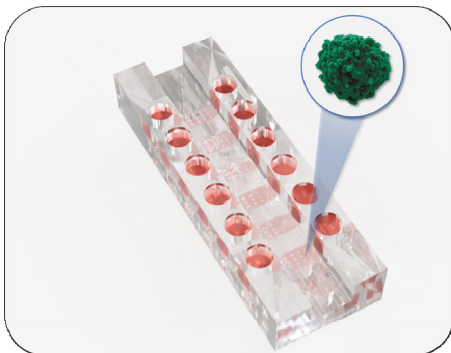


A microfluidic multicellular - spheroid microarray

The development of new drugs has several weaknesses. It takes about 10 years and € 1 billion to bring a new drug to market. In addition, regulatory approval is very expensive and animal testing does not reflect what happens in the body. Our device in the size of a credit card enables the formation of miniaturized human organs in the laboratory. The special structure of our device allows us to create various sizes of these mini organs on a single chip.

BACKGROUND

A long-standing trend in pharmaceutical development, toxicology and biomedicine has been the establishment of complex in vitro three-dimensional (3D) cell cultures whose structures and function resemble human tissues. Many scientific studies have confirmed that the organotypic 3D cell structures within a tissue significantly influence the behavior of living cells. This enhancement of biological model systems is not only intended to circumvent expensive animal experiments, but also to replace the currently existing and inadequate in vitro



models of 2D cell cultures. Although several complex 3D biological cell culture techniques have been established that enables miniaturization, and integration of such biological systems into biochips, also called organ-on-a-chip. This technology was first described by the World Economic Forum in 2016 as one of Top 10 "emerging technologies"

INNOVATIVE ASPECTS

Current techniques reportedly yielded in inhomogeneous sized 3D cell models, which are highly laborious and technical challenges limit scalability. Current methods have their focus on the production of size-tunable spheroids, but not on the microfluidic generation of these microtissues on-chip - in short, they are based on conventional cell culture plate assays. Based on geometry variations of the integrated micro-lenses, 3D human organ models can be produced in uniform quality and various sizes and shapes within a single disposable microslide. An additional advantage is the contemporaneous supply of media including different compositions and compound concentrations during spheroid formation as well as during long-term spheroid cultivation enabling lead-identification and optimization processes.

BENEFITS

- size controlled generation of multiple spheroids
- generation of up to 480 microtissues per device
- Size-depend spheroid harvesting of off-chip analysis
- cost-effective and time-saving monitoring of 3D cell cultures in a
- standardized and reproducible manner

APPLICATIONS:
EU, US

DEVELOPMENT STATUS:
Pending

KEYWORDS:
Organoids, High-throughput screening, drug testing

IPR:
EP, PCT and US

filed

INVENTORS:
Christoph Eilenberger
Mario Rothbauer
Peter Ertl

CONTACT:

Hildegard Sieberth
TU Wien
Research and Transfer Support
Karlsplatz 13/ E058-02-3
A-1040 Wien
T: +43.1.58801 415243
Hildegard.sieberth@
tuwien.ac.at
www.rt.tuwien.ac.at