Electronic Supplementary Material (ESI) for Lab on a Chip

Supporting Information

Automated generation of libraries of nL droplets.

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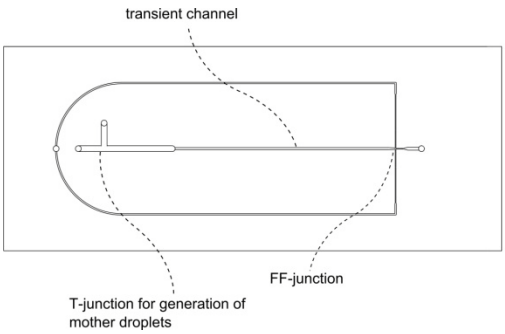

Fig S1. Schematics of the microfluidic chip that we used to study role of the geometry of the connection between the wide inlet channel and the narrow flow-focusing junction on the quality of the volume distribution of the daughter droplets.

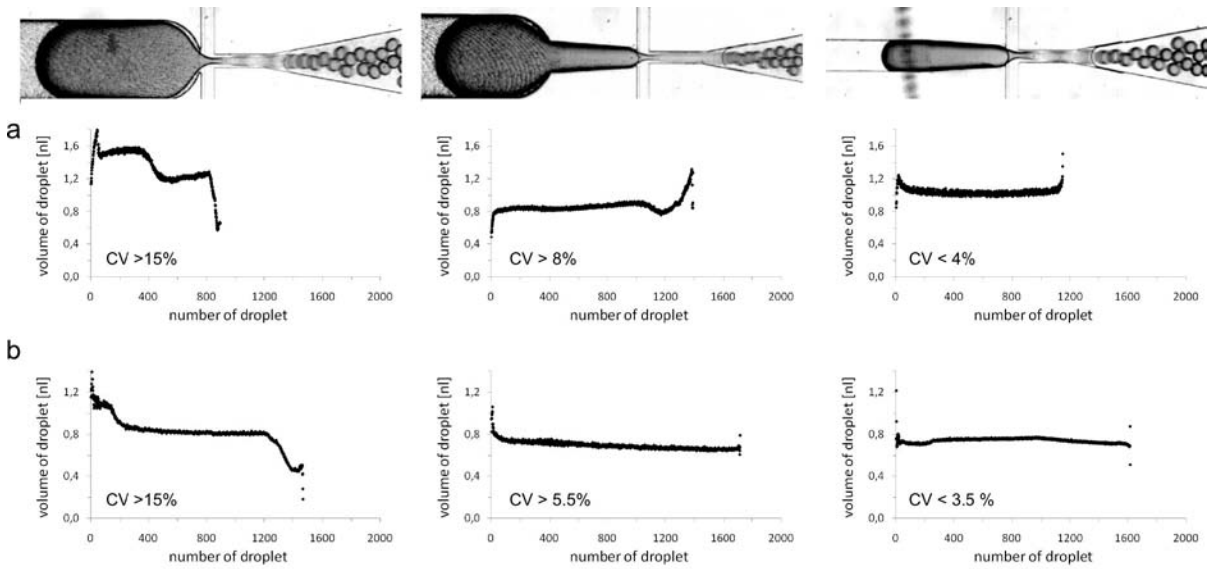

Fig S2. Micrographs of the three geometries of the connection between the wide inlet for the parental plugs and the narrow flow-focusing junction. From left to right, geometries referred to (in the main text) as a, b and c. Underneath each micrograph two graphs of the volumes of daughter droplets produced from a single parental plug in different sets of oil and surfactant. In row (a) perfluorocarbon HFE-7500 with 3% of PFPE-PEG-PFPE triblock surfactant and in row (b) paraffin oil Pionier 7467 with 2% Span 80. Scale bar is 800 μm.

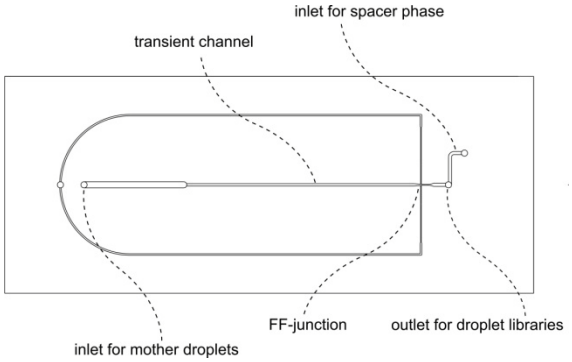

Fig S3. A schematic diagram of the microfluidic chip that we used for transformation of the sequences of ~microliter liquid plugs into populations of monodisperse daughter droplets.

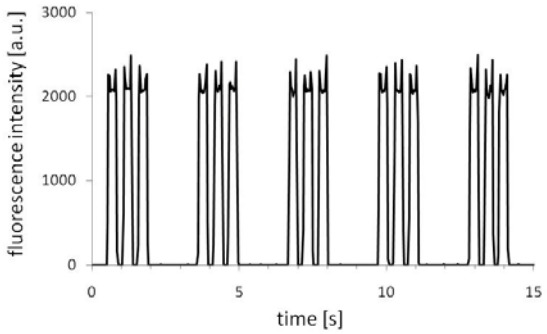

Fig S4. Intensity of fluorescence from a sequence of 27 droplets. The sequence contained groups of three drops, in alternation, three drops contained fluorescent dye and three contained neat water. We observed no fluorescence from the clean droplets, suggesting lack of cross-contamination between the samples. Please note that the signal from the neat droplets is zero - i.e. they are not visible on the graph.

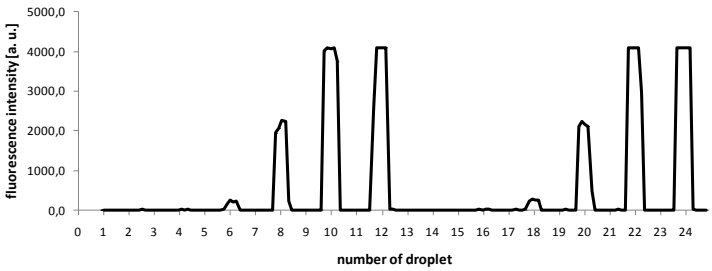

Fig S5. Intensity of fluorescence from a sequence of 24 droplets. The sequence comprised patterns of 12 droplets: odd droplets contained neat water and even droplets contained aqueous solutions of fluorescein at gradually increasing concentrations: 1 nM; 10 nM; 100 nM; 1 μM; 10μM; 100 μM. We observed no fluorescence from the clean droplets and from droplets with concentration of dye lower than 100 nM. Water droplet no 11 which is placed between droplet with highest concentration (no 10 and 12), also does not show fluorescence above the limit of detection (corresponding to concentration of 100 nM). This suggests that the level of cross contamination is lower than 0.1%. The level of signal from droplet containing 10 μM and 100 μM is equal due to saturation of the detector.