Electronic Supplementary Material (ESI) for Analyst.

Supplemental information

Title: Label-free separation and culture of tumor cells in a microfluidic biochip

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This supplemental information provides details of device design, expanded view of trapped cells inside the microfluidic chamber and the cell growth in traditional six-well plate as a control to the onchip culture.

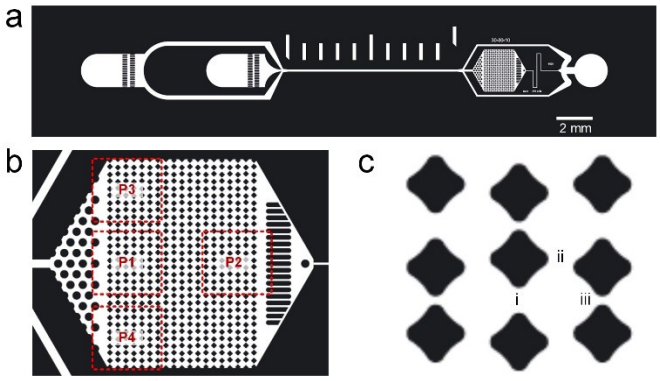

Fig. S1 Device layout and structure details inside the trapping/culture chamber. (a) Overview of the device. (b) Blowup of the trapping chamber. The four red dashed squares indicate the four observation windows for charactering cell growth curve. (c) Details of the trapping post array. Gap sizes are 28, 28, and 12 μm for gap (i), (ii) and (iii).

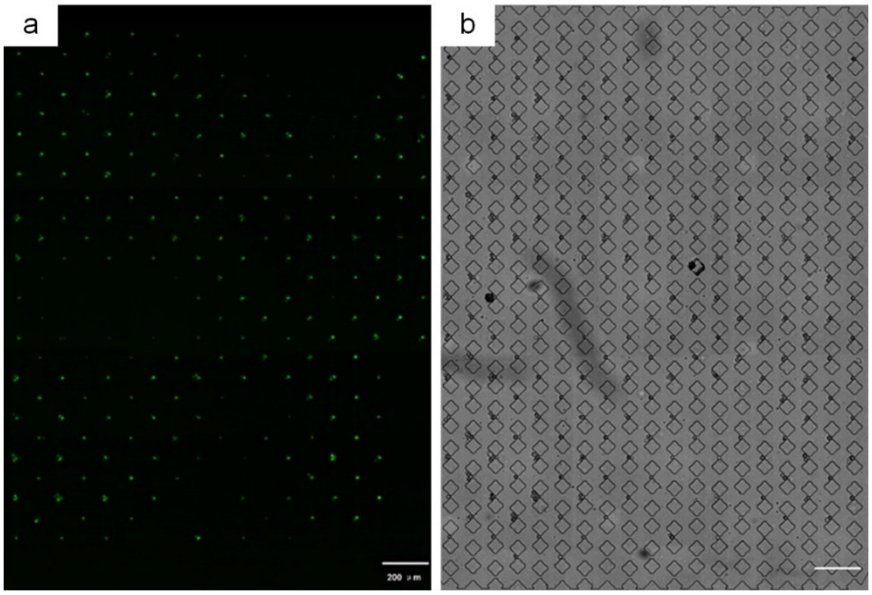

Fig. S2 Stitched fluorescent and brightfield images showing uneven trapping inside the chamber. HeLa cells were pre-stained with Hoechst 33342 prior to the experiment. (a) Fluorescent image of trapping, which is pseudocolored in green and (b) the corresponding bright-field image of stitched image.

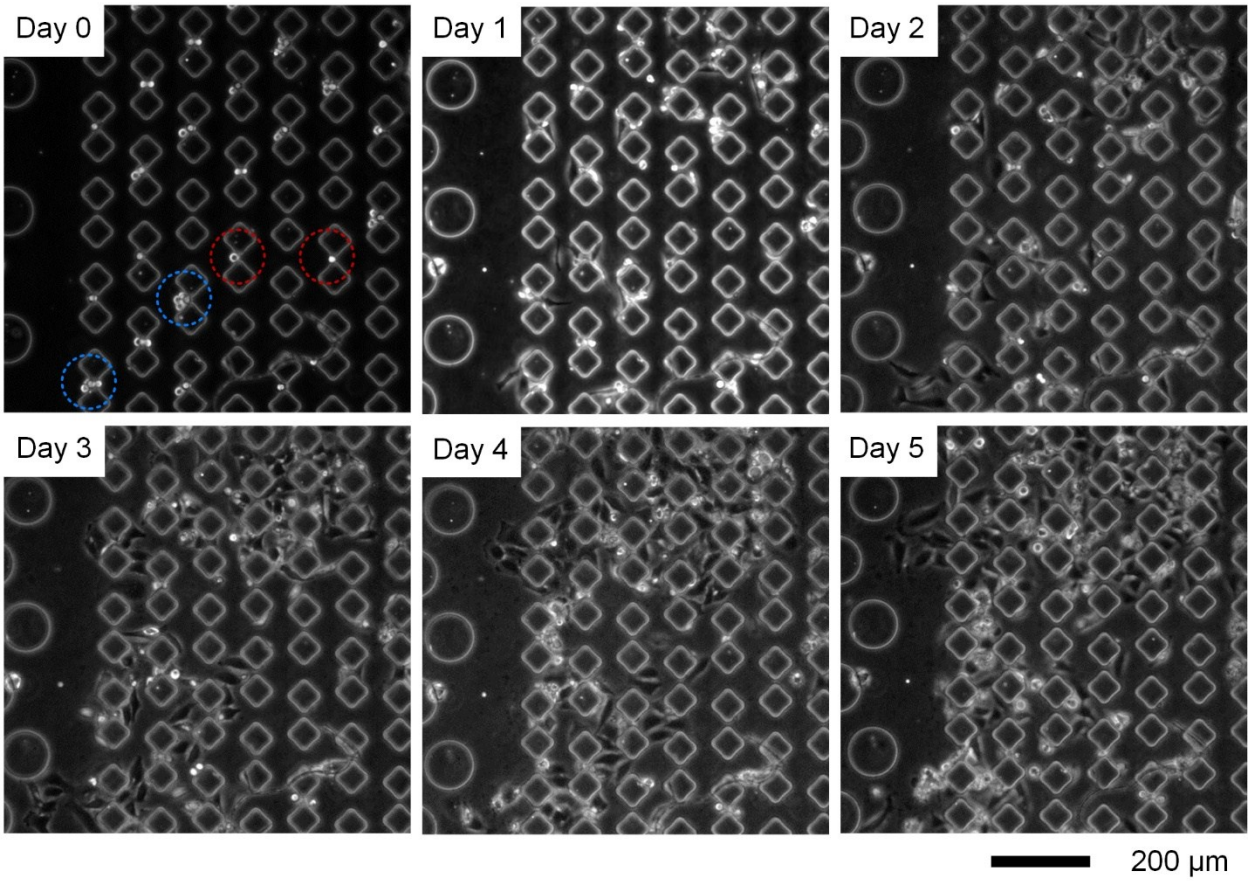

Fig. S3 *In situ* culture of HeLa cells. Phase-contrast images showing cell growth inside the chamber. Image of day 0 was taken 6 hours after cell separation and trapping.

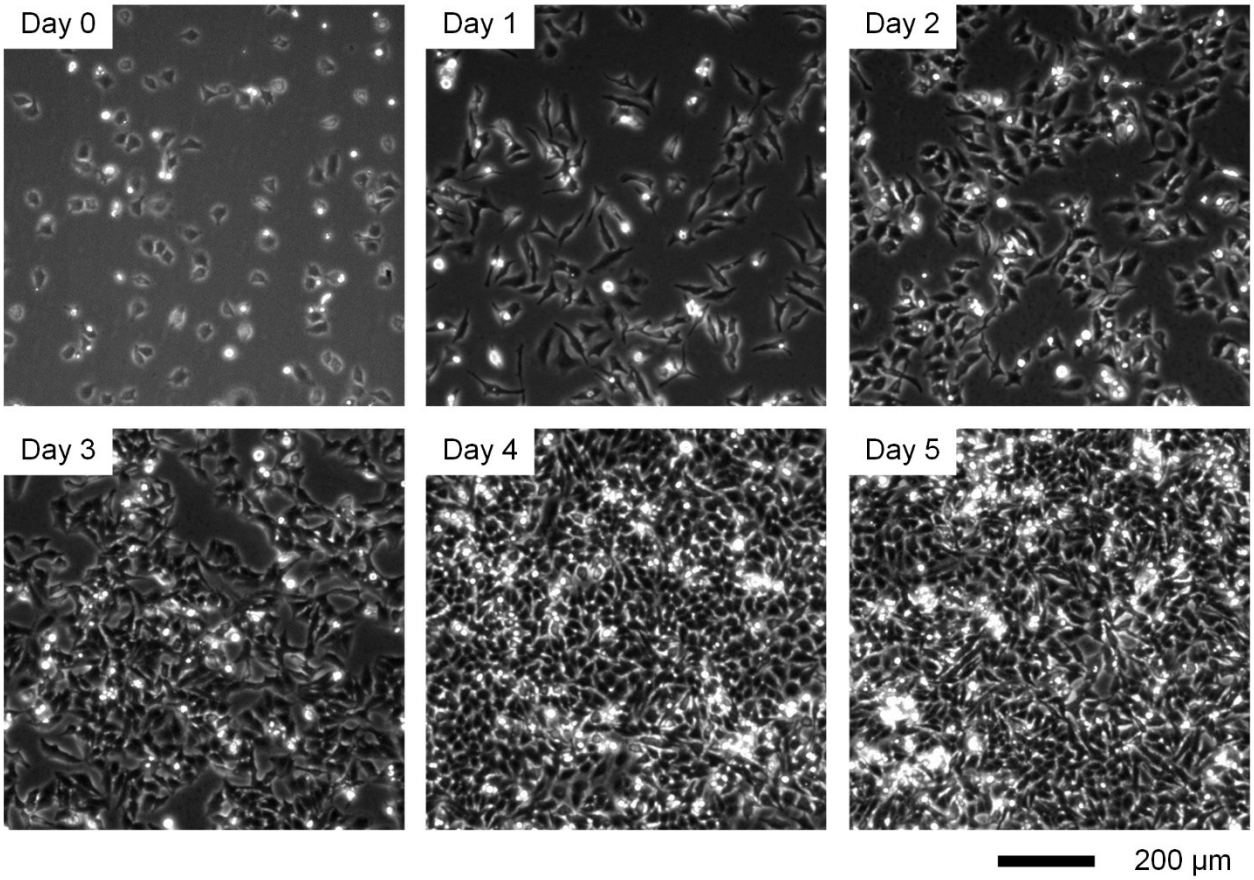

Fig. S4 Phase-contrast images of conventional culture of HeLa cells in six-well plate. Day 0 was imaged 6 hours later after cell seeding.

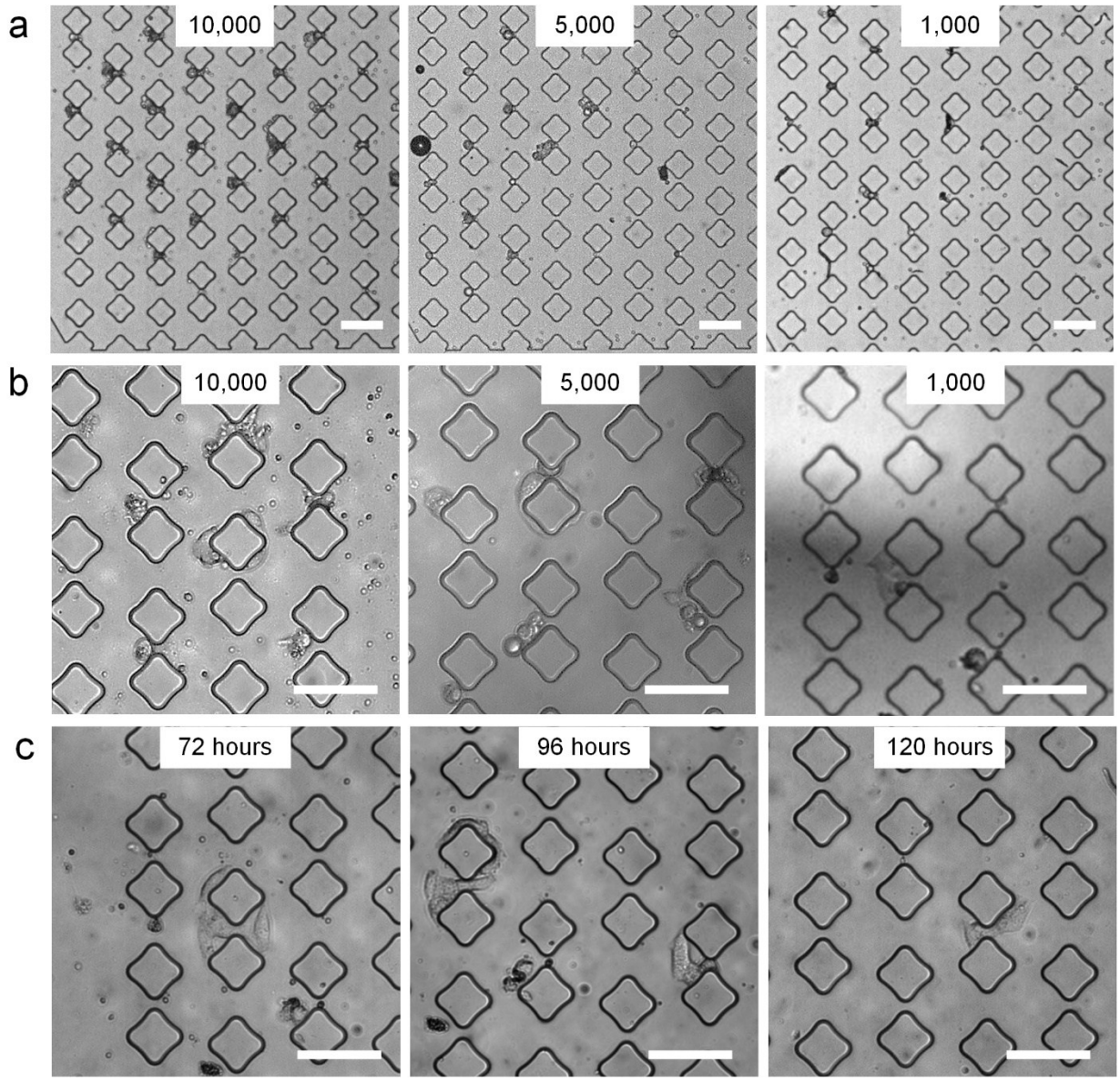

Fig. S5 Onchip separation and *in situ* culture of Hep G2 cells. Hep G2 cells were spiked into whole blood at the concentration of 10,000, 5,000 and 1,000 cells per mL. (a) Cells trapped in the micropost array after separation from blood. (b) Cell adherence observed 24 hours after trapping for all three spiking concentrations. (c) Observation of cell growth for 5 days (cell spiking concentration of 1,000 cells per mL). Some blood cells were also retained in the culture chamber due to the extremely high cell density of blood. These are bright-field images. Scale bars represent 100 μm.

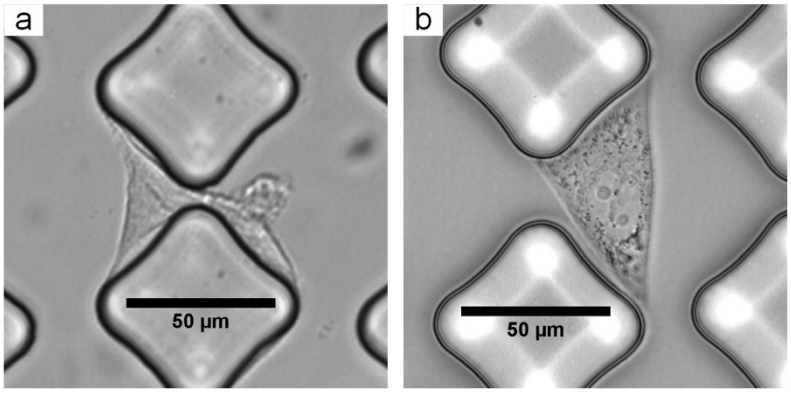

Fig. S6 Onchip culture of two additional cell-line cells inside microfluidic chambers with trapping arrays. (a) A549 cells on day 4. (b) H2228 cell on day 3. Here the same trapping design was used but gap sizes were modified slightly.