Meet the NOCI Twente PhD candidates

Multiplexed Organ on a Chip

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Recently organ-on-a-chip devices have been studied extensively in both academia and industry due to their high potential in biomedical applications. The aim of this research is to multiplex organ-on-a-chip systems with further integrated sensors for simultaneous, real-time analysis of the effect of different stimuli on the barrier function. This high-throughput screening platform may enhance the drug screening process and help to minimize animal experiments.

The developed eight-channel device (Fig. 1) provides opportunities to study several stimuli in parallel (Fig.2) and was successfully tested by emulating the blood-brain barrier (BBB) physiology (Fig.3).
The next step is to integrate electrodes for high-throughput analysis.

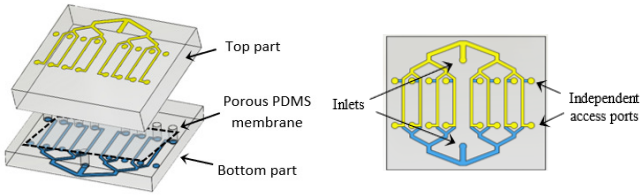

Figure:1 Exploded view of the chip which consists of top and bottom parts with eightchannels each and separated by porous PDMS membrane.

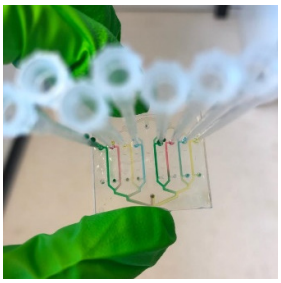

Figure:2 Proof of concept: different dyes in the chip.

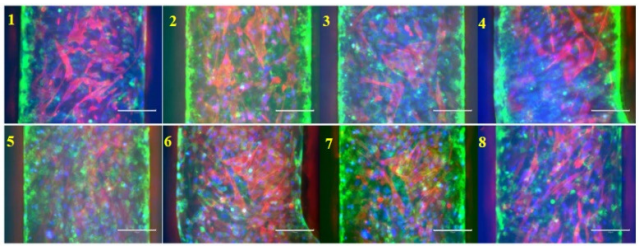

Figure:3 Immunostaining of endothelial cells with ZO-1 and human astrocytes with F-actin. Green represents endothelial cells and red- astrocytes, nuclei are stained blue with DAPI. (scale bar: 150 µm)