with Hoechst 33342 (nuclei), CellMask Actin Green (actin), and CellMask Plasma Membrane Deep Red (plasma membrane). The transparent microfluidic channel allows direct high-resolution confocal imaging of the sprouting process.



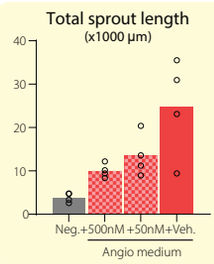
3D angiogenesis in organ-on-chip

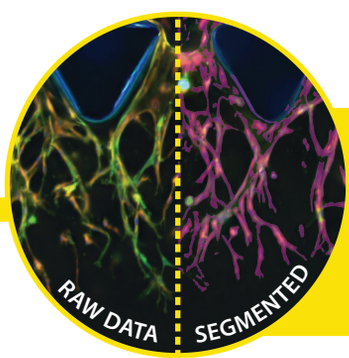
Assay-ready AngioPrime plate was cultured under control, pro-angiogenic, and anti-angiogenic conditions to generate dose-dependent sprouting responses.

Watch the automated analysis workflow

Automated analysis workflow

AI-assisted channel detection, 3D acquisition, and automated segmentation were performed to visualize and quantify angiogenic sprouts.





NBIL automates OoC imaging and analysis for faster, more reliable angiogenesis assays

OUR APPROACH

To minimize experimental variability and improve robustness, NBIL combines assay-ready AngioPrime with automated imaging and AI-driven analysis, enabling capture of efficient, consistent, and decision-ready OoC data.

- ✓ Pre-seeded, assay-ready platform supports **rapid, reproducible vascular sprouting** with decreased variability.
- ✓ Low-magnification overview scanning enables **fast and reliable micro-channel detection,** reducing manual setup time and increasing assay throughput.
- ✓ Per-chip autofocus and 3D acquisition ensure **complete, high-resolution reconstruction of each microfluidic channel**, giving you consistent datasets across experiments.
- ✓ AI-assisted segmentation automatically identifies angiogenic sprouts in 3D and quantifies sprout length, area, and penetration depth, **providing robust, reproducible metrics without manual analysis**.

Validated across multiple biological conditions, this end-to-end workflow reliably captures dose-dependent and media-driven angiogenic responses in OoC systems.

Nikon BioImaging Lab's services:

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