

**Get to know our
Multi-Organ-Chip
Technology**

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The Company

Who we are

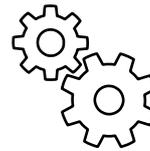
TissUse is a Berlin, Germany-based, biotechnology company, which has developed a unique "Multi-Organ-Chip" platform. Our technology has been successfully deployed by a wide range of partners and clients (e.g. FDA, EMA, Bayer, AstraZeneca, Beiersdorf), who can count on us being:



Innovative



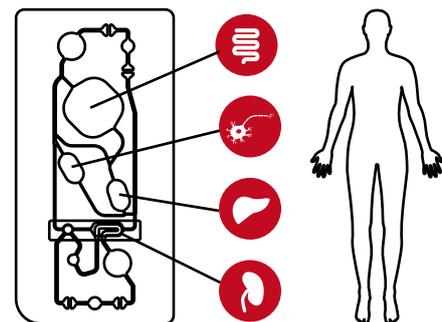
Professional



Efficient

What we offer

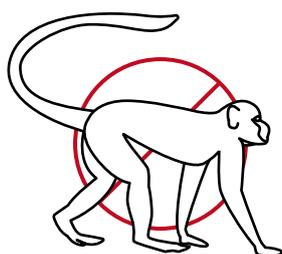
Our enabling technology platform consists of a miniaturized construct that closely simulates the activity of multiple human organs in their true physiological context. Unlike animal models (systemic, but not human) and human cells *in vitro* (human, but not systemic) this technology provides unparalleled preclinical insight on the *systemic* level using *human* tissue.



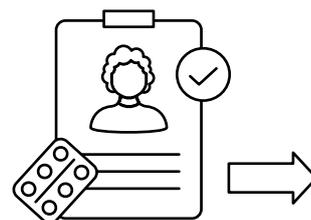
e.g. PB/PK compliant 4-Organ-Chip

What we aim for

Our **HUMIMIC Chips** provide a completely new approach to predict, for example, toxicity, ADME profiles and efficacy *in vitro*. TissUse's technology has already been utilized in a large variety of applications including drug development, cosmetics, food and nutrition and consumer products since 2012. In the future, this technology will reduce and replace laboratory animal testing and streamlining human clinical trials – that is our conviction!



Reduce and replace animal testing



Streamline human clinical trials

Our Brand & Products



HUMIMIC – under this brand TissUse combines a range of superpowers that make research easier, faster, and better. **HUMIMIC** products support you in developing pharmaceutical, chemical, and cosmetic products. Our unique, patent-protected technology simulates the activity of multiple human organs in their true physiological context, hence the brand name of “HUMIMIC” – a concept of art of “HUMAN” and “MIMIC.” After all, that is exactly what our **HUMIMIC** heroes do for you.

For detailed information on our products have a look at the **HUMIMIC Product Overview:**



Devices

HUMIMIC Devices act as the hub and control center of each and every mission. This is where the Chips are controlled and monitored. Whether a simple test series or complex experiments: we have the right equipment for every application. As a result, you can customize your setup to reflect your needs.

Chips

HUMIMIC Chips are the linchpin of our technology – the real superpower. They pave the way for your research and bring science to life: various organ models can be transferred directly onto the **HUMIMIC** Chips, where they deliver reliable research results.

Accessories

Sometimes, even superheroes need a little help. That's why you can complement your **HUMIMIC** technology with useful accessories to make your work easier, helping you to focus on what really matters: your science.

Our Publications

All publications:



Bone marrow
 Sieber et al. (2017)
 Schoon et al. (2020)



Skin – Liver
 Wagner et al. (2013)
 Maschmeyer et al. (2015)
 Kühnl et al. (2020)
 Tao et al. (2021)



Skin – 3D Tumor
 Hübner et al. (2018)



Liver – Kidney
 Lin et al. (2020)



Liver – Neuro
 Materne et al. (2015)
 Koenig et al. (2022)



Liver – Lung
 Schimek et al. (2020)



Intestine – Liver
 Maschmeyer et al. (2015)



Liver – Pancreas
 Bauer et al. (2017)



Liver – Testis
 Baert et al. (2020)



Immunocompetent Skin (biopsies) – Hair follicles
 Atac et al. (2013)



Skin – Thyroid – Liver
 Tao et al. (2023)



Optional: add vasculature
 Schimek et al. (2013)
 Hasenberg et al. (2015)



Intestine – Liver – Neuro – Kidney
 Ramme et al. (2019)



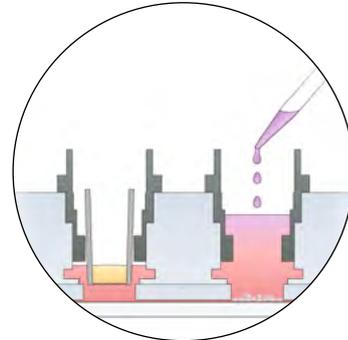
Intestine – Liver – Skin – Kidney
 Maschmeyer et al. (2015)

Our Technology

TissUse's proprietary technology platform is a miniaturised construct that closely simulates the activity of **multiple human organs** in their **true physiological context** at the **smallest possible biological scale**.

Made for single- & multi-organ culture

- Tissue cultures 100,000-fold smaller than original organs
- Flexible combination of different tissues
- Simultaneous culture of 2, 3 or 4 organ models per Chip
- Tissues accessible through lids
- Long-term co-culture of 14 days, 28 days or longer

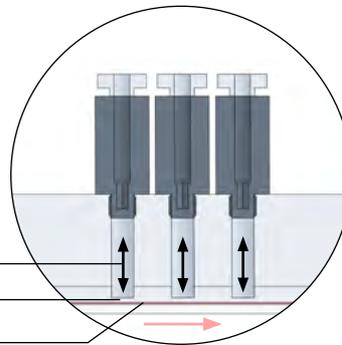


Near to physiological tissue to fluid ratio

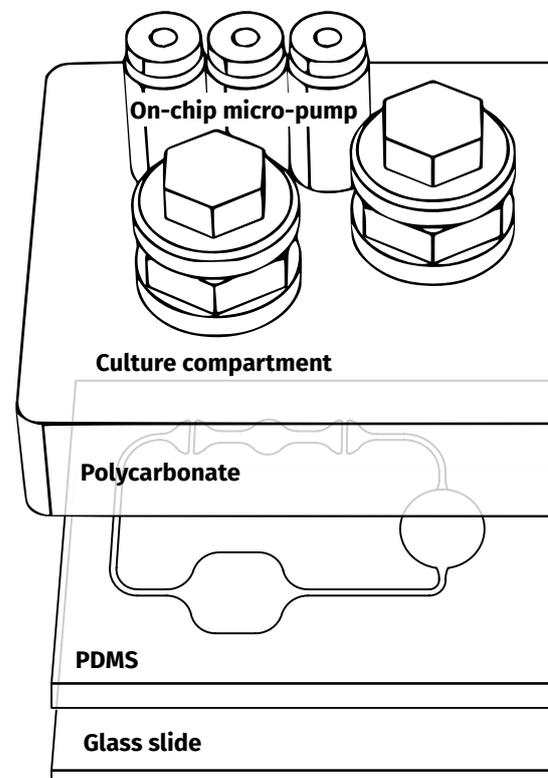
- Organ models connected in a closed microfluidic system
- Contained dilution of organ model produced metabolites and growth factors
- Relevant simulation of substance behaviour
- On-chip micro-pump for dynamic circulation of media/blood with vascular perfusion:

Each Chip circuit contains three pump membranes which are operated by change of pressured air and vacuum and thereby function as valves. This leads to a pulsating circulation of the medium through the channels - in a closed circuit.

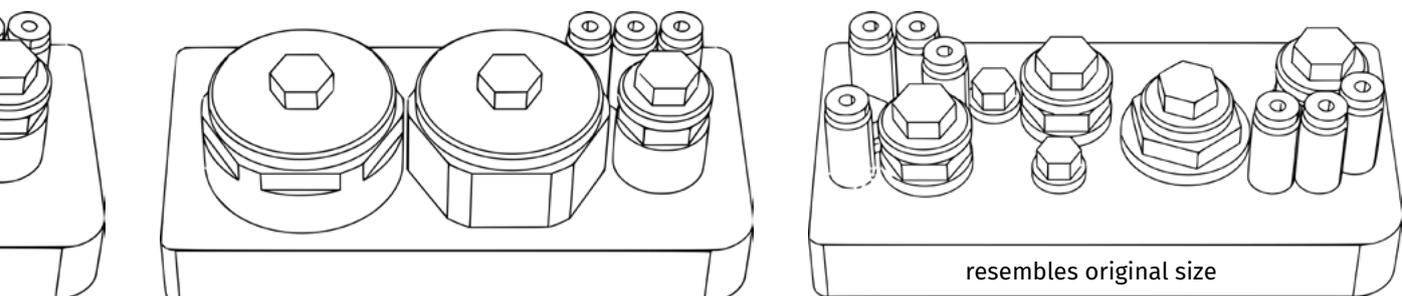
Alternating vacuum and pressure
Membrane
Channel with medium



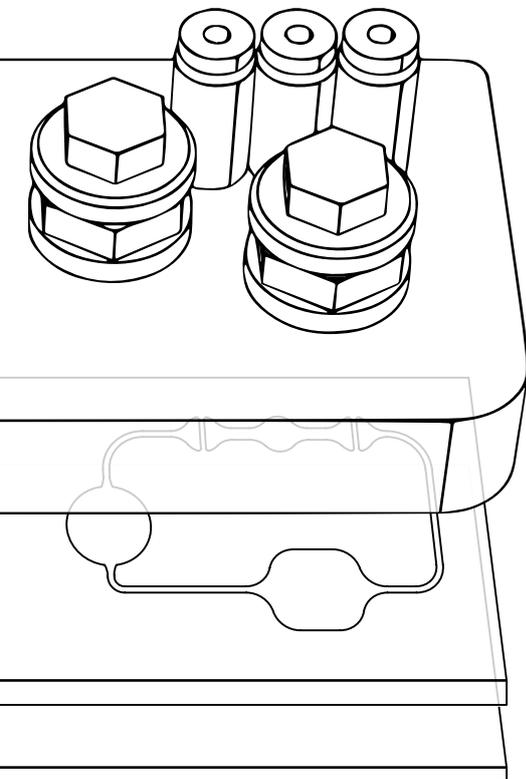
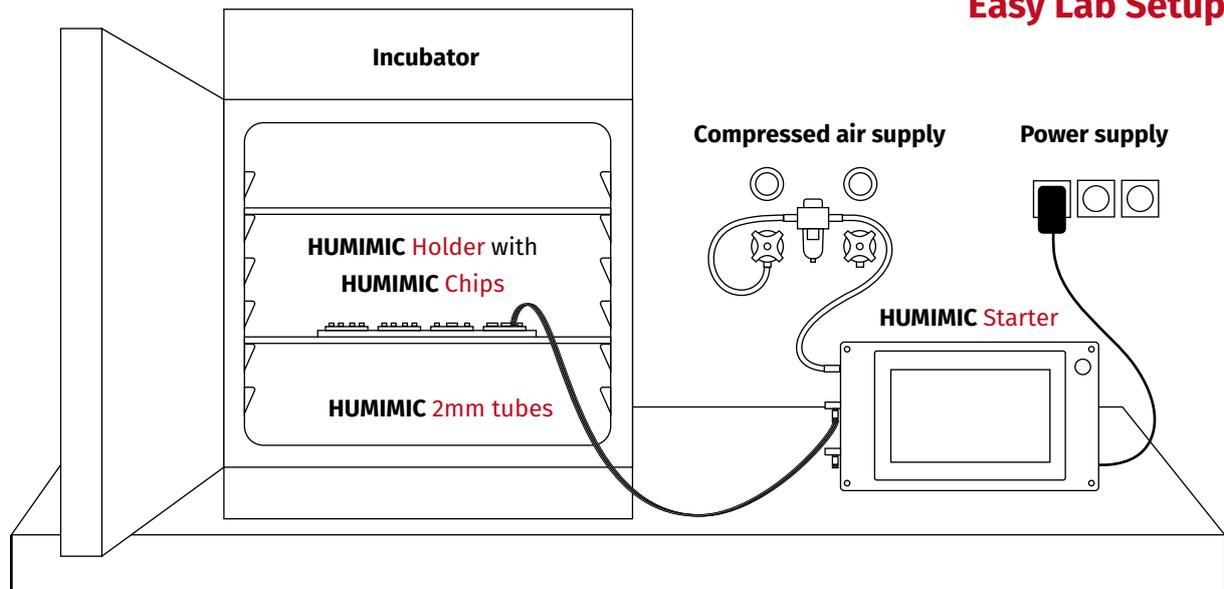
- Efficient near lifelike nutrient and oxygen supply
- Variable application of physiological shear stress
- Microfluidic chip format of a standard microscopic slide



Rapid prototyping of any relevant chip design



Easy Lab Setup



High compatibility

We want our customers to be as flexible as possible. Therefore our **HUMIMIC** technology is designed to be compatible with ...

... commercially available inserts

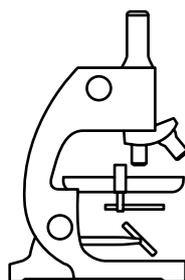
- Corning®: 96 well HTS Transwell®, 6.5 mm Transwell®
- Merck-Millipore: 96 well Millicell® insert, 24 well Millicell® standing insert

... different types of cell culture

- primary cells, iPS-based models, biopsies, cell lines, ...
- 2D models, 3D models, barrier models, ...



...existing lab equipment

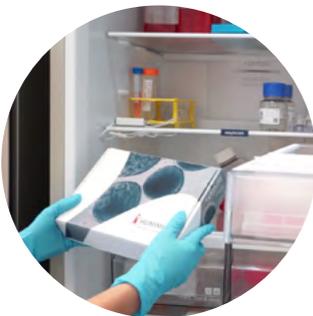
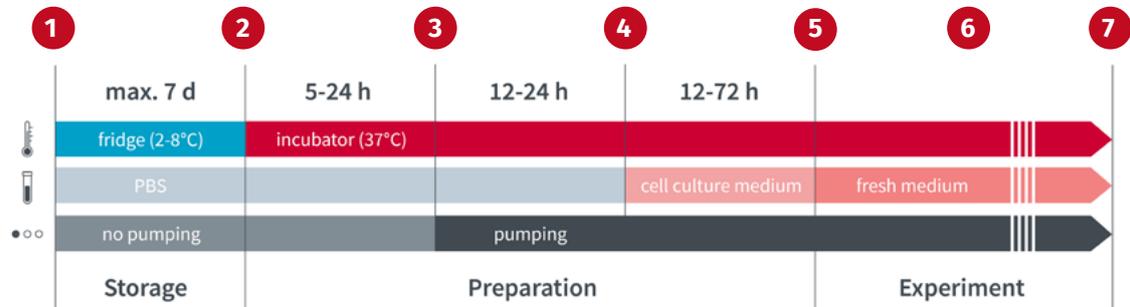


... life tissue imaging



Working with our HUMIMIC Chips

In our **Chip Training** or with the help of our **Quick Guides** and **Chip Handling Videos** our customers quickly learn how to work with our Chips. These are some exemplary activities during your experiment:



1 Store the Chips in the fridge for max. 7 days.



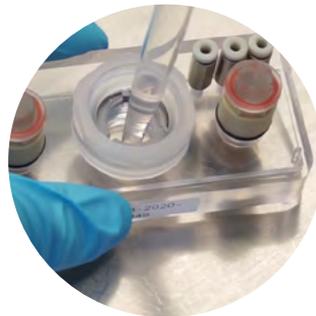
2 Unpack, check and disinfect the Chips ...



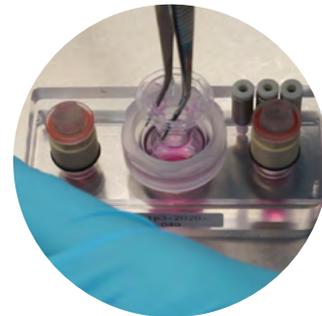
... and place them in the incubator at 37 °C.



3 Connect the Chips to the **HUMIMIC Starter** and start pumping.



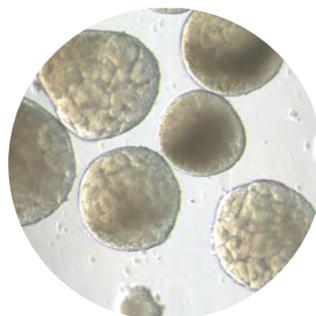
4 Exchange PBS for your respective Chip culture medium.



5 Load the Chip with tissues, e.g. add cell culture inserts.



6 Perform Medium exchanges following an exchange regimen ...



... as well as in-process controls, e.g. brightfield microscopy.



7 Collect tissues and medium for endpoint analysis.

Applications of our Technology

Broad field of applications

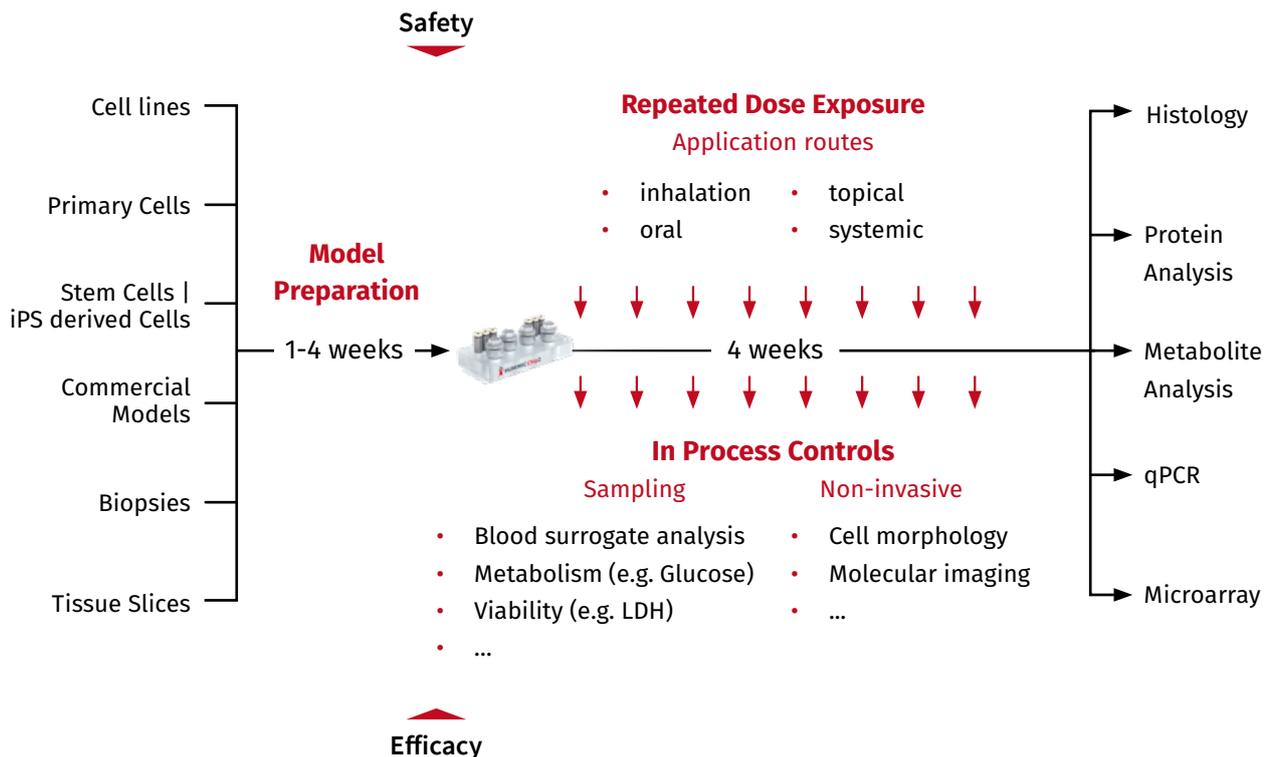
Our technology allows detailed studies of distribution and metabolization of various substances enabling the prediction of substance effects.



Drug development



Our goal is to deliver the tools to accelerate drug development through these stages together with all the scientists over the world towards patient's benefit. Our experienced team with long-standing expertise in Multi-Organ-Chip assay development (>50 MOC publications) will design your flexible, efficient and reliable assay for safety or efficacy testing.



Electrical sensing & stimulation

1 device – 3 functions: The **HUMIMIC ActSense** couples stimulation and sensing functionalities in a single multifunctional system!



TEER & Impedance spectroscopy

- Assess the junction dynamics and barrier integrity of endothelial or epithelial models.
- Additionally probe the electrical footprint of a cultured tissue.



ECG – EMG – EEG

- Monitor and assess heart (ECG), muscle (EMG), and brain (EEG) activity.



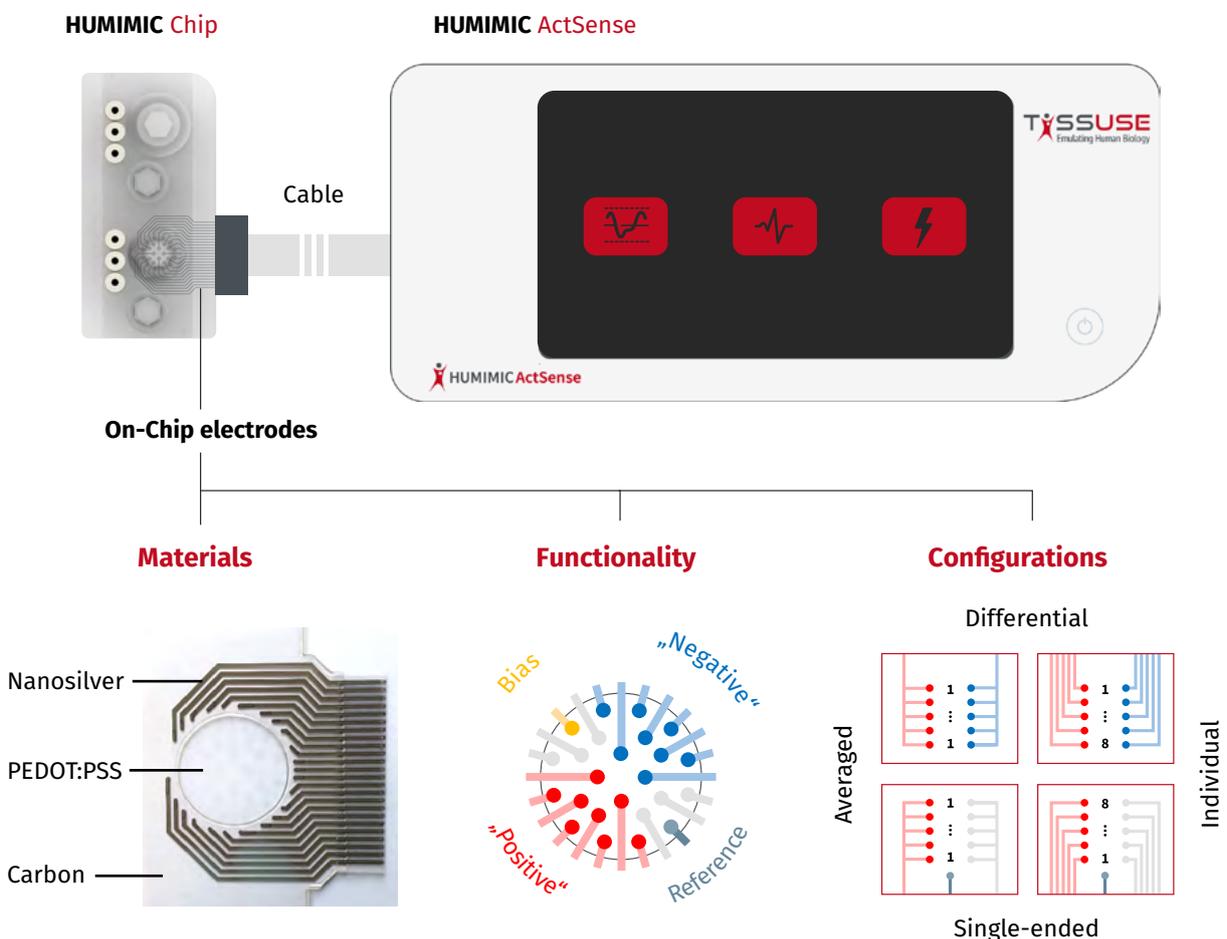
Stimulation

- Promote maturation, pacing and control of electrically active tissue.

How is it working?

The **HUMIMIC ActSense** gives you the opportunity to take the physiology of electrically active organ models to the next level while allowing for additional relevant read-outs. Collect several data points at once from your Multi-Organ-Chips, save them on the **HUMIMIC ActSense** and transfer them to your computer at a later time.

Learn more:



Upscaling through Automation

The benefits of automation

- 24/7 operation time and data acquisition
- Flexible feeding/dosing regimen and observation
- No interruption of cell culture conditions
- Highly reduced manual effort in handling ever evolving complexity of organ combinations
- Improved inter-user and inter-lab reproducibility
- Machine Learning and AI

The HUMIMIC AutoLab

Chip handling platform

- Simultaneous cultivation of 24 Multi-Organ-Chips
- Systemic pulsatile media circulation
- Media exchanges, substance application and sample extraction
- Incubation and sterile conditions for liquid handling

Microscope

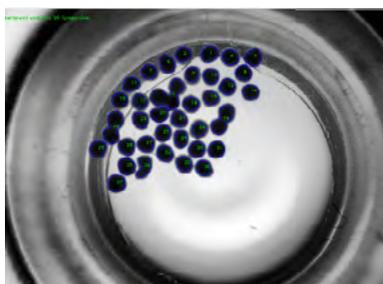
- Routine microscopic analyses and in-process quality control
- Fluorescence and bright field in-detail imaging with up to 10x magnification

Automated cold storage

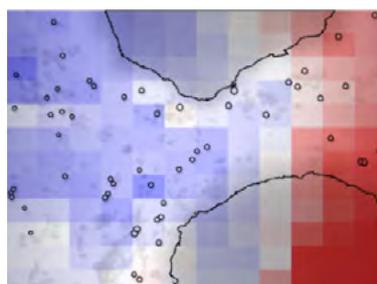
- Automatic provisioning of media, substances and samples from 4°C storage
- Cell culture material supply

AutoLab in-process analysis capabilities

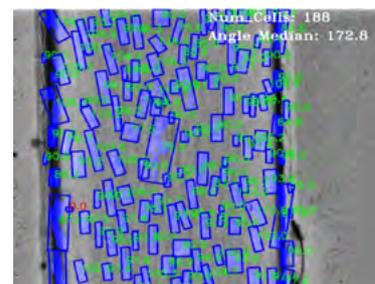
- Spheroid and cell detection
- Tracking of changes in size, morphology and count of cells and spheroids
- CO₂ or pH Heat-Maps
- Virtual AI staining



Spheroid tracking



pH heat map with spheroids



AI based endothelial cell detection



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