Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic Supplementary Information

Single-Cell Isolation by Modular Single-Cell Pipette for RNA-Sequencing

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The Supporting Information includes:

Figures S1-S6

Movie S1 showing the mSCP for single-cell isolation with 3 times acceleration.

Movie S2 showing single-cell capture by applying negative pressure and single-cell release by applying positive pressure.

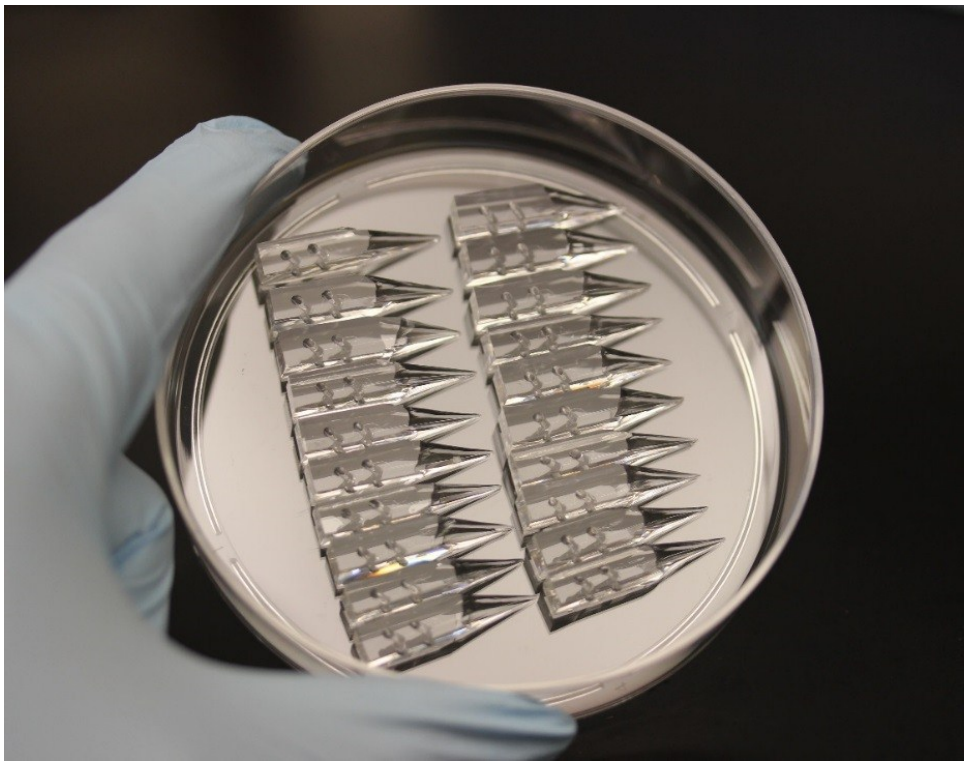

Figure S1. 20 SCP-Tips are laid on a Petri dish with 9 mm in diameter.

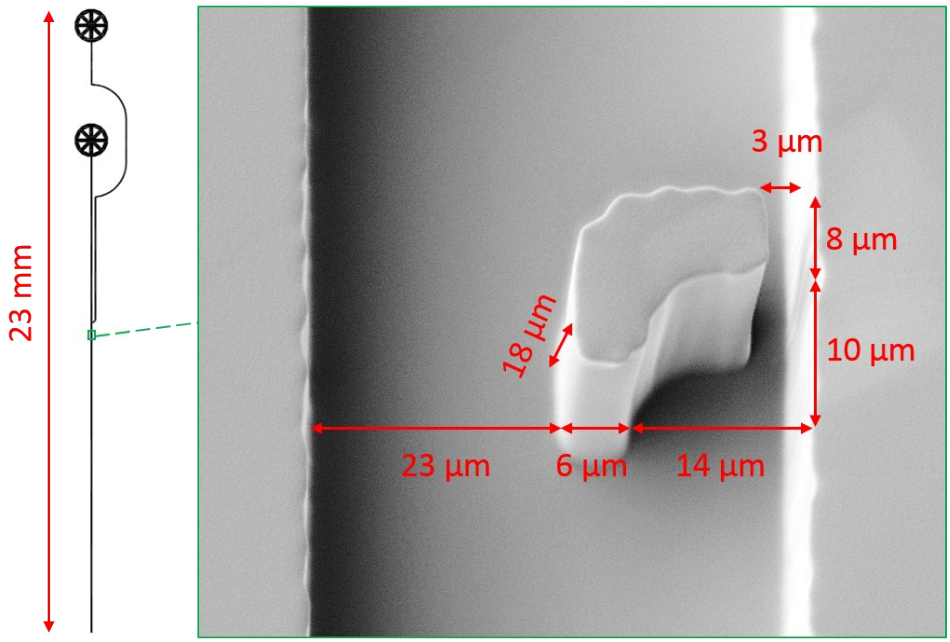

Figure S2. Detailed dimensions of SCP-Tip containing a hook.

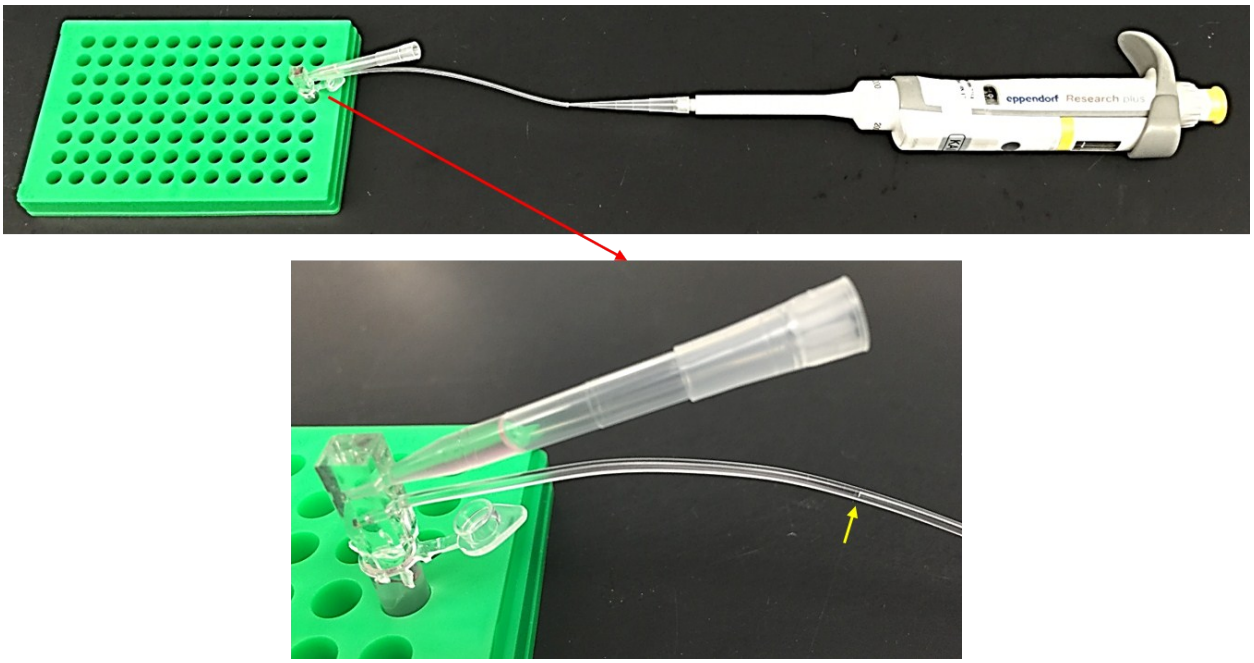

Figure S3. Operational process for evaluating the relationship between applied negative pressure and average liquid velocity. The gas-liquid interface into the microtubing is clear and indicated by the yellow arrow in the magnified photograph. The inner diameter of the microtubing is 500 µm. The average liquid velocity within the microtubing (v_t, m/s) is calculated according to the Equation 1: $v_t = l/t$, where l is the increased liquid length (m) and t is time (s). The average liquid velocity within the microchannels (m/s) (v_c) is calculated according to the Equation 2: $v_c = \Phi \cdot v_t \cdot \pi \cdot r^2/(w \cdot h)$, where Φ is fluid resistance-based correction factor (0.4 in SCP-Tip containing a hook and 0.5 in SCP-Tip containing a hydrodynamic trap), r is radius of microtubing (m), w is width of microchannel (m), and h is height of microchannel (m).

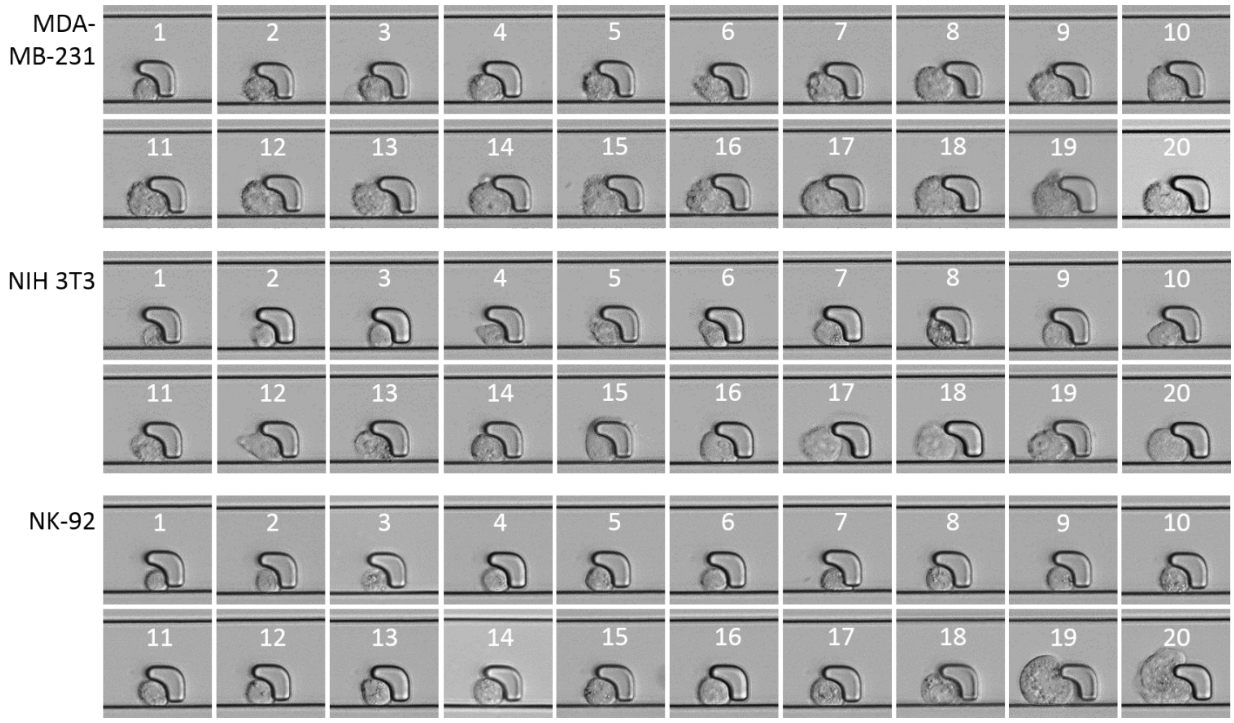

Figure S4. Single-cell capture by hook, including MDA-MB-231(breast cancer cell) with diameter of 12-20 µm, NIH 3T3 (fibroblast) with diameter of 10-18 µm, and NK-92 (natural killer cell) with diameter of 9-24 µm. For each cell type, 20 single cells are randomly captured. Micrographs are arrayed according to the size of single cells.

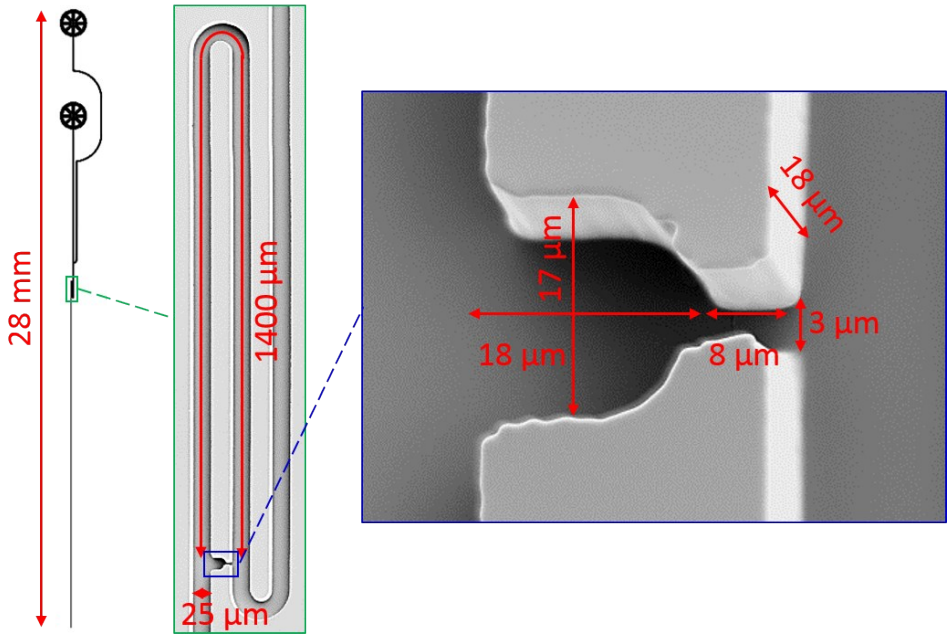

Figure S5. Detailed dimensions of SCP-Tip containing a hydrodynamic trap.

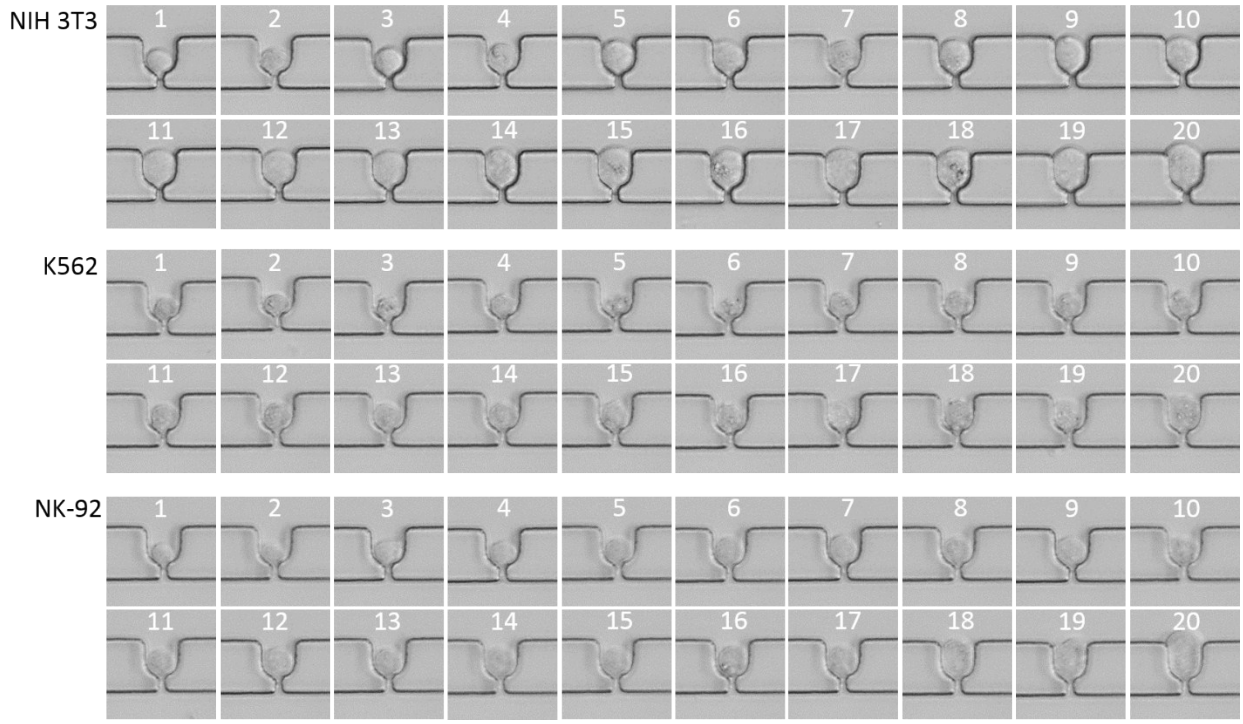

Figure S6. Single-cell capture by hydrodynamic trap, including NIH 3T3 with diameter of 13-18 µm, K562 (lymphoblast) with diameter of 12-17 µm, and NK-92 with diameter of 11-20 µm. For each cell type, 20 single cells are randomly captured. Micrographs are arrayed according to the size of single cells.