Fabrication of Elastomeric Cavities with Controllable Curvatures for Forming 3D Tumor Spheroid and *in situ* Drug Screening

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Three-dimensional (3D) cell culture platforms have drawn great attention since the 3D cell culture is able to recapitulate in vivo microenvironment of tissues. Herein, we suggest novel elastomeric cavity structures with controllable sizes and curvatures for spheroid formation as tunable 3D cell culture system. Elastomeric cavities were fabricated by one-step interfacial reaction between water droplets and immiscible liquid polydimethylsiloxane (PDMS). Owing to high surface tension of water, spherical cavities were spontaneously formed on the liquid PDMS and their morphologies (sizes and curvatures) were easily controlled by droplet volumes and compositions. Using optimized cavities, we successfully demonstrated the formation of single 3D spheroids in each cavity with high efficiency. To reflect complex microenvironment of cancer tissue, we formed tumor spheroids with fibroblasts. For further clinical application, we applied this platform in in situ drug screening to investigate how tumor cells respond to drugs in their 3D microenvironment. We believe that our proposed platform would lead to significant contributions in tissue engineering and cancer research.