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iPSZÜRICH

A Lecture Series Focused on Induced Pluripotent Stem Cells

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UCL

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DRIVING HUMAN PLURIPOTENT STEM CELLS FATE IN MICROFLUIDS

Microfluidics allows to achieve local concentrations of ligands representative of the *in vivo* stem cell *niche* as well as to manipulate ligands availability with high temporal resolution and a minimal amount of culture media, gaining highly precise control over the cell microenvironment. As such, microfluidic devices are increasingly being used to recapitulate signals of the stem cell *niche* affecting pluripotency as well as differentiation, from germ layer specification to tissue morphogenesis, to finally derive unprecedented models of tissue physiology and disease.

In this talk, I will discuss how the confined environment in microfluidics emphasizes the accumulation of endogenous cell-secreted factors, impacting the response of human pluripotent stem cells (hPSCs) to extrinsic signaling. This has implications on their functional differentiation to hepatocyte-like cells and their suitability for high-throughput drug toxicity assays. I will also discuss how to gain insight into the hPSCs' secretome during hepatic differentiation and how to leverage these findings for efficiently and robustly deriving 3D hepatic organoids models from hPSCs, that are gaining enormous interest for modeling liver development and disease.