

Chip Less Microfluidic Device for High Throughput Liver Spheroid Generation

Authors : Sourita Ghosh, Falguni Pati, Suhanya Duraiswamy

Abstract : Spheroid, a simple three-dimensional cellular aggregate, allows us to simulate the in-vivo complexity of cellular signaling and interactions in greater detail than traditional 2D cell culture. It can be used as an in-vitro model for drug toxicity testing, tumor modeling and many other such applications specifically for cancer. Our work is focused on the development of an affordable, user-friendly, robust, reproducible, high throughput microfluidic device for water in oil droplet production, which can, in turn, be used for spheroids manufacturing. Here, we have investigated the droplet breakup between two non-Newtonian fluids, viz. silicone oil and decellularized liver matrix, which acts as our extra cellular matrix (ECM) for spheroids formation. We performed some biochemical assays to characterize the liver ECM, as well as rheological studies on our two fluids and observed a critical dependence of capillary number (Ca) on droplet breakup and homogeneous drop formation

Keywords : chip less, droplets, extracellular matrix, liver spheroid

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