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

Crossed flow microfluidics for high throughput screening of bioactive chemical-cell interactions

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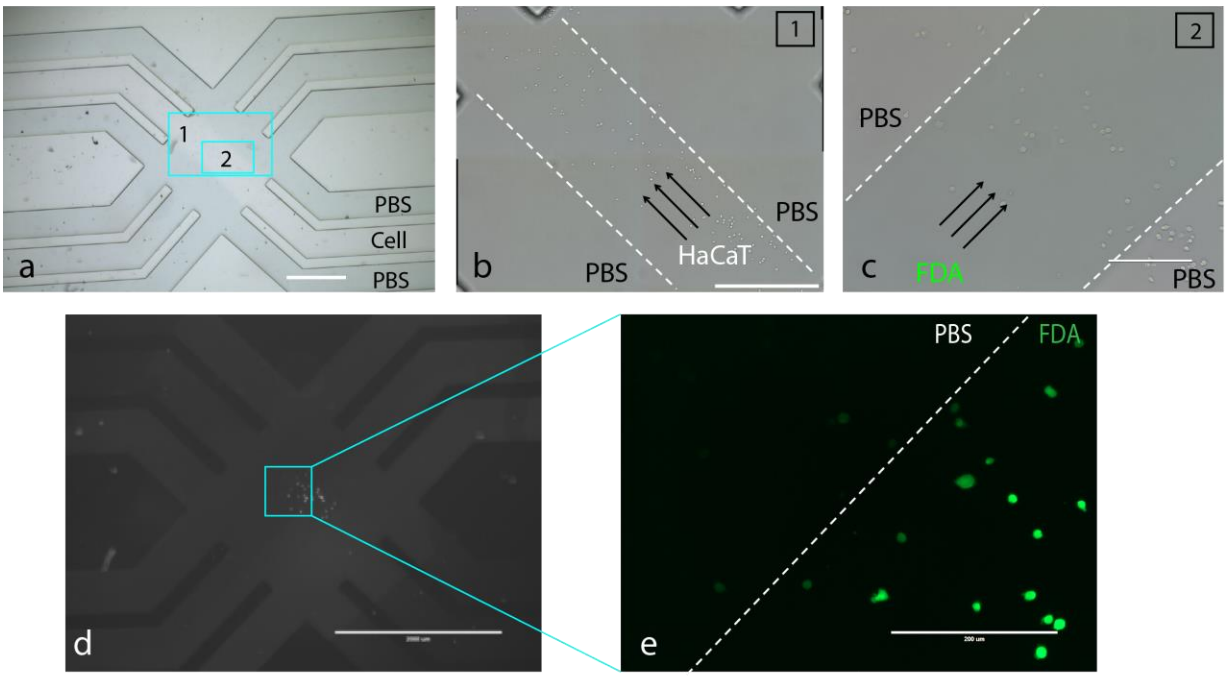
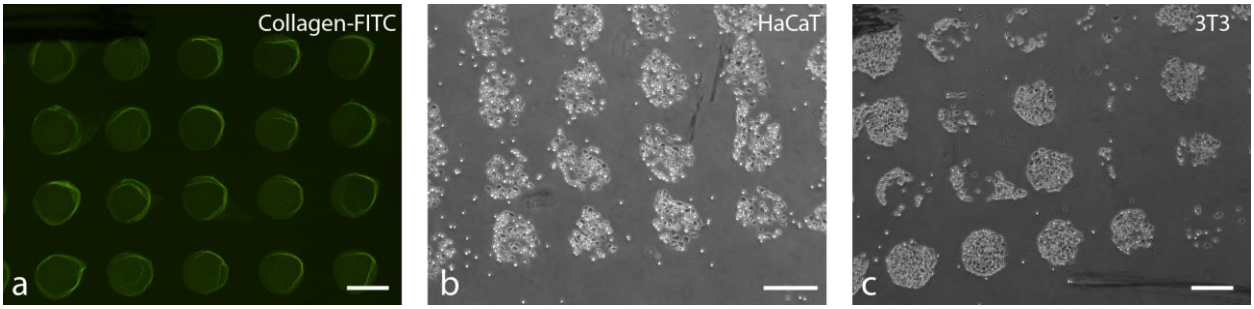
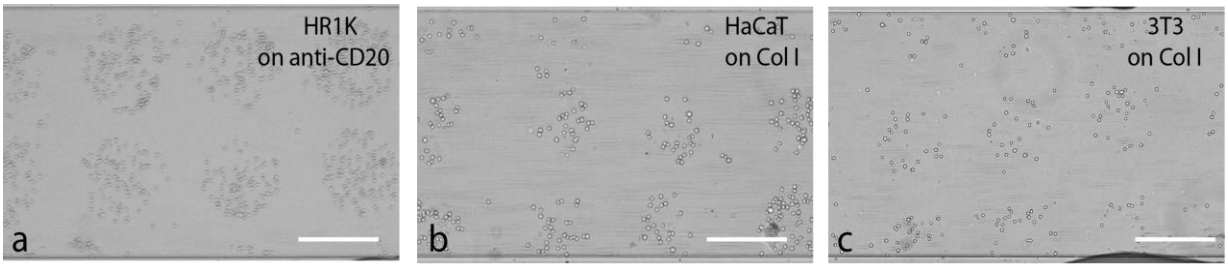
Electronic supplementary figures



Supplementary Figure 1. HaCaT cells capture on 3x3 chip. (a) A micrograph of the reaction area of a 3x3 chip design with the cell suspension flowing in the central channel and was sandwiched by PBS buffer streams. (b) Region 1 in (a), where HaCaT cells were captured by immobilized type I collagen. (c) Region 2 in (a), where FDA treatment stream sandwiched by PBS streams were perfused over the HaCaT cells. Low (d) and high (e) magnification fluorescence microscopy images showing the regions where cells in contact with FDA solution showed green fluorescence signal and PBS contacted area lacking fluorescence signal. Scale bars: a) 1mm; b) 500 µm; c,e) 200 µm; d) 2 mm.



Supplementary Figure 2. On-chip capture of adherent cells under static conditions. (a) Microarray of type 1 collagen-FITC was developed using a micro arrayer equipped with 350 µm diameter capillary pin. HaCaT (b) and 3T3 (c) cells were harvested and incubated statically over the collagen microarray and loosely bounded cells were washed away. Scale bars: a-c) 350 µm.



Supplementary Figure 3. On-chip cell capture under perfusion using single-channeled microfluidic chip. (a) HR1K cells were perfused and captured over anti-CD20 antibody printed array. HaCaT (b) and 3T3 (c) cells were perfused and captured on type 1 collagen arrays. Scale bars: a-c) 350 µm.

Electronic supplementary videos

Video 1: HR1K cells were immobilized on anti-CD20 antibody spots via the microfluidic platform. Medium flow rate (3X cell loading flow rate) was perfused for 15 minutes and no cell dissociation was observed.

Video 2: HR1K cells were immobilized on anti-CD20 antibody spots via the microfluidic platform. High flow rate (5 to 10X cell loading flow rate) was used and cell detachment was observed but no re-attachment to down-stream protein spot as the flow rate was too high for cells to be captured by antibody.