

Microfluidic single-cell analysis technologies for biosciences

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Cell sorting by flow cytometer has now become a commonly used technique in the biological science. This allows cells of interest to be isolated from a heterogeneous sample. Yet, it can introduce undesired damages and stresses to sorted cells such as, morphological changes, delayed cell growth, decrease in cell viability and alterations in gene expression. In this talk, I will overview our approach to minimize such 'sorter-induced cellular stress' (SICS) and several examples of sorting of cells that were difficult to sort with conventional cell sorters.

In the latter half of the talk, I will talk about our on-going approach on microfluidic compartmentalization techniques combined with microfluidic cell sorting, such as encapsulation of cells within water-in-oil droplets and hydrogels and in vitro reactions within for high-throughput screening of hyper-producer cells.