Development and Applications of Microfluidic Devices for Liver-on-a-Chip Studies

Modeling the human physiology *in vitro* is a challenging task, yet one of importance for the development of drugs and the study of diseases. To better address the complexities of human organs, microfluidic systems called organs-on-chips are being developed to emulate organ-specific environments for cell culture. Such systems are designed to recapitulate one or several key physiological features from the organ in question within an *in vitro* culture platform.

This thesis describes the work performed to develop, refine, and validate organs-on-chips designed specifically to mimic physiological cues from the human liver. Designed to allow perfusion, low levels of shear stress, and three-dimensional culture, the livers-on-chips described herein are intended for culture of induced pluripotent stem cell-derived hepatocytes as well as cocultures between hepatocytes and hepatic non-parenchymal cells.

Philip Dalsbecker earned his Ph.D. working in the Biological Physics Lab at the University of Gothenburg. His research focuses on the development and applications of microfluidics towards mimicking the human liver. He defended his Ph.D. thesis in November 2021.

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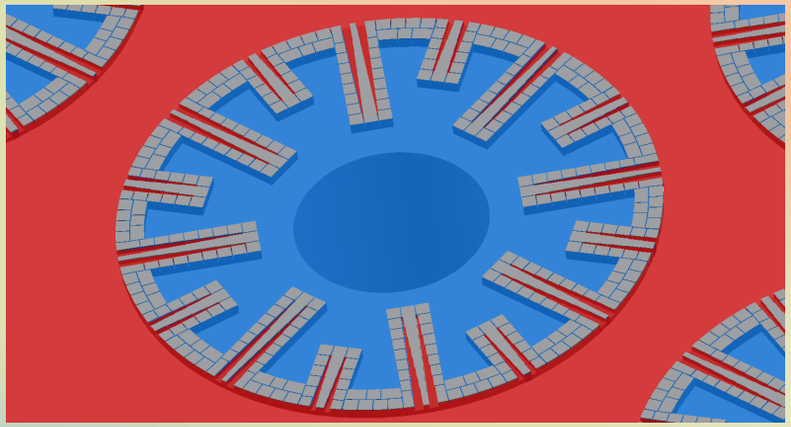

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