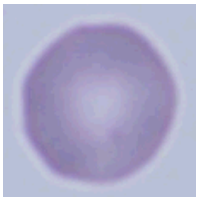
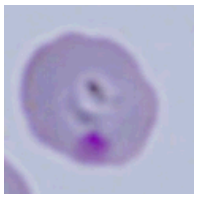
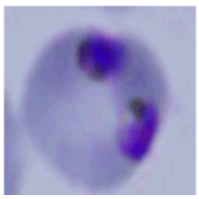
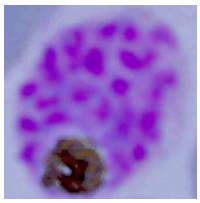
Deformability based cell margination - A simple microfluidic design for high throughput malaria infected erythrocytes separation

Supporting Information

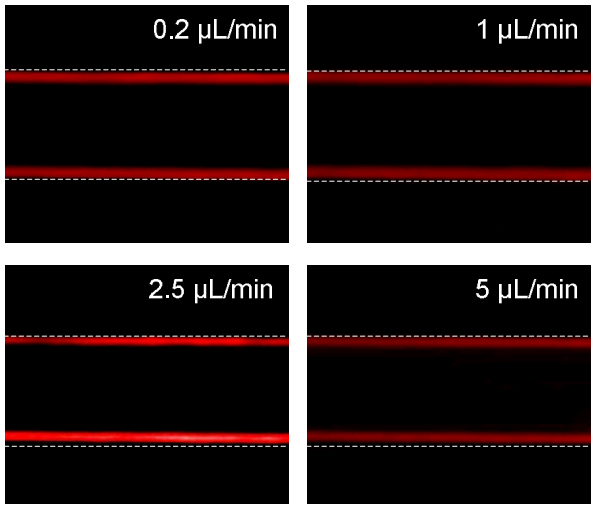
SI Table 1

Classification of *P. Falciparum* infected erythrocytes.

Infection stage	Giemsa stained micrograph	Elastic modulus * (μN/m)
Normal RBCs		8
Ring stage		16
Trophozoite stage		21.3
Schizont stage		53.3

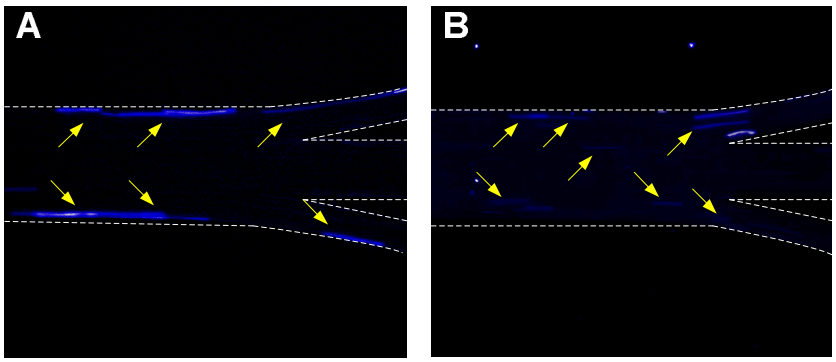
* Obtained from S. Suresh et al. *Acta Biomaterialia* (2005) [Ref #8]

SI Figure S1



Superimposed images confirming the margination of 6 µm beads (fluorescently labeled red) to the channel sidewalls at the microchannel outlet. Tests were conducted with a 40% hematocrit sample spiked with fluorescently labeled beads at flow rates ranging from 0.2 µL/min to 5 µL/min. (white dotted lines indicate the approximate channel wall boundaries).

SI Figure S2



Schematic illustration of the microchannel outlet showing the margination of fluorescently labeled early and late *i*RBCs spiked in 40% hematocrit sample flowing at 5 µL/min. (**A**) The stiffer late trophozoite/schizont stage *i*RBCs (fluorescently labeled blue) are displaced completely to the sidewalls which are then collected by the asymmetrical smaller daughter side channels. (**B**) Due to the subtle differences in deformability compared to uninfected RBCs, the ring stage *i*RBCs do not marginate completely to the sidewalls as compared to the late stage cells. Nonetheless, the infected cells are still efficiently collected by the smaller daughter side channels.

SI Movie 1

Video of the microchannel outlet region clearly indicating the margination of 3µm beads in 10% hematocrit sample flowing at 2.5 µL/min. Even at low hematocrit, the stiff beads marginate

efficiently to the sides as the deformable RBCs focus at the channel centre. Also, the presence of a prominent cell-free/plasma layer is observed due to the low hematocrit.

SI Movie 2

Video captured at the microchannel outlet showing margination of 3μm beads in 40% hematocrit sample at 2.5 μL/min. Again, the rigid beads marginate to the sides efficiently. However, due to high hematocrit no cell-free/plasma layer is observed.

SI Movie 3

Outlet flow showing tests conducted with late stage *i*RBCs spiked in 10% hematocrit sample at 2.5 μL/min. Contrary to the results obtained with beads, the stiff *i*RBCs remained randomly distributed across the channel with no margination.

SI Movie 4

Outlet flow showing tests conducted with late stage *i*RBCs spiked in 40% hematocrit sample at 2.5 μL/min. The stiff *i*RBCs marginate efficiently to the sides at high hematocrit.