Bubbles Navigating through Networks of Microchannels

(Supplementary Information)

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Table S1. Occupancy of channels by bubbles and the selection of the path at the first intersection of the network shown in Figs. 2, 4, 5.

	Occupancy of channel (# of bubbles)					The path an incoming bubble selects
	A	B	C	D	E	
(1)	0	0	1	1	1	Right (A)
(2)	0	0	1	0	1	Right (A)
(3)	0	0	2	1	0	Right (A)
(4)	1	0	1	0	2	Right (A)
(5)	0	0	1	1	0	Left (B|CD|E)
(6)	1	0	0	1	1	Left (B|CD|E)
(7)	1	0	1	0	1	Left (B|CD|E)
(8)	1	0	1	1	0	Left (B|CD|E)
(9)	1	0	1	0	0	Left (B|CD|E)
(10)	1	0	2	0	1	Left (B|CD|E)
(11)	2	0	1	0	0	Left (B|CD|E)

Note: The data set (3) and (5) determined the lower and upper bound of the resistance of a bubble, respectively.

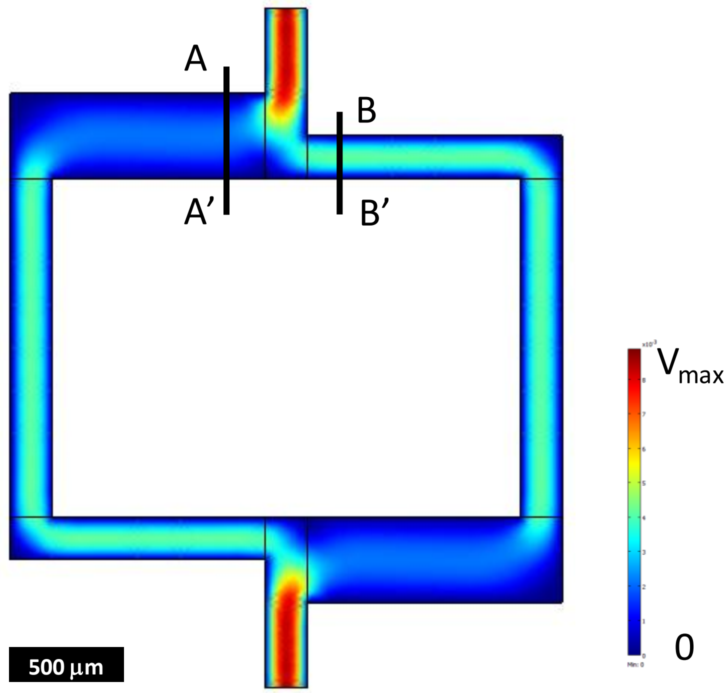

Figure S1. The flow field of a single-phase Newtonian fluid in a point-symmetric two-path network. The Reynolds number is set to be zero so that the flow is Stokesian whose flow field can be calculated by solving Equations 1 and 2. The viscosity and density of the hypothetical fluid are set to 1 (kg m s^{-1}) and zero, and the pressures at the inlet (top) and outlet (bottom) are 1 (Pa) and zero. Obviously the flow field is point-symmetric as well, making the volumetric flows across the A-A' and B-B' cross-sectional areas to be identical.