

Osteoarthritis-on-a-Chip

Osteoarthritis (OA) is one of the most prominent global diseases, leading to chronic pain and disability in approximately one out of eight adults. Osteoarthritis-on-a-Chip is a novel automated and miniaturized screening platform to test new therapies for osteoarthritis.

TECHNOLOGY

The microfluidic cartilage-injury-microtissue array comprises primary equine chondrocytes in a three dimensional hydrogel. The thickness of articular cartilage and subchondral bone of horses closely resemble the human knee. The microtissue shows a structural organization of the chondrocytes in different layers similar to native cartilage.

The chip is mimicking the in vivo situation by precisely controlling environmental cues such as mechanical stimulation while featuring the advantages of microfluidics including automated fluid handling and incorporation of sensors. The microtissue can be mechanically or biochemically injured. Different drugs can be added.

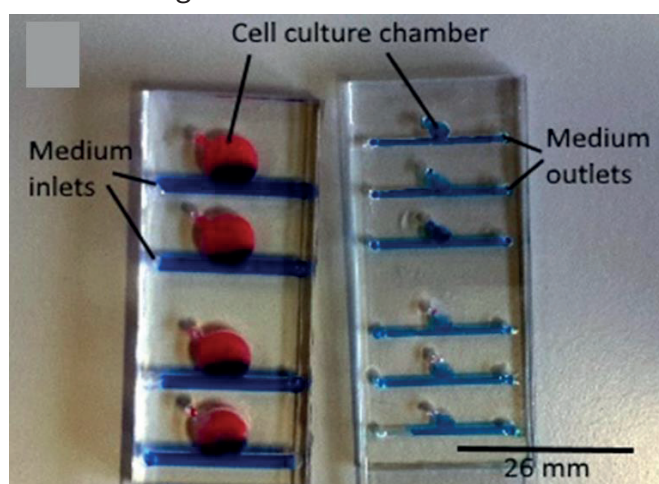


Fig.: Small and large prototype, 2-8 mm cell chamber diameter, 1-2 mm in height © Dr. Julie M. Rosser

APPLICATIONS

- Screening platform for therapies for osteoarthritis
- Research tool for the development of new osteoarthritis drugs
- Research tool for the onset and progression of osteoarthritis from a very early stage on
- Screening platform and research tool for other inflammatory diseases

ADVANTAGES

- For the first time a functional 3D cartilage tissue is developed that perfectly mimics native cartilage
- The functional cartilage microtissue shows high cell viability over long periods
- With a height of 1-2 mm, the chip allows direct observation through the microscope
- Reliable non-animal test method

REFERENCE:

M039/16
EM107

DEVELOPMENT STATUS:

Prototype available (medium throughput)
Next goals are upscaling to high throughput and development for individualized medicine

KEYWORDS:

Osteoarthritis
Cartilage-injury-model
3D functional cartilage tissue organ on a chip

IPR:

Patent pending

OPTIONS:

R&D cooperation,
License agreement, Sale

INVENTOR:

Julie M. ROSSER
Florien JENNER
Peter ERTL

CONTACT:

Christine Ruckenbauer

Technologie Transfer
christine.ruckenbauer@
vetmeduni.ac.at
Tel: 01 25077 1047