Innovative Microfluidic Solutions for Drug Discovery

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Résumé

The microfluidics department of the PCBIS platform develops innovative microfabrication tools for drug discovery, enabling the creation of high-precision, cost-effective and physiologically relevant *in vitro* models. Our workflow covers the entire process, from custom microchip design and mold fabrication to PDMS casting, surface coating, cell culture, and imaging. Here we present the versatility of our expertise through several examples: i) micropatterned microfluidic chips for reproducible cell assays and controlled neuronal network formation; ii) compartmentalized devices with microchannels to separate axons and soma for region-specific drug testing; iii) a human cell-based blood–brain barrier (BBB)-on-a-chip as a relevant complement to the existing *in vivo* BBB model on the platform; iv) fluorescence exclusion-based microfluidic assays to monitor sub-micrometric cell volume changes in living cells; v) droplet-based microfluidic screening for reduced reagent and cell consumption, enabling high-throughput assays and applications in personalized medicine. Together, these developments illustrate the ability of the PCBIS microfluidics department in addressing diverse challenges in drug discovery, ranging from physiologically relevant organ-on-a-chip models to the miniaturization of laboratory processes through lab-on-chip systems.

Mots-Clés: Microfluidic, Microfabrication, Micropatterning, Organ on a chip, Lab on chip, Screening

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