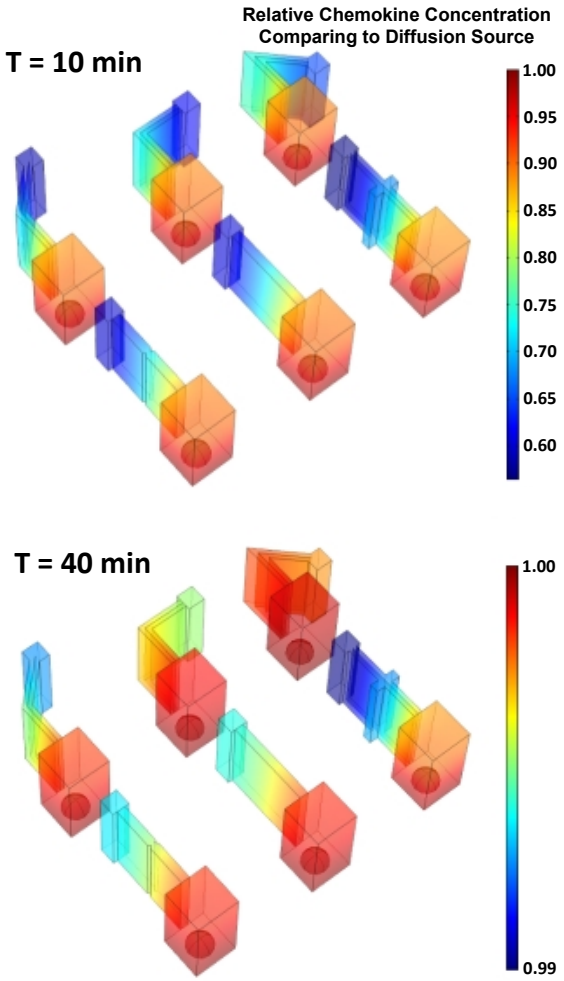
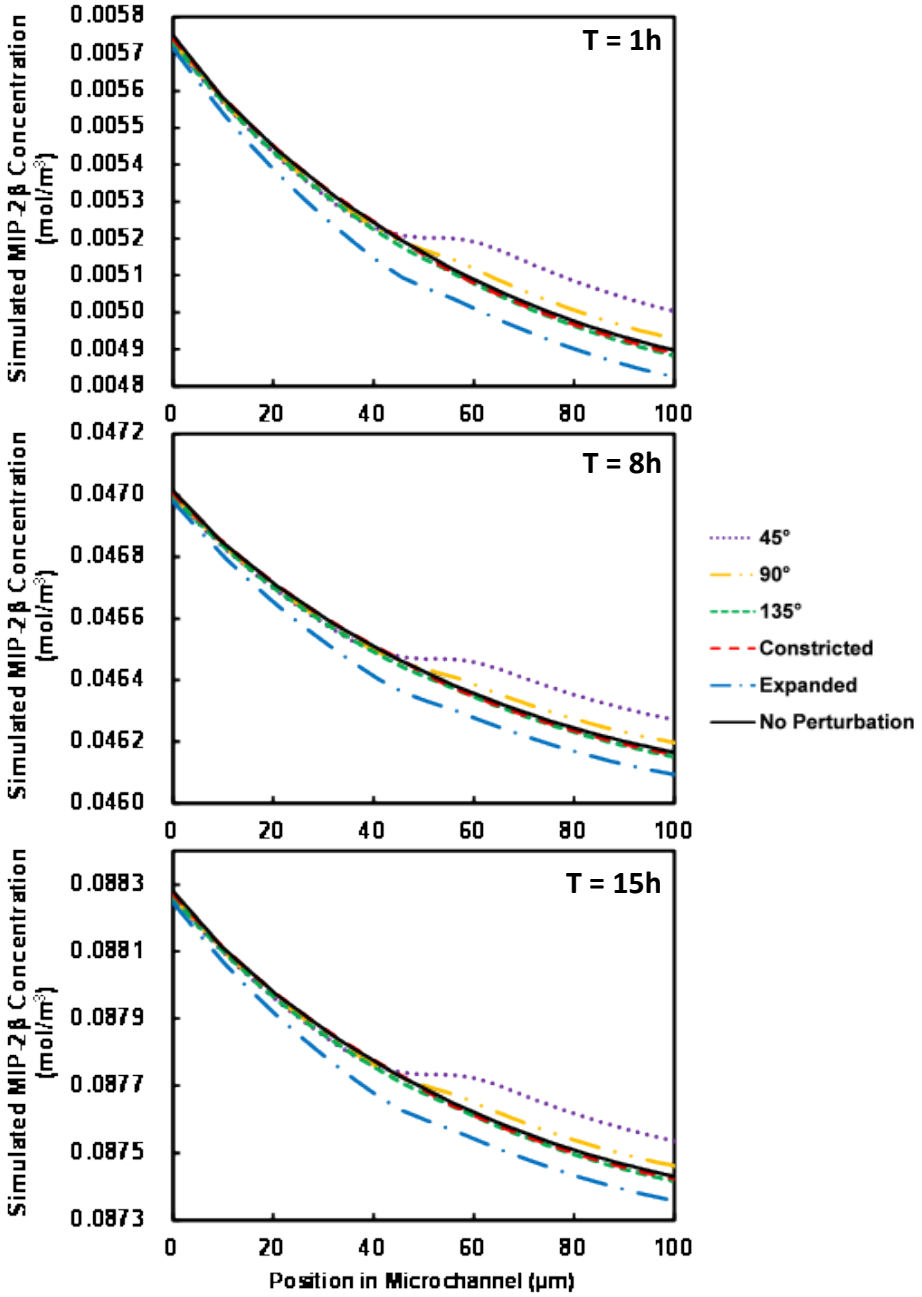
Electronic Supplementary Material (ESI) for Lab on a Chip.

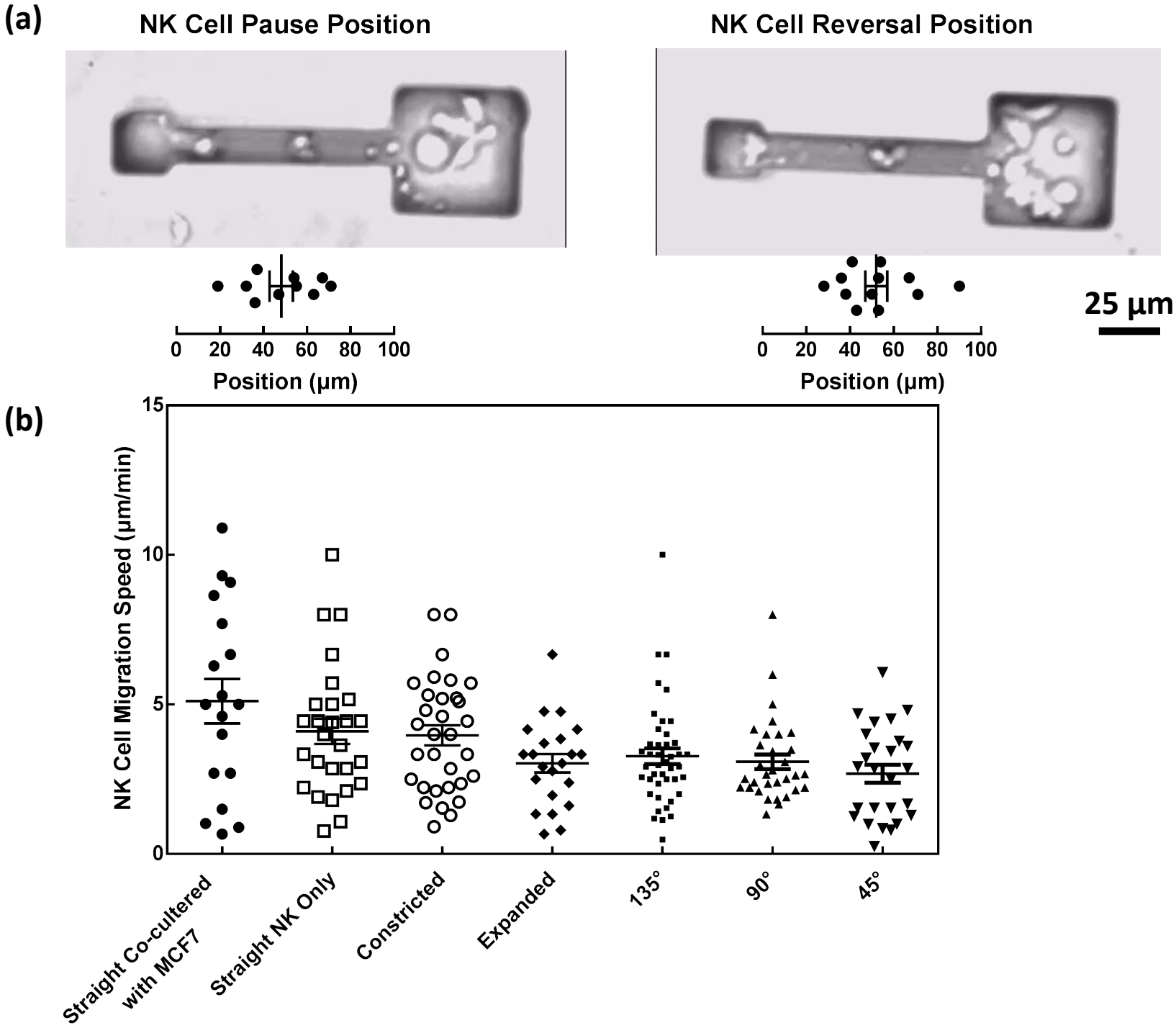
Supplementary Figures

(a)


Relative Chemokine Concentration
Comparing to Diffusion Source
T = 10 min
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
T = 40 min
1.00
0.99

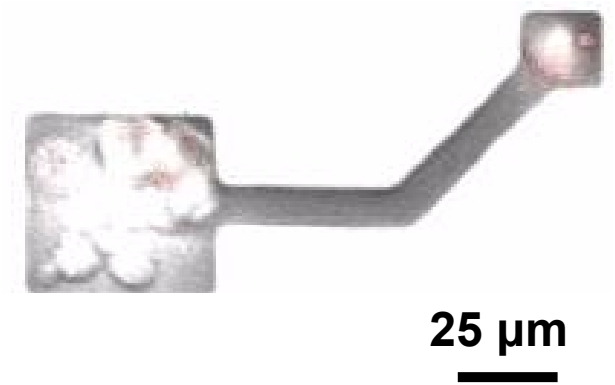
(b)


T = 1h
T = 8h
T = 15h
Simulated MIP-2β Concentration (mol/m³)
0.0058
0.0057
0.0056
0.0055
0.0054
0.0053
0.0052
0.0051
0.0050
0.0049
0.0048
0.0472
0.0470
0.0468
0.0466
0.0464
0.0462
0.0460
0.0883
0.0881
0.0879
0.0877
0.0875
0.0873
0
20
40
60
80
100
Position in Microchannel (μm)
45°
90°
135°
Constricted
Expanded
No Perturbation


(a)
NK Cell Pause Position
NK Cell Reversal Position
0 20 40 60 80 100
Position (μm)
0 20 40 60 80 100
Position (μm)
25 μm
(b)
NK Cell Migration Speed (μm/min)
15
10
5
0
Straight Co-cultered with MCF7
Straight NK Only
Constricted
Expanded
135°
90°
45°

(a)

Pass

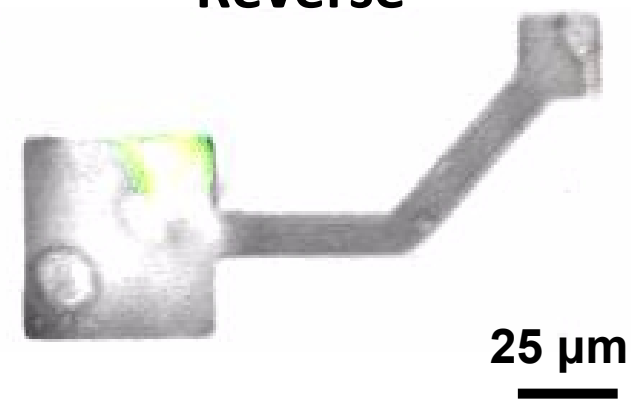


(b)

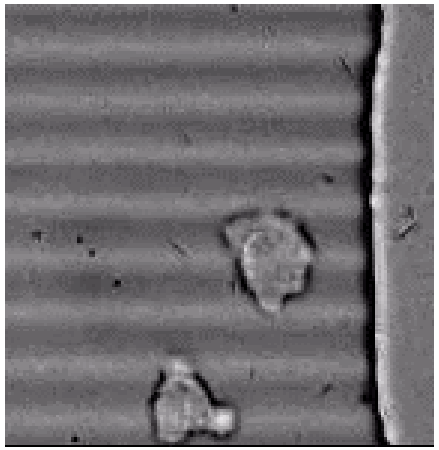
Pause

(c)

Reverse



(a)



No Migration –
Moved around
Adhesion Sites

(b)

Migration –
Release from
Adhesion Sites

Figure Captions

S1: Numerical simulation of chemokine diffusion in the microchannels. (a) Comparison of chemokine concentration in relation to diffusion source. The concentration need over 40 min to reach equilibrium when diffusion source has a constant chemokine concentration. (b) Chemokine gradient across the microchannels with different perturbations at different time stamp. Difference of concentration was always ~ 9×10^{-4} mol/m^3.

S2: NK cell migration without MCF7 cell co-culture inside microwell and microchannel arrays. (a) Movies of random NK cell pauses and reversals inside straight channel without perturbations. Individual and average positions of these occurrences were recorded. (b) Average migration speed of NK cells in straight microchannels without presence of MCF7 cells. Highly motile NK cells could enter microchannels, average migration speed did not have significant difference compared to their conterparts with MCF7 co-cultured.

S3: Movies of NK cell (a) passing, (b) pausing, and (c) reversing at 135 degree bends.

S4: NK cell morphology change during migration in confined microchannel with patterns. (a) NK cell generated adhesion sites on grating edges and moved around adhesion sites. (b) NK cell migrated perpendicular to grating orientation and released from previously established adhesion sites.