Supporting Information

Multi-functional Regulation of 3D Cell-laden Microspheres Culture on an Integrated Microfluidic Device

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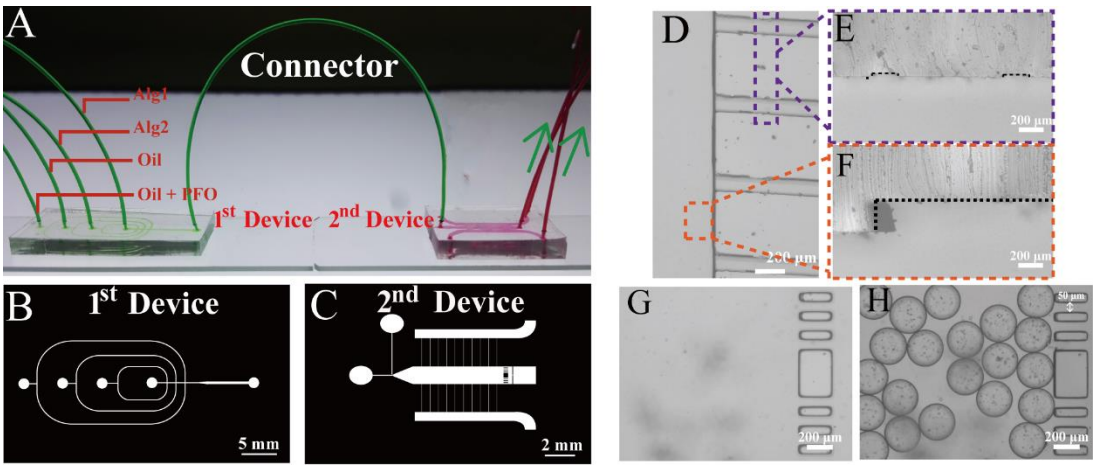

Figure S1. (A) The integrated microfluidic device assembled on two glass microscope slides (75 mm × 25 mm). In the 1st device, heterogeneous-cell-laden microspheres were generated, which were transferred to the 2nd device wherein oil extraction and cell culture medium switching were performed. The corresponding masks design of the two devices are shown in the (B) and (C). (D) Bright field images of the main channel and connecting microchannels. (E) showed the height of the connecting microchannels were around 20 μm and (F) Showed the height of the main channel was around 200 μm. (G) showed the intercepting micropillars at terminal point of the main channel. (H) The relevant microscopic image of micropillars during microspheres collection.

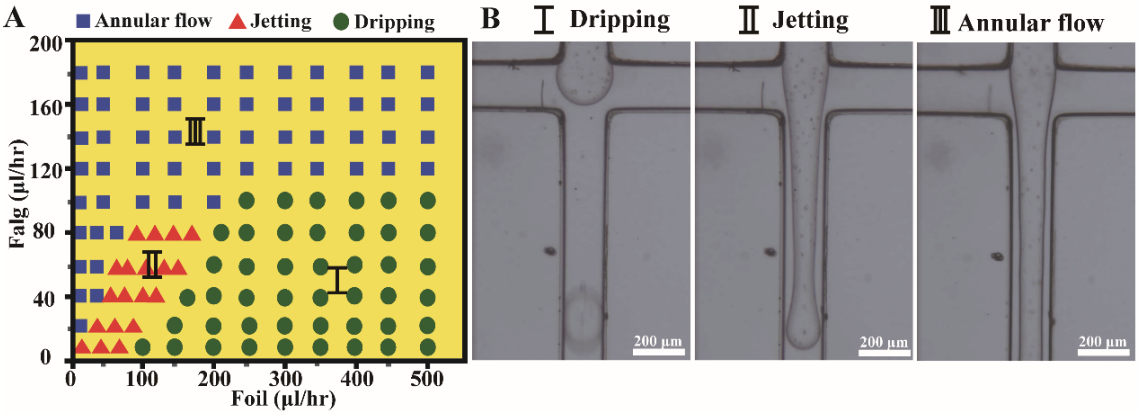

Figure S2. (A) A pictographic flow pattern map of microsphere generation (B) corresponding bright field images. Blue square, red triangle, and green circle represent annular flow, jetting, and dripping, respectively.

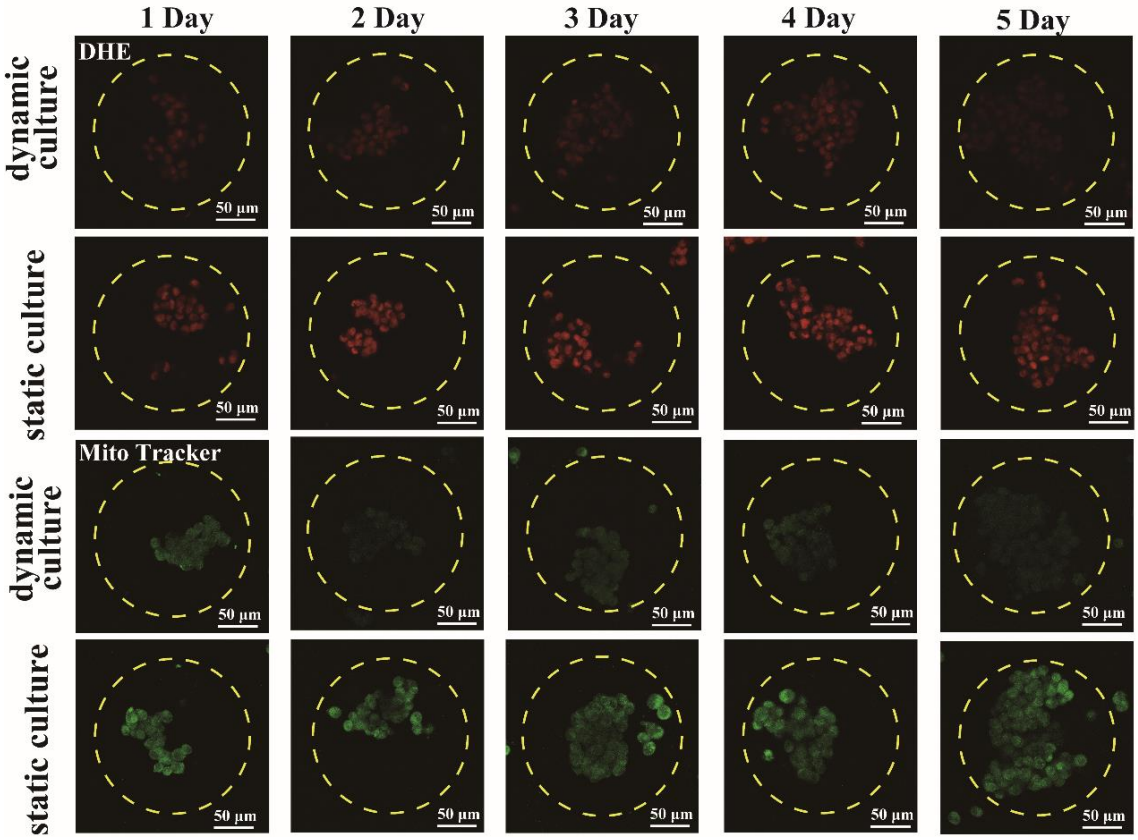

Figure S3. Confocal fluorescent images of GSSG and mitochondria under dynamic-culture and static-culture states. (Here the endogenously produced GSSG was treated with DHE red fluorescent dye, and mitochondria was treated with Mito-Tracker green fluorescent dye). For this experimental study, the initial cell density fixed at 5.0×10^6 / ml.

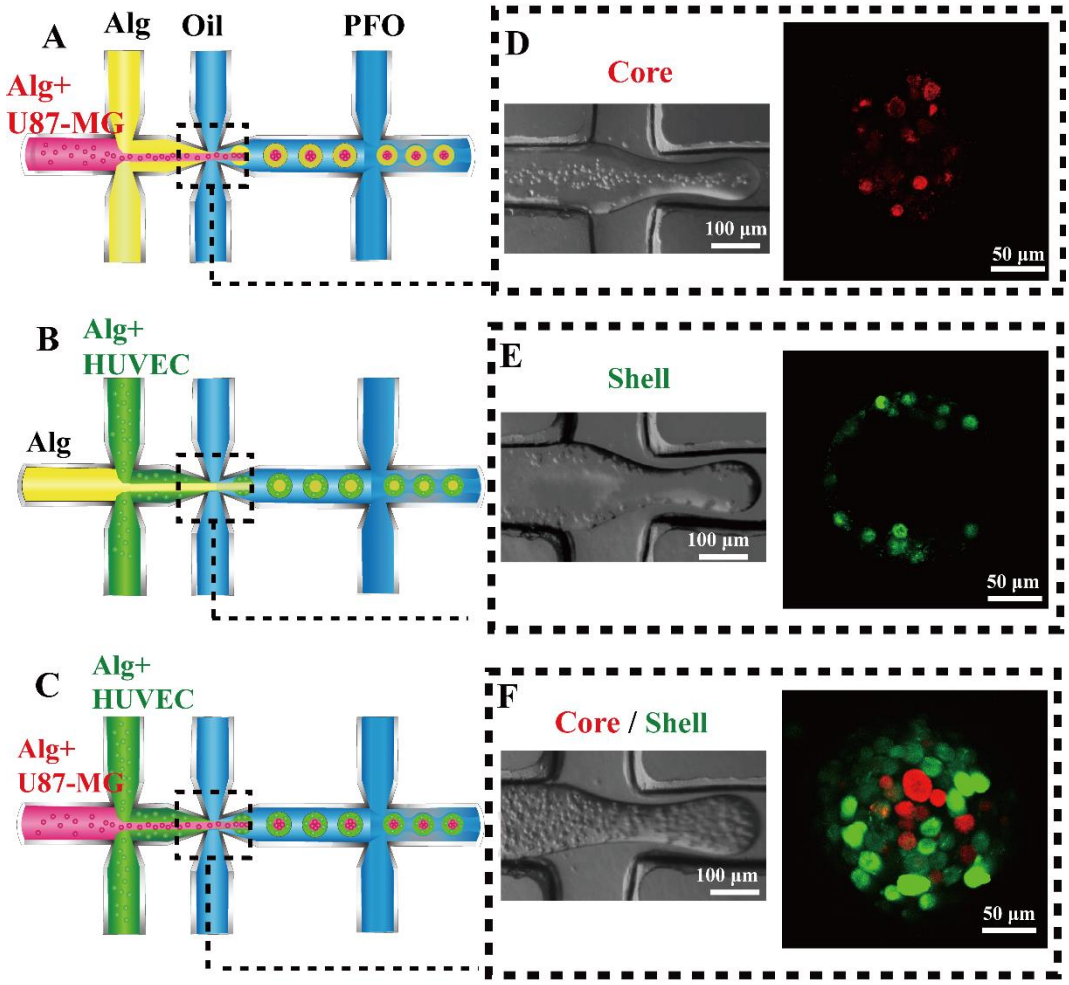

Figure S4. (A-C). A schematic representation of the assembly process of U87-MG cells and HUVEC cells in the core-shell microsphere. (D-F). Corresponding optical images and fluorescent images of microsphere with corresponding spatial structure. (Note: For A-B, The flow rate of the two dispersed phases were separately set as 50 μl/h，while，for C, the flow rate of the U87-MG and HUVEC phases were set as 50 μl/h, 100 μl/h, respectively.)