Supporting Information (SI)

Controlled viable release of selectively captured label-free cells in microchannels

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A. Fabrication of microfluidic device components

Double sided adhesive (DSA) layer: The channels were cut into 80 µm DSA (iTapeStore, Scotch Plains, NJ) using a laser-cutter (Versalaser, Moscow, Russia). Each DSA piece measured 24 mm X 35 mm. The channel dimensions measured 28 mm in length and 4 mm in width with 80 µm height. DSA pieces were placed 1.5 mm from the horizontal edges (**Fig. S1**). The channel inlet and outlet regions were angled at 127^{o} to better facilitate the introduction and evacuation of fluids [1, 2]. Three channels were cut into each DSA piece with 3 mm space in between.

Polymethymetacrylate (PMMA) layer: The inlet and outlet ports for the fluid were cut into 3.5 mm thick PMMA sheets (McMaster Carr, Santa Fe Springs, CA) using the laser-cutter as seen in. Each PMMA layer was cut into 24 mm X 35 mm pieces (**Fig. S2**). The inlet ports measured 0.59 mm in diameter, and were positioned 0.5 mm from the right edge of each corresponding channel cut into the DSA. The outlet ports also measured 0.59 mm in diameter, and they were positioned 0.5 mm from left edge of each channel. Five equally spaced markers along the channels, each 0.4 mm in diameter, were cut 1 mm from both the top and bottom edges of the PMMA layers, to act as indicators for microscopic imaging locations along the channels. A number was engraved into the top left corner of each PMMA layer to help identify each microchip.

B. Assembly of microfluidic channels

The bottom surface of the microfluidic release channels were made of PNIPAAm polymer layer (Upcell, Nalge Nunc International, Rochester, NY). The microfluidic chips were prepared using the following components: DSA layer, PMMA layer, and a PNIPAAm coated polystyrene or uncoated polystyrene layer. The channels were cut into the DSA, and the inlets and outlets were cut into the PMMA using the laser cutter as described above. The DSA's protective layers were removed and carefully adhered to the PMMA layer. A thin mark was made with the laser cutter on the underside of the bottom surface, marking the boundaries of the middle channel. Then, a thin layer of temperature responsive liquid crystal stain (Edmund Scientific, Tonawanda, NY) was applied to work as a temperature indicator throughout the experiment. Epoxy glue (5-Minute Epoxy, Devcon, Danvers, MA) was used to seal the edges of the assembled microfluidic chips. Tygon tubing with external diameter of 0.762 mm (Cole-Parmer, Vernon Hills, IL) was inserted into each outlet and fixed using epoxy glue. Polystyrene tissue culture plastic was used as a control surface for microfluidic channels and the control microchips were fabricated according to the protocol described above. Surface cleanliness was critical when working with the polymer coated surface to reduce contamination, which may hinder the capture and release performance of the polymer.

REFERENCES

1. S. Moon, H. O. Keles, A. Ozcan, A. Khademhosseini, E. Haeggstrom, D. Kuritzkes and U. Demirci, *Biosensors & Bioelectronics*, 2009, **24**, 3208-3214.
2. S. Moon, U. A. Gurkan, J. Blander, W. W. Fawzi, S. Aboud, F. Mugusi, D. R. Kuritzkes and U. Demirci, *PLoS One*, 2011, **6**, 8.

FIGURES

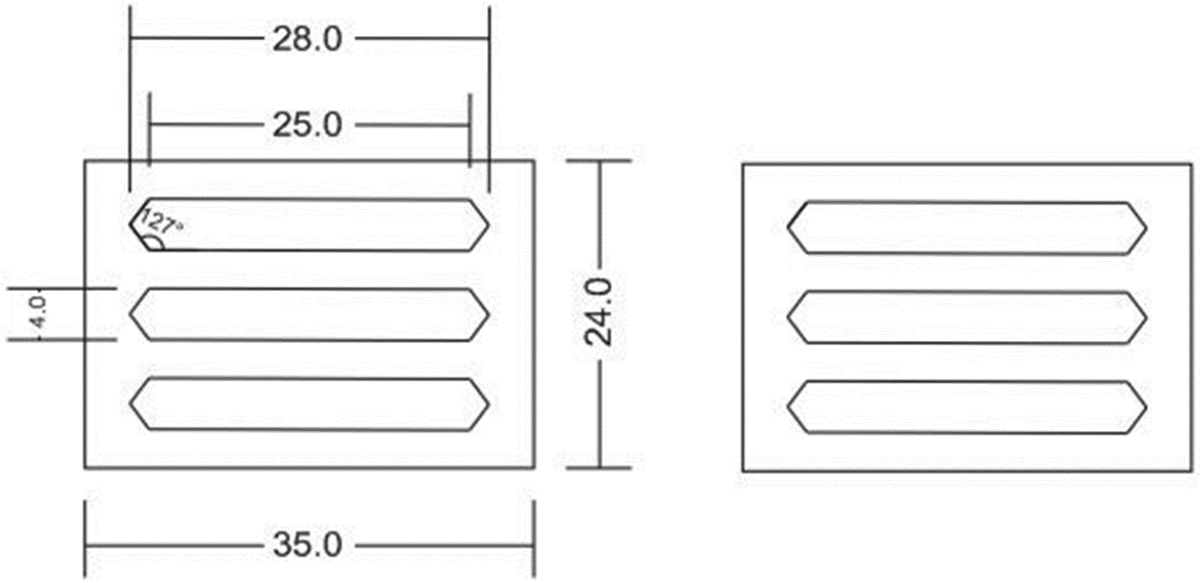

Figure S1: Computer aided drawing of the 80 µm thick DSA film that was sandwiched between PMMA and polystyrene surface to form the microfluidic channels. Dimensions are in millimeters.

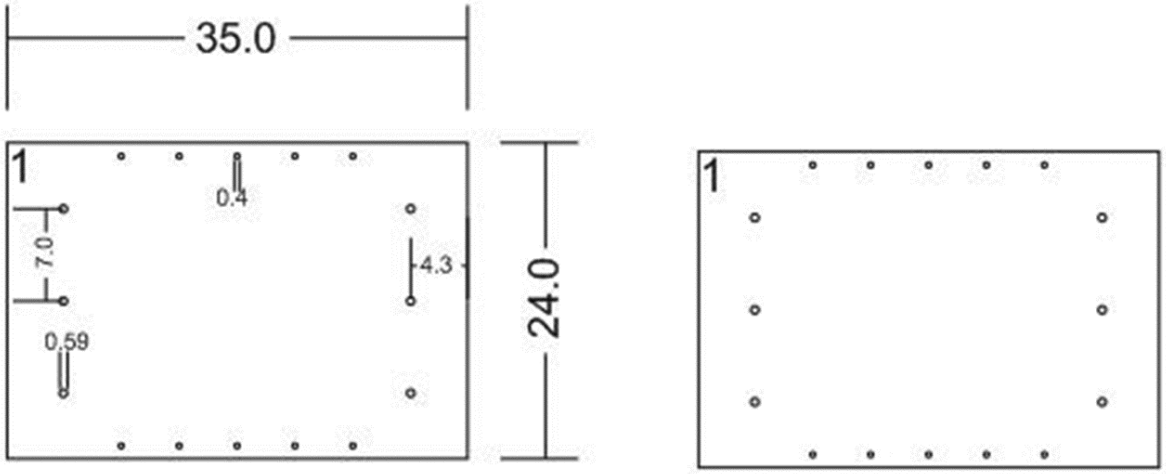

Figure S2: Computer aided drawing of the top PMMA layer of the microfluidic chips. Dimensions are in millimeters.