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

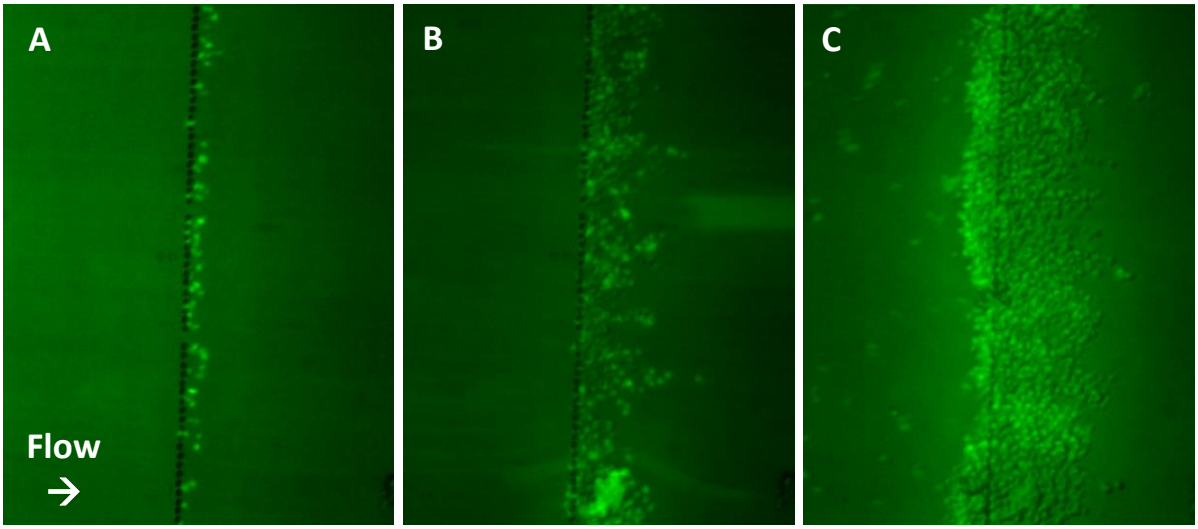

Figure S1. Platelets adhere and aggregate due to a single column of micropillars. Platelets initially aggregate exclusively at the back of the pillar array (A) and continue to adhere to the pillars and one another at the back of the array (B). As the aggregate occludes the channel, incoming platelets begin to adhere to the platelet mass and back fill the channel, thus extending the aggregate to the front of the pillar array (C).

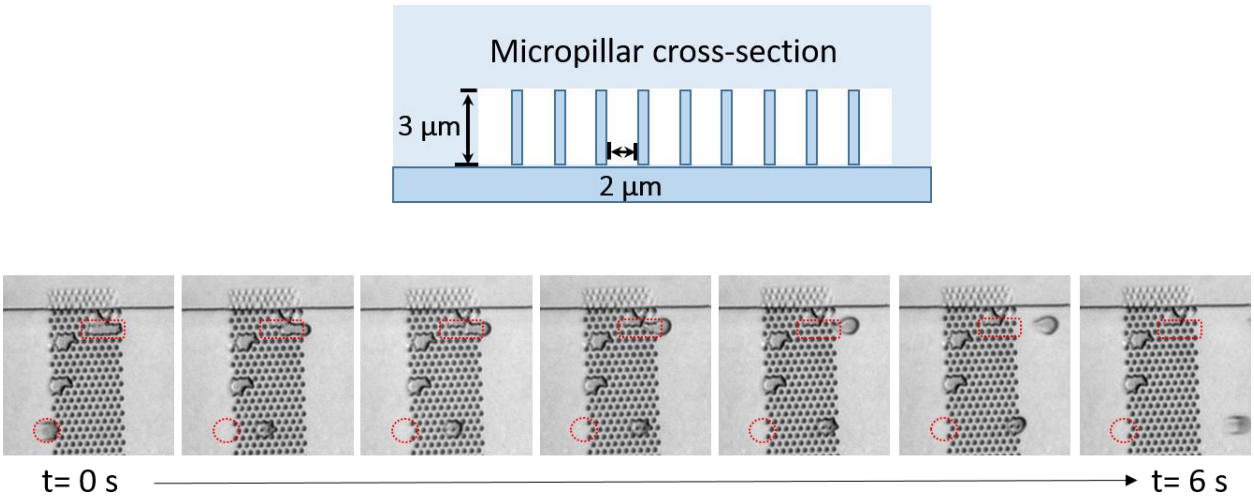

Figure S2. RBCs elastically deform through micropillar array. Cross-section of device (top). Over the course of 6 seconds, RBCs transit array with minimal downstream morphological changes (bottom).

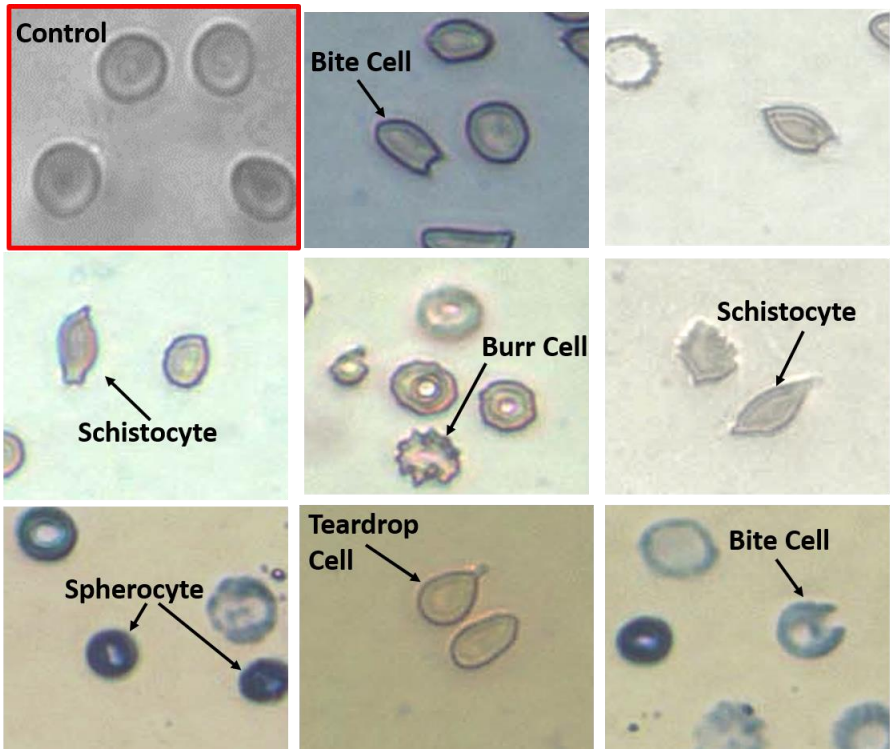

Figure S2. RBC morphologies present in microcanal effluent from a 60 µm canal.Passage through canals results in various abnormal RBC morphologies. Spherocytes and microspherocytes were the most commonly seen abnormal RBC morphologies. Control cells refer to cells perfused through channel without canals.

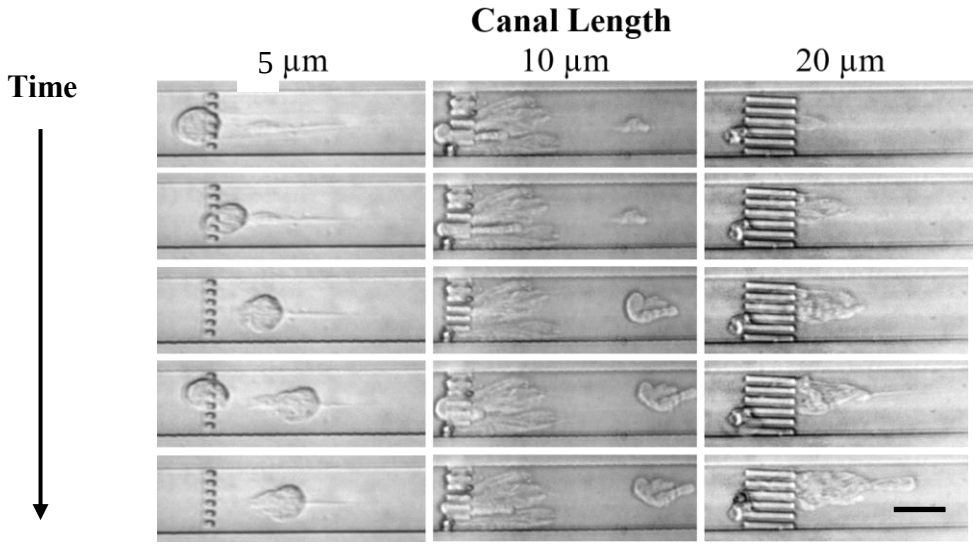

Figure S3. Time course of neutrophils perfused through microcanals. Neutrophils perfused through 5 µm, 10 µm, and 20 µm microcanals and fragment into membranous material that is tethered to the canals. Successive neutrophils add to the membranous material left behind from neutrophils that have previously interacted with the canals. Accumulation of material is evident when looking down the column for each canal length. Scale bar = 20 µm.

Supplemental Movie S1. Platelets (calcein) adhere and aggregate in micropillar array

Supplemental Movie S2. Red blood cells transiting 60 µm canals.

Supplemental Movie S3. Neutrophils fragment into DNA-rich membranous material. Stained with Sytox Green in a 20 µm canal.

Supplemental Movie S4. Red blood cells are entrapped in neutrophil membranous debris. Canal length of 20 µm.