Special Issue

Microfluidic High-Throughput Single-Cell Analysis

Message from the Guest Editor

Cellular heterogeneity is a hallmark of multicellular life, giving forms and functions to organisms by facilitating specialization. With such ubiquity, it is of no wonder that this heterogeneity controls the physiology and pathogenesis of many diseases. Despite the known cellular heterogeneity, it is still common to use population-scale bulk analysis, masking the subsets of cells critical for biological discoveries and clinical decisions. As compared to bulk analysis. single-cell analysis, which analyzes the properties of individual cells, is the key to deciphering heterogeneous attributes in cell populations. Microfluidic technology has emerged as a state-of-the-art approach for single-cell analysis because of its precise micro-environment manipulation, minimal reagent usage, and high potential in scaling and automation. Its capability to control fluids in the range of nanoliters to picoliters can not only precisely isolate individual cells inside each chamber at single-cell resolution but also achieve high sensitivity of chemical sensing from a small amount of cellular contents.

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Deadline for manuscript submissions

closed (31 October 2021)

Micromachines

an Open Access Journal by MDPI

Impact Factor 3.0
CiteScore 6.0
Indexed in PubMed

mdpi.com/si/63638

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