

# **High-Content Modelling of Human Tissues and Diseases *in vitro* for Precision Drug and Nanomedicine Screening**

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Microphysiological systems are microfluidic three-dimensional or compartmentalized miniature human tissue and organ models that recapitulate the important biological and physiological parameters of their *in vivo* counterparts. These biomimetic microtissues are anticipated to supplement the conventional planar, static cell cultures, and to bridge the gaps between the current pre-clinical animal models and the human body. In addition, multiple microtissues may be channeled together through the microfluidics in a similar manner they arrange *in vivo*, providing the capacity to analyze interactions among these models. In this tutorial lecture, I will discuss our recent efforts on developing various organ-on-chip platforms formed by integration of biofabrication technologies harnessing sophisticated microfluidics and volumetric tissue configurations. These platforms will likely provide new opportunities in constructing functional tissue and disease models for drug discovery, (nano)therapeutics screening, and precision medicine.