Microfluidic Cell Separation and Analysis

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Abstract

The isolation of different cell subpopulations is one of the fundamental procedures for further downstream processing such as cell culture, cell therapy, diagnostics, and hematology or morphological studies in clinical fields. As the need for cell manipulation and separation techniques becomes more significant, traditional cell separation researches are oriented toward applying their principles to a lab-on-a-chip device or finding a new physical principle for cell separation operated in a microfluidic device.[1),2)] In this study, we first review the recent development of cell separation methods carried out in a microfluidic device. Then, the presentation focuses on the development of a trapezoidal electrode array as a novel planar electrode structure for the dielectric horizontal switching of microparticles by negative dielectrophoresis (DEP).[3)] Unlike conventional DEP scheme, the device shows high separation efficiency for cell/microparticle separation, eliminating nonspecific adherence problem. This result can be useful to develop a novel blood cell separation and analysis device, which requires high cell recovery and selectivity. Some recent results on the microfluidic 3-dimensional cell culture platform for cell-based assays are also introduced and discussed.

References

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