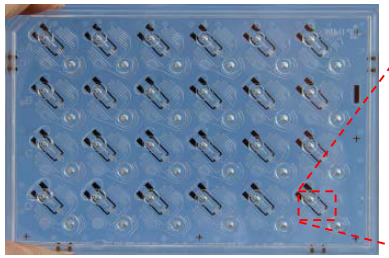
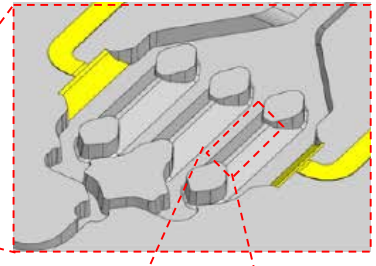
HepaChip-MP

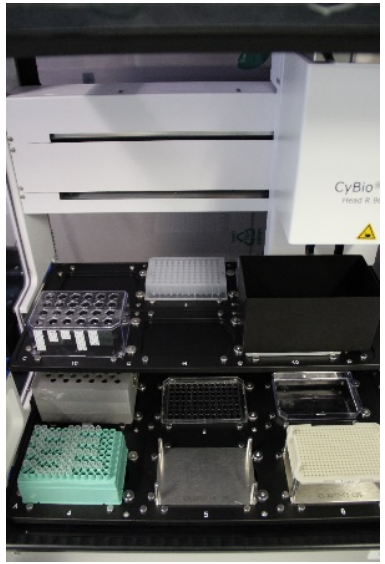
Microfluidic in vitro model of the liver sinusoid featuring:

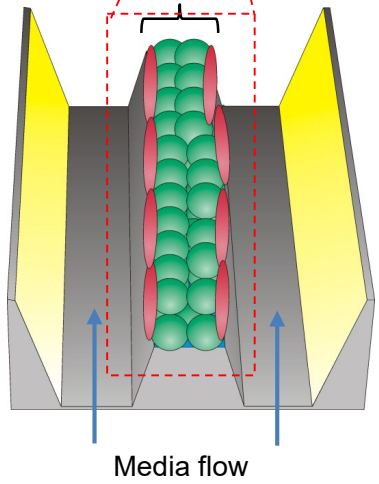
- Automated and reproducible chip handling
- 24 culture areas / chip
- SBS format and fluidic ports
- Active 3D-assembly of cells in sinusoidal structure
- Continous uni-directional perfusion
- Applicable with different cell types (PHH, HepaRG, HepG2, HuLEC and others)
- Integrated oxygen sensors for non-invasive and time-resolved measurements of cellular respiration
- Comprehensive set of readouts

PHH = primary human hepatocytes; HuLEC = human liver endothelial cells









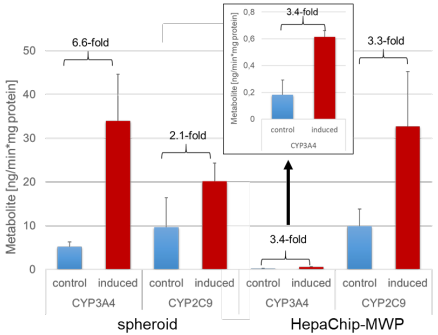
Applications

- **Substance testing:**
  - Drugs
  - Toxins
  - Liver protective substances
  - Nutrition factors
- **Study liver physiology**
  - Development of microfluidic disease models of liver (e.g. NASH)
  - Assessment of mitochondrial function / dysfunction (respiration)
  - Investigation of pathomechanisms of diseases
- **Personalized medicine applications:** cultivation and treatment of patient derived hepatocytes

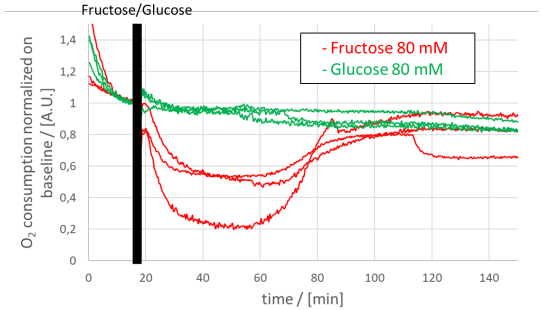
- **Available readouts:**
  - Cytochrome P450 activity and induction
  - Cellular respiration
  - ATP concentration
  - Redox potential
  - Nile red staining (neutral lipids)
  - Immunostaining
  - Other assays under development

Readouts & endpoints

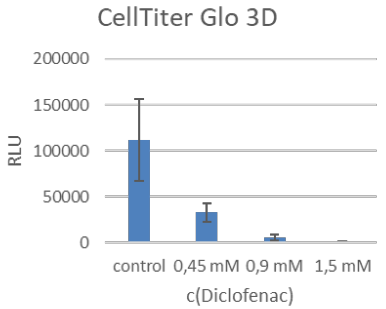
metabolism



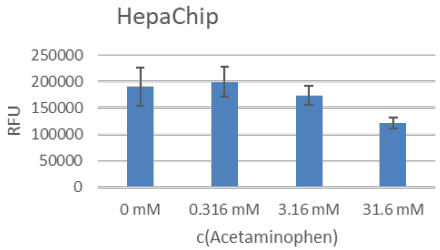
cellular respiration



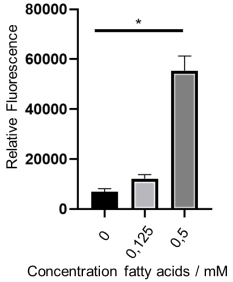
ATP concentration



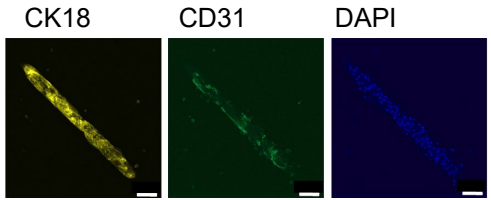
redox potential



nile red staining (neutral lipids)



immunostaining



What makes HepaChip-MP unique?

Feature	User Benefits
Microfluidic model mimicking the in vivo liver sinusoid	Enhanced relevance for in vivo effects
Parallelization, microfluidic perfusion without tubing, SBS industry format	Seamless integration into cell culture workflows, ease of handling & sample retrieval
Automated chip priming and cell assembly by robot	Robust, reproducible operation of OoC model
Continuous perfusion	Constant concentration conditions
Low substance adsorption	Reliable dosing
Excellent optical properties / microscopy	Comprehensive readout methods applicable
Integrated sensors enable continuous measurement of oxygen consumption	Label free continuous monitoring of vitality and cellular respiration

Contact

- HepaChip-MP is available for substance testing, development of disease models and cooperation projects to study liver physiology

Contact:

- Dr. Martin Stelzle, martin.stelzle@nmi.de
- phone: +49 7121 51530 75
- NMI Naturwissenschaftliches und Medizinisches Institut an der Universität Tübingen

- https://pubs.rsc.org/en/content/articlehtml/2020/lc/d0lc00357c