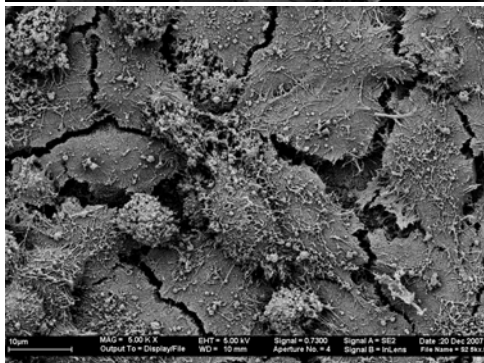
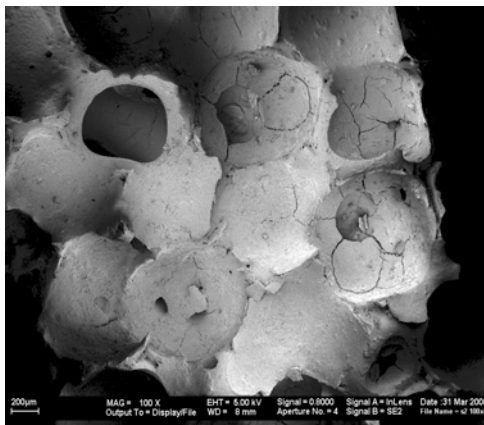


Team member: Dr. Christiane Goepfert, Kerstin Michael
Supervisor: PD Dr.-Ing. Ralf Pörtner
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Description:

Future developments in pharmaceutical research and regulatory requirements such as the European REACH program on registration, evaluation, authorisation and restrictions of chemicals require high numbers of animal experiments. As a result of ethical concerns, cell culture tests with human cell lines or primary cells are considered as a potential alternative. However, current testing protocols using two-dimensional (2D) cell cultures in Petri dishes are not equivalent to animal trials. Three-dimensional (3D) tissue cultures may overcome fundamental obstacles in the development of new therapeutic agents. Many new candidates of therapeutic agents are intended as agonists or antagonists of specific receptors on human cells. For these substances, organ-like test systems based on human cells are mandatory. In some cases, new pharmaceuticals lead to unexpected adverse reactions even after approval by the authorities and despite successful clinical studies. It is commonly accepted, that these problems are related to genetic diversity..

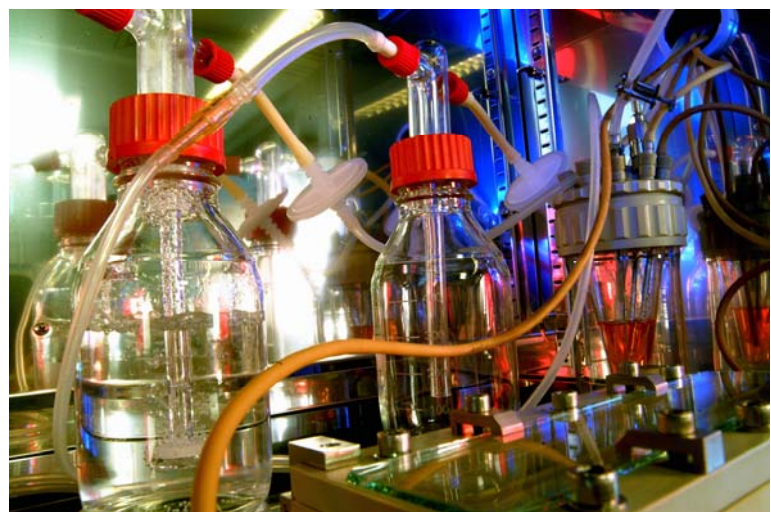


Cultivation of hepatoblastoma cells on ceramic carriers. Above: Native Sponceram® (Zellwerk GmbH). Below: Sponceram® covered with cells

Therefore, characterized human *in vitro* test systems such as bioreactor based 3D tissue cultures (so called micro organoids) representing a broad range of genetic diversity could be advantageous. By now, there is increasing interest among industrial companies for human micro-organoids as test system. Micro-organoids hold an enormous potential for the replacement of animal trials. It is anticipated that these culture systems will allow for solutions in many problems related to pharmaceutical testing.

Within this project hepatoblastoma HepG2 cells are used as a model system for human liver cells. 3D cultures of these hepatoma cells are obtained by seeding them on macroporous ceramic carriers and by cultivating in a bioreactor.

The project is performed in close cooperation with Bioglobe GmbH, Hamburg and Zellwerk GmbH, Eichstätt.



Flow-chamber bioreactor for cultivation of three-dimensional tissue constructs

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Contact: PD Dr.-Ing. Ralf Pörtner

Institute of Bioprocess and Biosystems Engineering, Hamburg University of Technology (TUHH)
 Denickestrasse 15, D-21073 Hamburg, Germany.
 Phone: +49-40-42878-2886 Email: poertner@tuhh.de Web: www.tuhh.de/ibb