Electronic Supplementary Information

Hybrid Microchannel-Solid State Micropore device for fast and optical cell detection

Carol M. Olmos, Gustavo Rosero, Tamara Fernández-Cabada, Ross Booth, Manuel Der, Juan M. Cabaleiro, Alexis Debut, Luis Cumbal, Maximiliano Pérez and Betiana Lerner*.*

1. Dependence of control variables on the pore fabrication process and the silicon surface

Table S1. Characterization of Surface Roughness of micropores

Silicon wafers	Ra (nm)
KOH-50-HCl-40-0.5	2
KOH-50-HCl-40-0.1	2
KOH-50-HCOOH-40-0.5	6
KOH-50-HCOOH-40-0.1	13
KOH-50-HCl-60-1	3
KOH-50-HCl-60-0.5	5
KOH-50-HCOOH-60-0.5	7
KOH-50-HCl-80-1	2
KOH-50-HCOOH-80-1	5
KOH-50-HCOOH-80-0.1	7

The codes of the micropores correspond with the concentration of the KOH, followed by the acid, temperature and voltage applied during the electrochemical etching.

2. Dependence of control variables on the electrical characterization

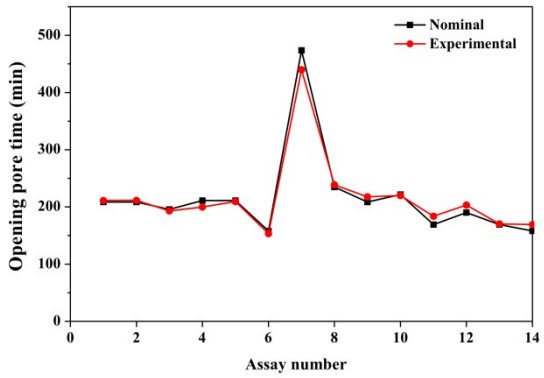

Figure S1. Opening pore time comparison

3. Application

Cell quantification

Macro: Cells in focus under Microscopy bright field

```
makeRectangle(217, 51, 273, 308);
run("Crop");
imageCalculator("Divide create 32-bit stack", "0p3mlph.pcoraw-
1recortada.tif","t:26/1000 - 0p3mlph.pcoraw");
run("NaN Background", "stack");
run("Convolve...", "text1=[-1 -1 -1 -1 -1\n-1 -1 -1 -1 -1\n-1 -1 -1 -1 -1\n-1 -1 -1 -1 -1\n-
1 -1 -1 -1 -1\n] normalize stack");
setThreshold(1.0770, 1.1626);
setOption("BlackBackground", false);
run("Make Binary", "method=Default background=Default");
run("Analyze Particles...", "size=15-Infinity show=Outlines display exclude clear
include summarize stack");
selectWindow("Result of 0p3mlph.pcoraw-1recortada-1.tif");
```

4. Simulation

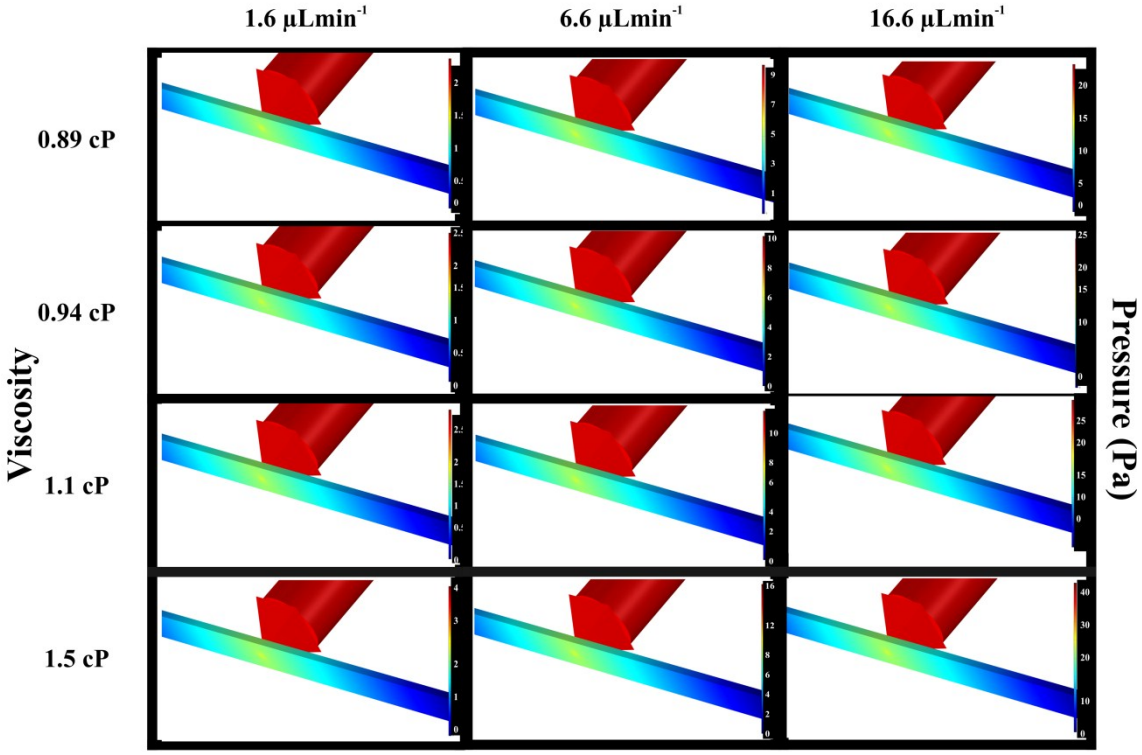

Fig S2. Pressure drop distribution in the micropore and PDMS microchannel at varying flow rates and viscosities.

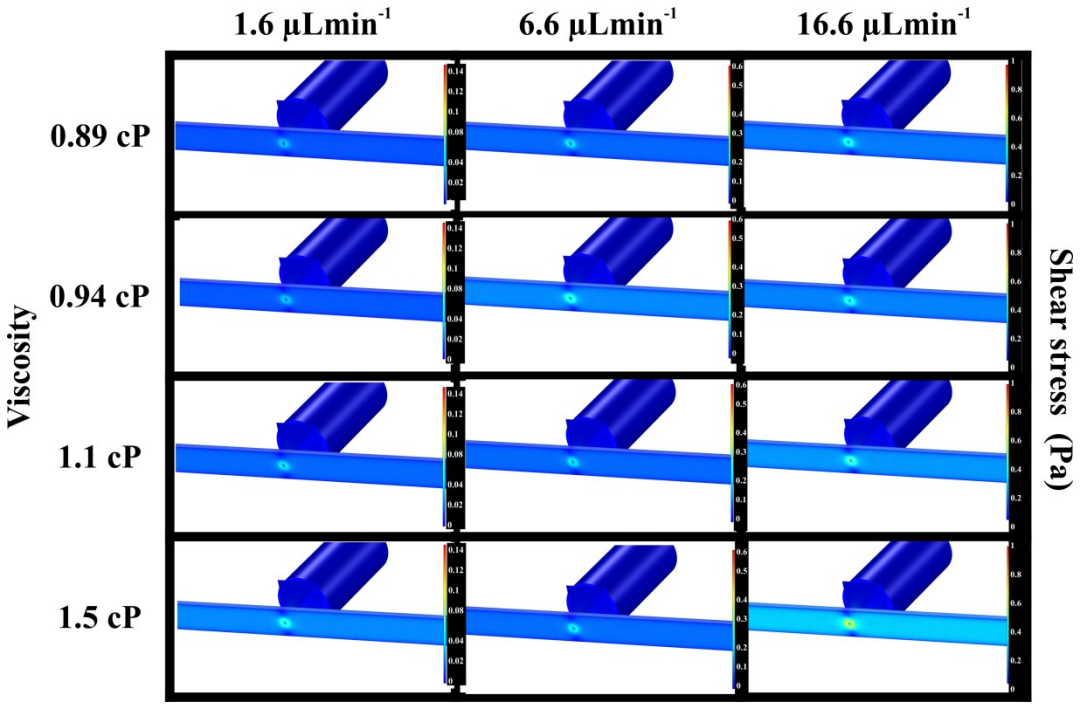

Fig S3. Shear stress distribution in the micropore and PDMS microchannel at varying flow rates and viscosities.

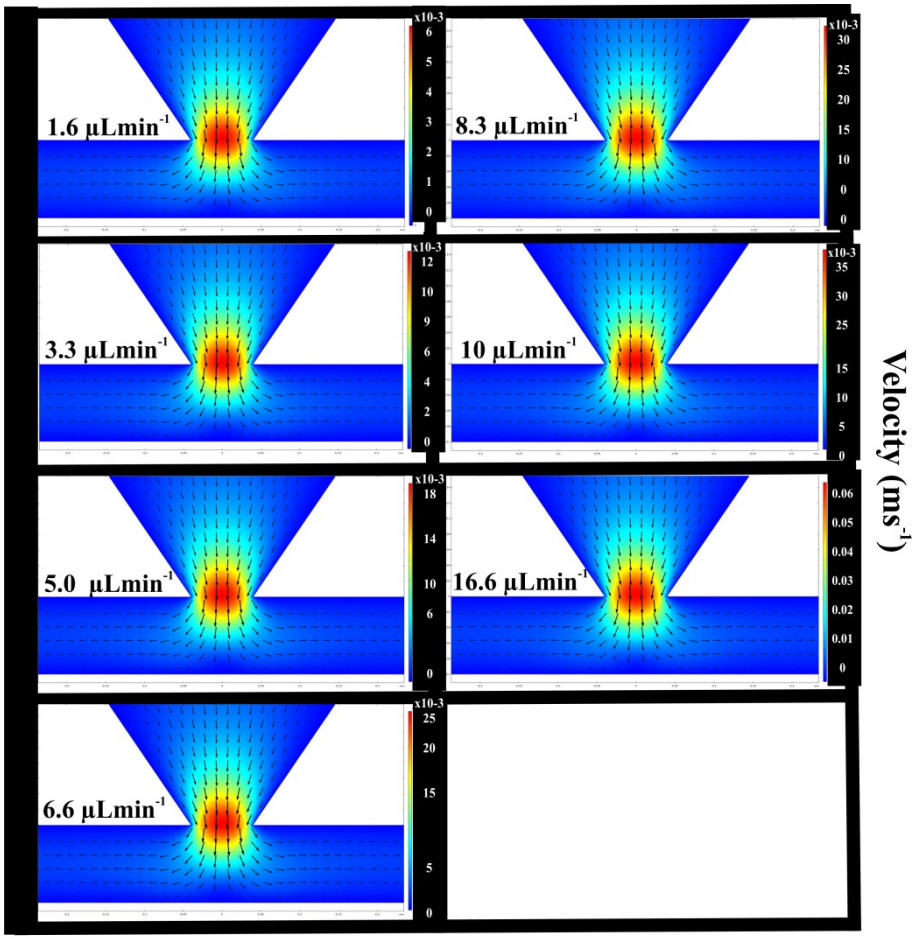

Figure S4. Velocity profiles distribution in the micropore and PDMS microchannel at varying flow rates and viscosity of 0.89 cP.

Video 1: Functionality of the microfluidic device for visual detection and counting cells.