1 2 **Supplementary materials for: Multiplexed fluidic plunger mechanism for the measurement of red blood cell deformability**

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10 **Supplementary Video 1.** Video of the multiplexed RBC threshold pressure measurement process. The
11 constrictions are initially loaded with RBCs. The applied pressure is slowly increased as part of a saw-
12 tooth pressure waveform until all the RBCs transit through the constrictions. The video was sped up 4
13 times.

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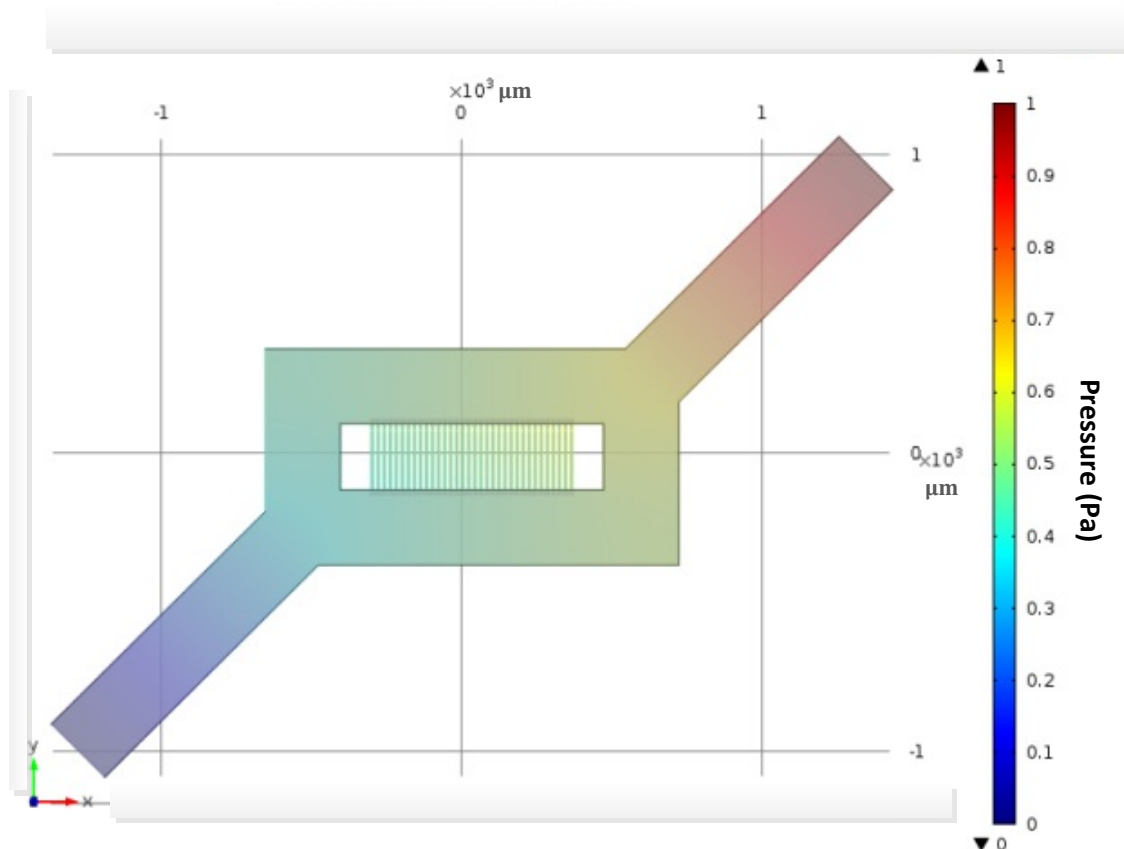
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16 **Supplementary Figure 1.** Finite element model of pressure distribution in the bypass and loading
17 microchannels created using COMSOL.

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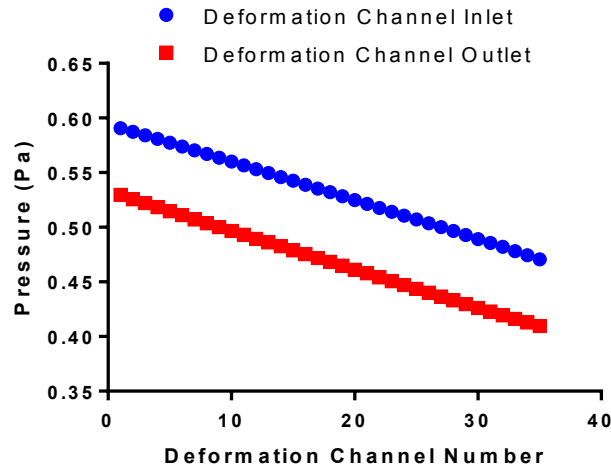
Supplementary Figure 2. Pressure at the inlet and outlet of the deformation microchannels sampled from the finite element model. This analysis confirms that a consistent pressure difference is applied across the parallel deformation microchannels.
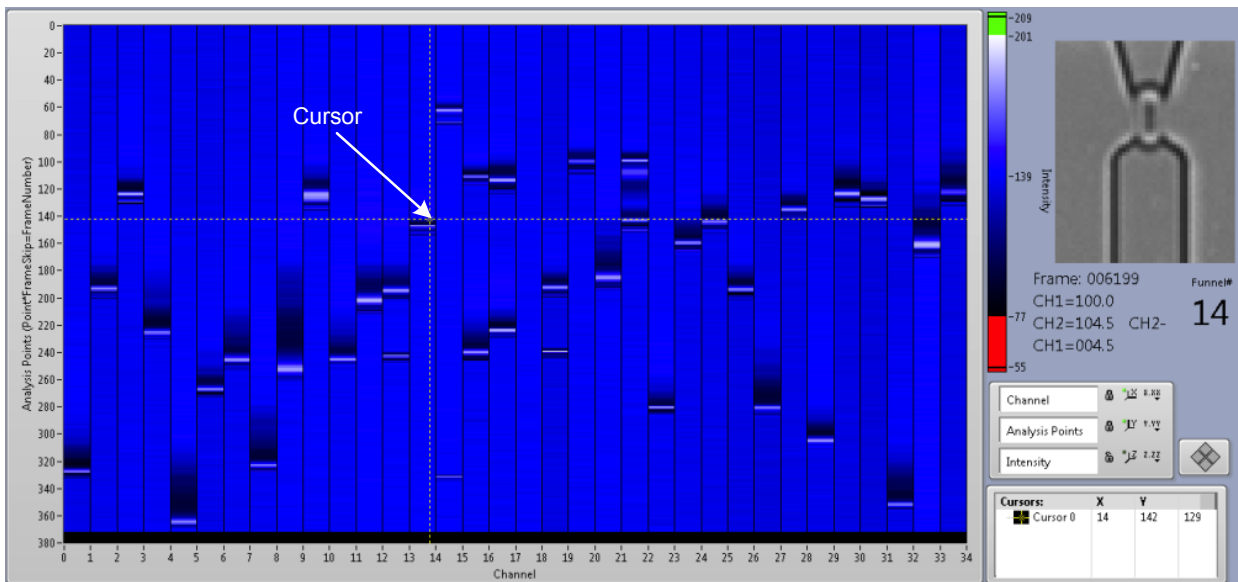
Supplementary Figure 3. Interface of the video analysis software developed to identify the threshold pressures of each individual cell. Each deformation channel is represented in a column. The vertical axis of the column represents time in seconds. The color in each strip in the column represents the average intensity at the minimum point of the funnel. Cells transiting through the funnel constriction create an anomaly in intensity. A dark strip indicates the beginning of a RBC transit event through a constriction, and a white strip represents the full passage of a RBC through the constriction. The time-lapsed image of the deformation of each individual RBC can be selected and viewed by hovering the cursor over each color strip, enabling the corresponding applied pressure to be readout.