Supporting Information

Controlled production of sub-millimeter liquid core hydrogel capsules for parallelized 3D cell culture

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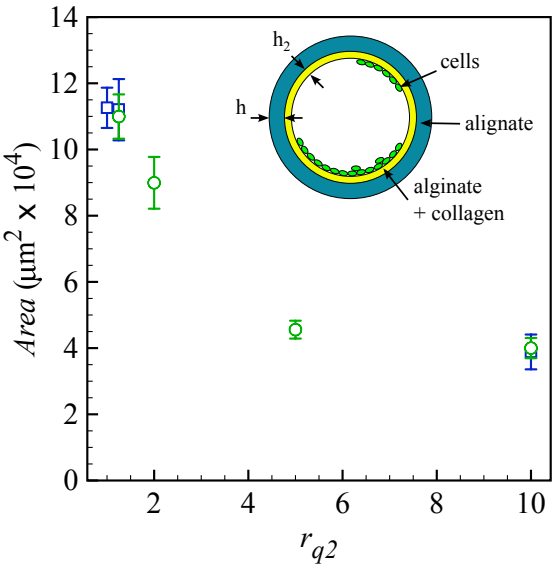

Figure S1: Effect of the flow rate ratio r_{q2} between the core and the intermediate layer on the spreading area of the cells. Two different set of experiments are reported and correspond to day 7 (□) and day 9 (○) after encapsulation. The data points represent average values obtained from 5 to 30 images of capsules like the ones reported in Figure 8. The inset is a schematics of the capsule structure along with the different hydrogel membrane thicknesses set by flow rate ratios.

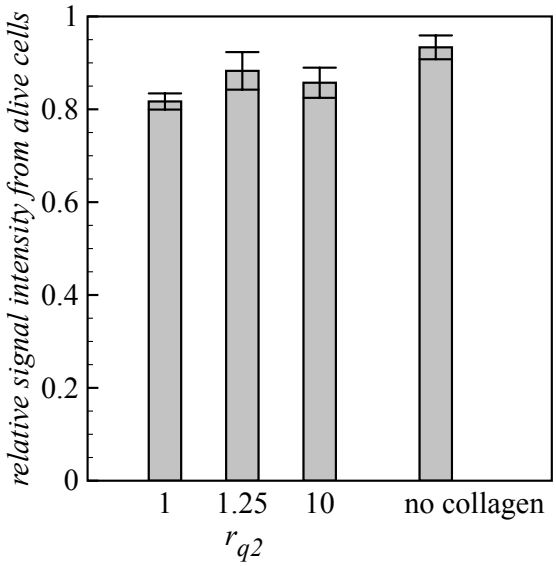

Figure S2: Relative signal intensity from alive cells (green) as a function of the intermediate flow rate ratio r_{q2} and without intermediate layer obtained with the live/dead assay at day 7 from 5 capsules for each condition and for 1 set of experiments.

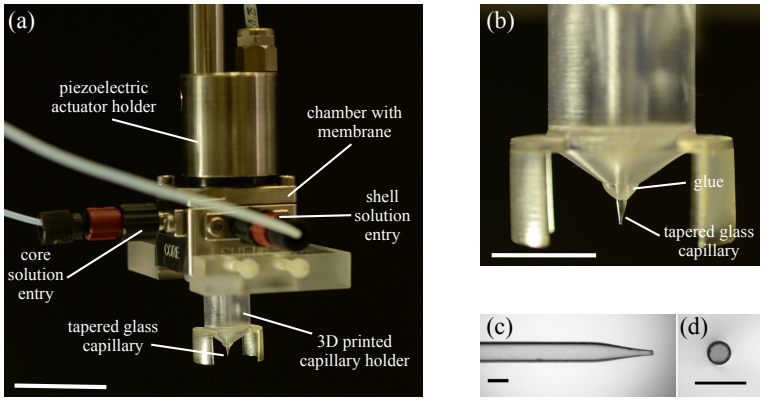

Figure S3: (a) Overview of the encapsulation device. Scale bar is 2 cm. (b) Close view of the 3D printed injector (design file is available upon request). Scale bar is 1 cm. (c) Side view of the tapered glass capillary. Scale bar is 1 mm. (d) Front view of the tapered glass capillary's end. Scale bar is 0.5 mm.

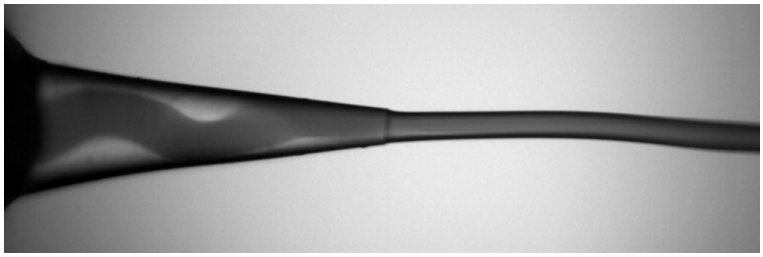

Figure S4: Video 1: Close view of the injector where a shear viscoelastic instability of the annular flow develops and leads to a flapping jet.

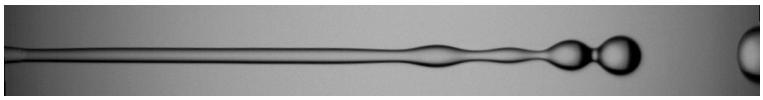

Figure S5: Video 2: Visualisation of the jet fragmentation without any controlled perturbations. The inner diameter of the glass tip is 170 μm, the flow rate ratio is 3, the total flow rate is 120 mL/h, the outer solution viscosity is 1.82 Pa.s and the inner one is 34 mPa.s.

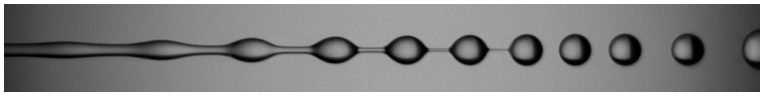

Figure S6: Video 3: Visualisation of the jet fragmentation under harmonic perturbations, $U_p = 3$ V, $f = 800$ Hz. The inner diameter of the glass tip is 170 μm, the flow rate ratio is 3, the total flow rate is 120 mL/h, the outer solution viscosity is 1.82 Pa.s and the inner one is 34 mPa.s.