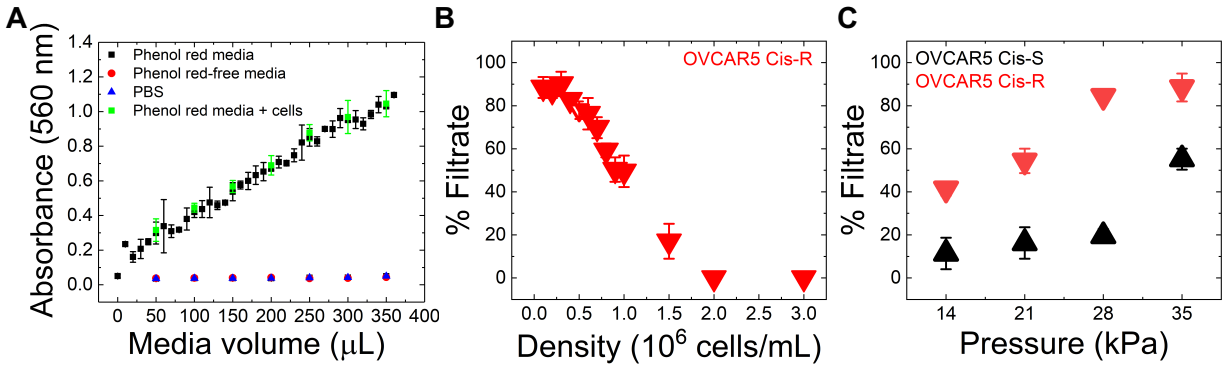
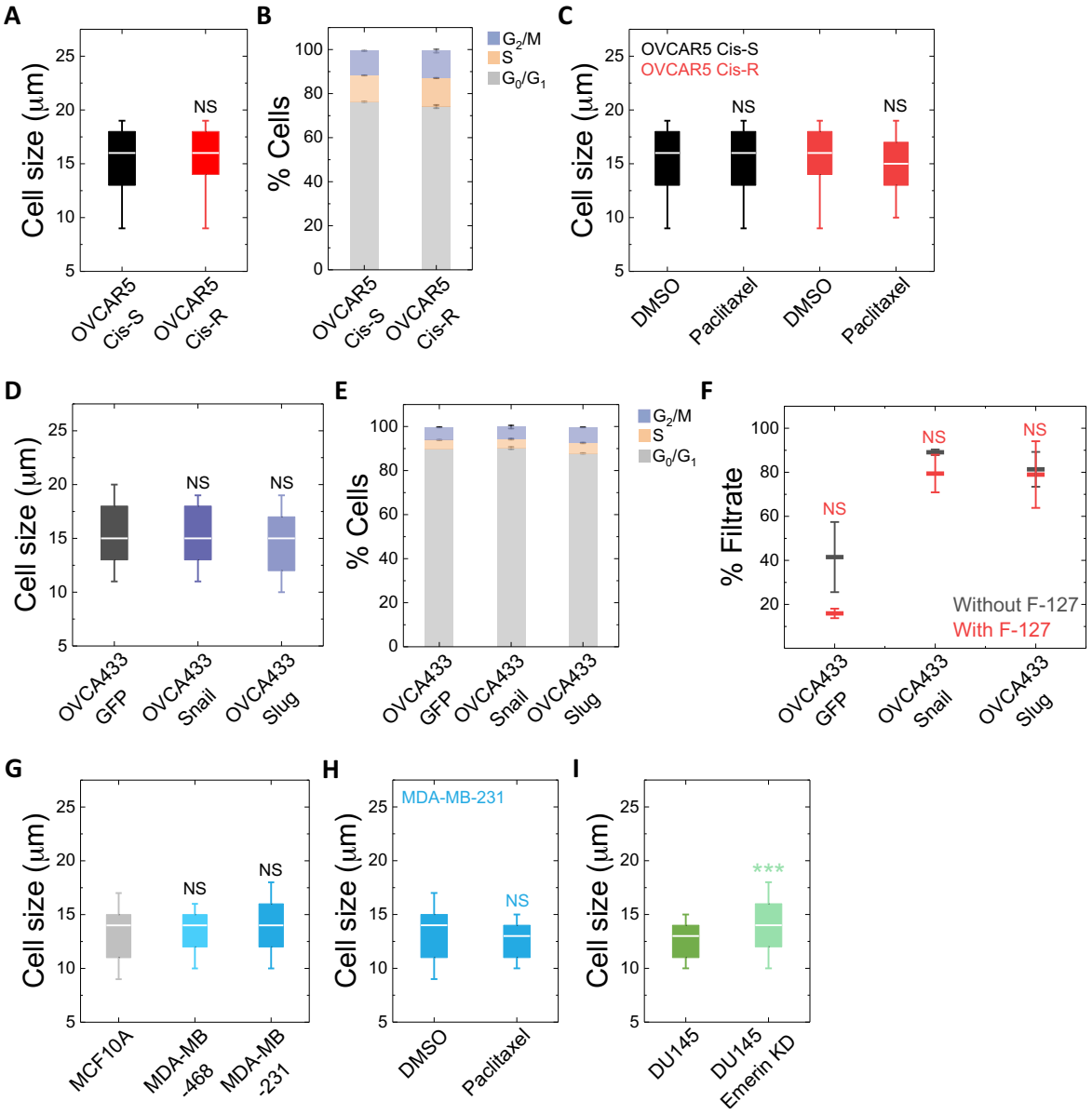
Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Figures

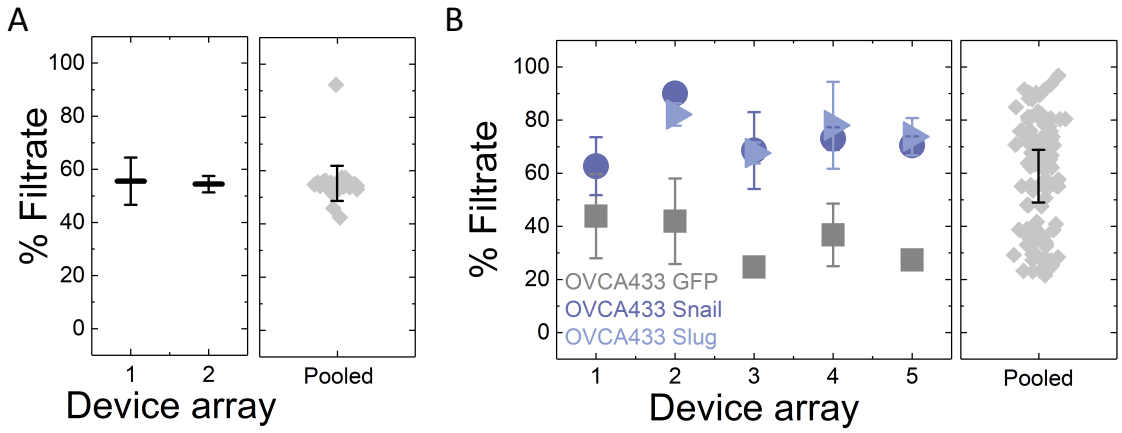


Supplementary Figure 1. Optimization of HT filtration for sensitive- versus resistant-human ovarian cancer (OVCAR5) cells. (A) Absorbance measurements at 560 nm as a function of cell medium volume yields a standard curve. Measurements of cell suspension in phenol red containing media obtained for OVCAR5-CisR cells at 0.5 x 10^6 cells/mL. Below media volumes of ~25 µL, reliable absorbance measurements in a 96-well plate format cannot be obtained, which thus sets the lower limit for filtrate to be ~7% of the initial volume loaded. % Filtrate is determined by volume of filtrate relative to initial volume of a suspension of human ovarian cancer (OVCAR5) cells on: (B) Density of cell suspension. OVCAR5 Cis-R cells are filtered through a device with gap size of 10 µm at 28 kPa over 90 s. Cell density is measured to be within ± 0.04 x 10^6 cells/mL, which is smaller than the symbols. (C) Driving pressure to filter the OVCAR5 Cis-S and Cis-R cell suspension , 0.5 x 10^6 cells/mL, through a device with interpillar gap size of 10 µm over 90 s. Driving pressure is measured to be within ± 0.14 kPa, which is smaller than the symbols. Each data point represents mean ± SD from three independent experiments.



Supplementary Figure 2. Characterization of cell size, cell cycle distribution, and effect of treatment with surfactant (pluronics F-127) on filtration. (A) Cell size data for human ovarian cancer OVCAR5 Cis-S and Cis-R cells. (B) Difference in cell cycle distribution of OVCAR5 Cis-S and Cis-R cells is statistically not significant. (C) Cell size data for OVCAR5 Cis-S and Cis-R cells treated with 0.1 μM paclitaxel for 24 h prior to size measurements. (D) Cell size data for OVCAR433 GFP, Snail and Slug cells. (E) Difference in cell cycle distribution of OVCAR433 GFP, Snail and Slug cells is statistically not significant. (F) Treatment with surfactant (pluronics F-127) does not have a significant effect on filtration of ovarian cancer (OVCA433) cells. Differential filtration of OVCA433 GFP, Snail and Slug cell suspensions with added pluronics F-127 at 0.01% w/v through 10 μm gaps at 28 kPa, 60 s, and 0.5 x 10^6 cells/mL Each data point represents mean ± SD from two independent experiments. Cell size data for human breast cancer (G) MCF10A, MDA-MB-468 and MDA-MB-231 cells, (H) MDA-MB-231 cells treated with 0.1 μM paclitaxel for 24 h prior to size measurements, and human prostate cancer (I) DU145 and DU145 Emerin KD cells. Cell size box plots show the 25th and 75th

percentiles of cell size measurements, whiskers denote 10th and 90th percentiles and line is the median cell size. N > 400 cells over three independent experiments. Statistical significance determined using Mann Whitney U test. Cell cycle data sets represent mean ± SD from two independent experiments. Statistical significance determined using student's t-test. *** p < 0.001; ** p < 0.01; * p < 0.05.



Supplementary Figure 3. Quantification of variability in filtration measurements. (A) Filtration of media without cells through HTF device arrays with gap size of 10 μm at 38 kPa for 20 s. Shown here is data from two device arrays. Pooled data indicates the pooled SD in measurements. (B) Differential filtration of OVCA433 GFP, Snail and Slug cells using five different PDMS device arrays with interpillar gap size of 10 μm at 28 kPa for 60 s and 0.5 x 10^6 cells/mL. Each data point represents mean ± SD. Pooled data indicates the pooled SD in measurements of % filtrate using HTF.