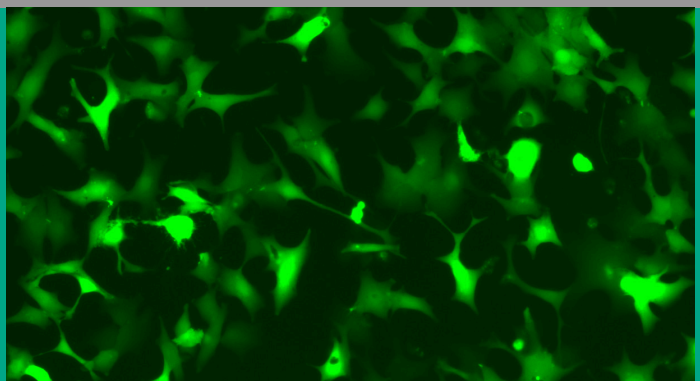
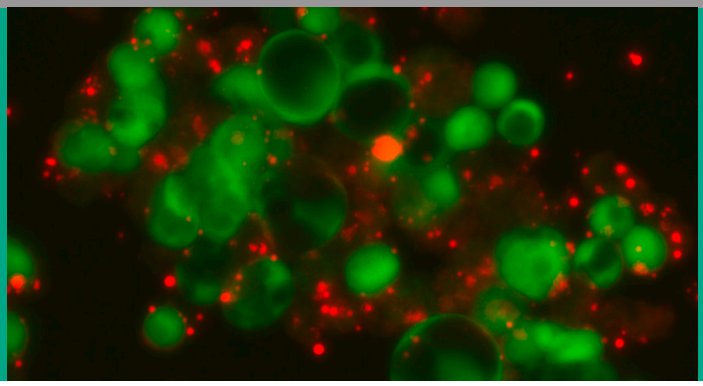
Fraunhofer
IZI

FRAUNHOFER INSTITUTE FOR CELL THERAPY AND IMMUNOLOGY IZI





ORGANOTOXICITY

Fraunhofer Institute for Cell Therapy and Immunology IZI

Schillingallee 68
18057 Rostock
Germany

Contact

PD Dr. Martin Sauer
Project Group Extracorporeal Immunomodulation
Phone +49 381 494-2630
martin.sauer@izi.fraunhofer.de

www.izi.fraunhofer.de

The organotoxicity unit at Project Group Extracorporeal Immunomodulation offers a wide range of analytical and diagnostic methods. Cell-based biosensors are used for the early detection of organ failure and assessment of prognosis in critically ill patients:

- Liver
- Nervous system
- Immune system

Liver failure

Liver failure is associated with a high mortality rate and can be caused by acute liver diseases or by the deterioration of an existing liver disease. However, medication such as paracetamol may also cause acute liver failure. Liver damage caused by medication is the most common reason for withdrawing drugs that have already been approved for the market. However, there is no reliable test system available at present to detect liver failure at an early stage. This gave rise to the development of a microtiter plate assay based on human liver cells that can be used to detect liver failure at an early stage in a clinical setting and to evaluate the toxicity of drugs and medical devices. By optimizing and standardizing the procedure, reliable statements can be made with regard to exogenous, and also endogenous, toxicity.

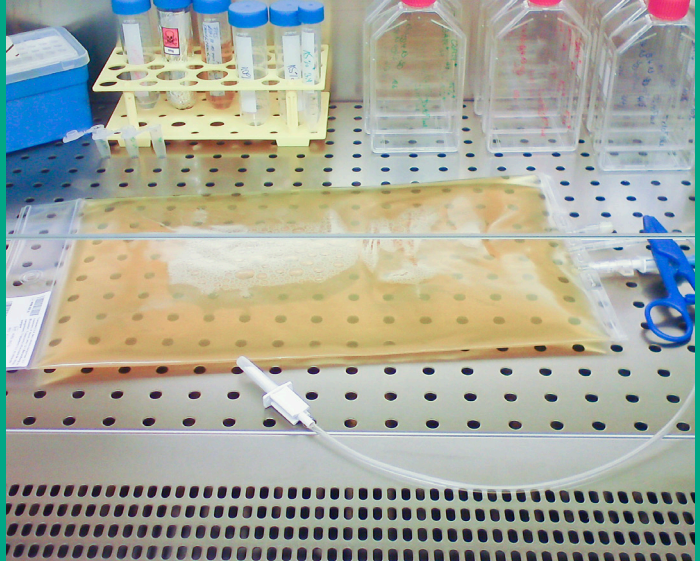
In vitro test systems

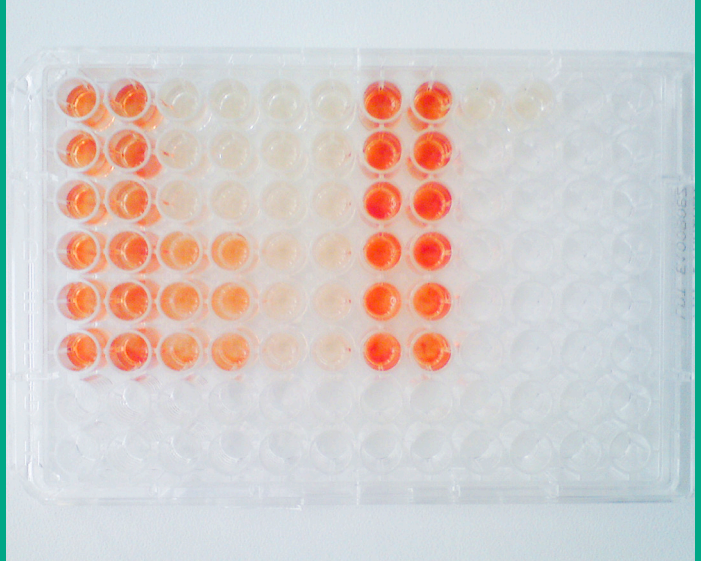
In vitro test systems are implemented to replace, reduce and refine (3R principle) animal trails. The assays are useable for pharmaceutical (toxicology, drug development, efficacy testing, bioactivity assays, quality control) and chemical industry (toxicity testing) as well as basic research.

The following in vitro test systems are established for investigation of

- Hepatotoxicity
- Neurotoxicity
- Leukocyte immunoparalysis

All analyses are performed according to ISO 10993-5:2009.





Last not least we perform all tests according to DIN EN ISO/IEC 17025:2005-08 to ensure a high accuracy of results.

Equipment

The Fraunhofer Project Group is fully equipped for the work with cell lines.

- Cell culture facilities
- Fluorescent microscopy
- FACS analysis
- Live cell Imaging
- Photometer, chemiluminescence- and fluorescence measurement

Due to close connection to University Medical center Rostock and to a close network of scientific cooperation partners, the group also has access to additional state-of-the-art technologies.

Having both equipment and expertise in house, we are capable to carry out even advanced project of organotoxicity analyses to development and validation of any in vitro test system.

IP situation

We patented the use of human hepatocytes for determining liver function and liver regeneration.

Selected references

Sauer, M. et al. (2012) **Impaired cell functions of hepatocytes incubated with plasma of septic patients.** Inflamm Res.61(6):609-16.

Sauer, M. et al. (2013). **A liver cell-based biosensor in patients with septic shock: results of a second prospective study.** Regenerative Medicine 8(6):137-8

Sombetzki M. et al, (2016). **Biosensor for Hepatocellular Injury Corresponds to Experimental Scoring of Hepatosplenic Schistosomiasis in Mice.** BioMed Res International 2016; ID: 1567254

Sauer M, et al. (2016). **Bioartificial therapy of sepsis: Changes of norepinephrine-dosage in patients and influence on dynamic and cell based liver tests during extracorporeal treatments.** BioMed Res International; Article ID 7056492. http://dx.doi.org/10.1155/2016/7056492