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Squishy non-spherical hydrogel microparticles

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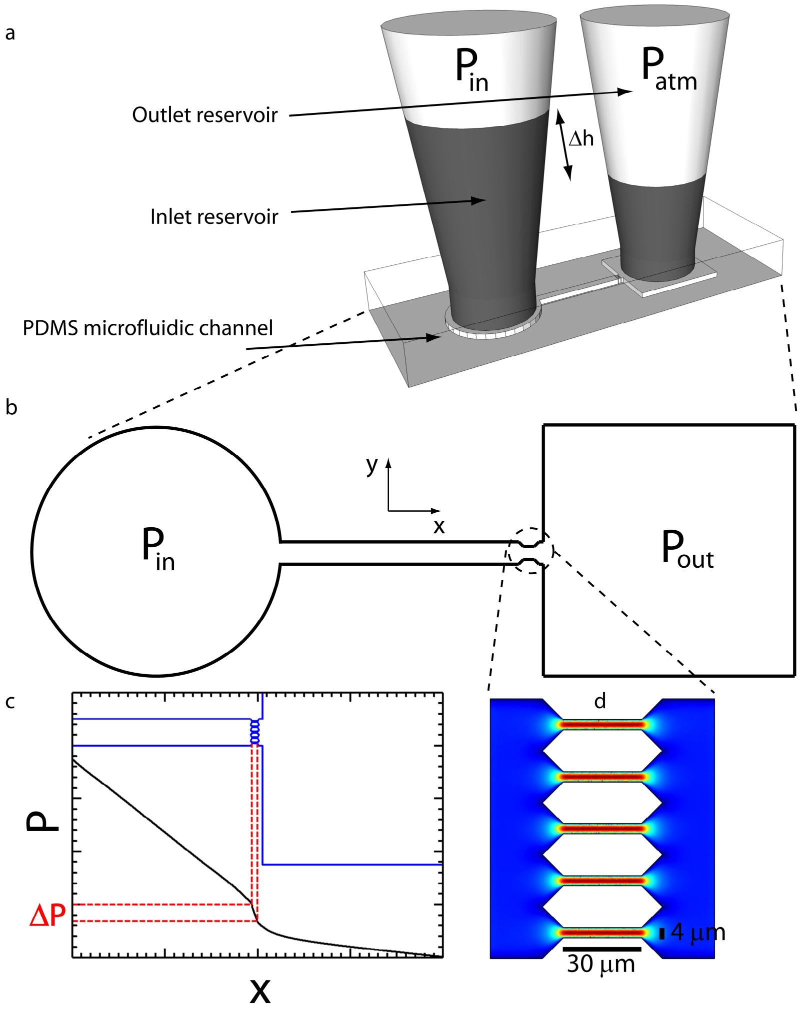

Figure 1. Illustration of the mechanical test used in this study. a) Illustration of the microfluidic channel used for flow testing with the inlet and outlet reservoirs. A known inlet pressure was applied to the inlet reservoir and the outlet reservoir was maintained at atmospheric pressure. The height difference of the fluids in the two reservoirs was measured and included in the determination of the total pressure drop across the channel. b) A top down illustration of the channel geometry used in this study. c) A representative pressure profile along the channel calculated using COMSOL multiphysics software. d) A close-up image of the fluid velocity inside the constrictions calculated using COMSOL.

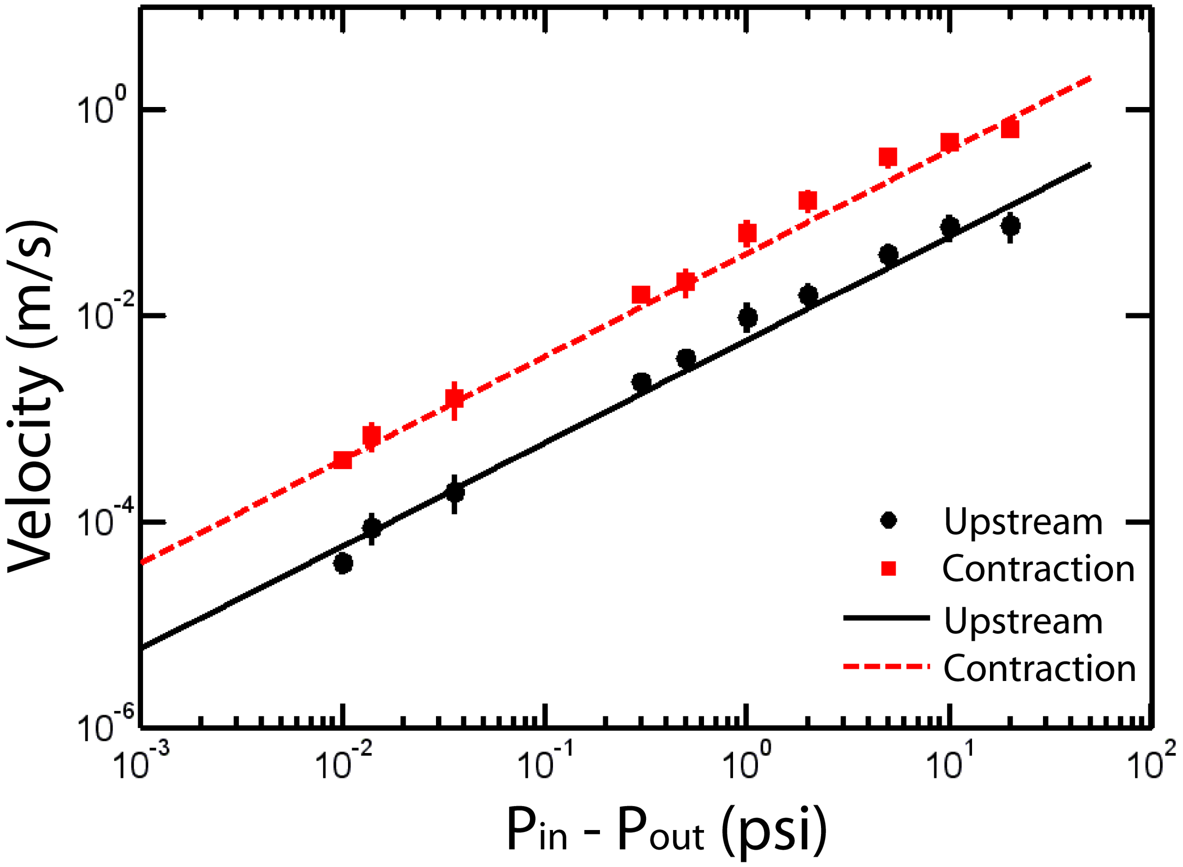

Figure 2. Comparison of theoretical and experimental velocities for a given pressure drop across the flow channels. The theoretical velocities upstream (black solid line) and within the contractions (red dashed line) were calculated using COMSOL. The experimental velocities upstream (black circles) and within the contractions (red squares) were determined by measuring the velocity of 0.9μm tracer particles (Bangs Labs) using high-speed video from a Phantom v4.2 camera (Vision Research). The theoretical predictions match well with the experimental measurements of velocity as a function of pressure drop. This gives us confidence that the theoretical calculations done with COMSOL are valid for these experiments.