

A high throughput droplet based electroporation system

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Delivery of exogenous genetic materials across the cell membrane is a powerful and popular research tool for bioengineering. Among conventional non-viral DNA delivery methods, electroporation (EP) is one of the most widely used technologies and is a standard lab procedure in molecular biology. We developed a novel digital microfluidic electroporation system which has higher efficiency of transgene expression and better cell viability than that of conventional EP techniques. We present the successful performance of digital EP system for transformation of various cell lines by investigating effects of the EP conditions such as electric pulse voltage, number, and duration on the cell viability and transfection efficiency in comparison with a conventional bulk EP system. Furthermore, the parallelization of the EP processes has been developed to increase the transformation productivity.