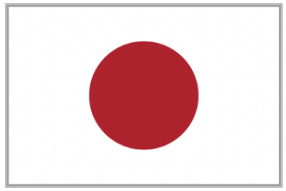


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SERIES 76

Dr. Shinji Sugiura

Series – 76

Date and Time : 2022-06-21 (15:30 - 16:30 JST | 12:00 - 13:00 IST)
Venue : Zoom
Speaker : Dr. Shinji Sugiura
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Title- Development of a pneumatic pressure-driven microphysiological systems

Recently, microphysiological systems (MPS) are attracting attention as a new in vitro culture system that reconstructs three-dimensional tissue structure, blood flow, and mechanical movement on a microfluidic device to reproduce organ function in vivo [1]. However, there are limited examples of multi-throughput medium circulation in MPS have been reported. We have developed a pneumatic pressure-driven perfusion culture system [2, 3], and applied this system to a pneumatic pressure-driven medium circulation for endothelial cell culture under physiological shear stress [2]. More recently, we have reported a multi-throughput multi-organ-on-a-chip system based on a pneumatic pressure-driven medium circulation platform with a microplate-sized format as a novel type of MPS [3]. A plate-formatted multi-organ microfluidic device can be used for an eight-throughput two-organ system or four-throughput four-organ system by adopting the corresponding microfluidic plate. Our pneumatic pressure-driven MPS possesses the following advantages for the application to the drug discovery: simultaneous operation of multiple multi-organ culture units, design flexibility of the microfluidic network, pipette-friendly liquid handling interface, and applicability to experimental protocols and analytical methods widely used in microplates. Therefore, we believe that our multi-organ culture platform will be an advantageous research tools for drug discovery

References: [1] Kopec, A.K. et al., “Microphysiological systems in early stage drug development: Perspectives on current applications and future impact.” J. Toxcol. Sci. 46, 99 (2021). [2] T. Satoh et al., "A pneumatic pressure-driven multi-throughput microfluidic circulation culture system", Lab Chip, 16, 2339 (2016). [3] T. Satoh et al., "A multi-throughput multi-organ-on-a-chip system on a plate formatted pneumatic pressure-driven medium circulation platform", Lab Chip, 18, 115 (2018).