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.

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