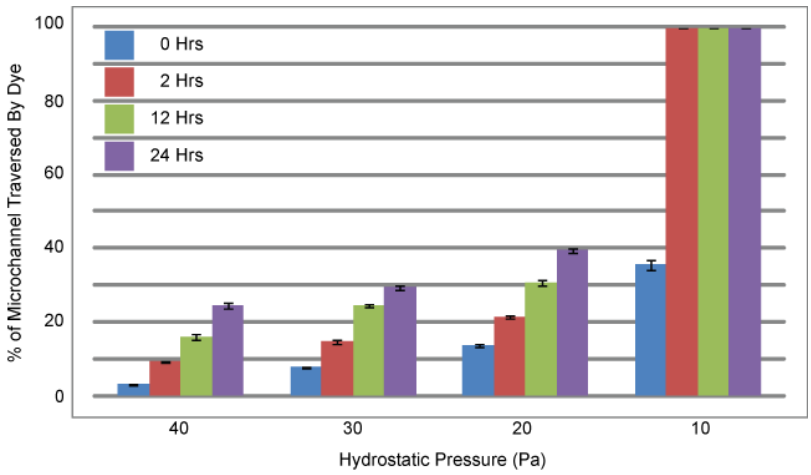
Supplementary Material (ESI) for Lab on a Chip

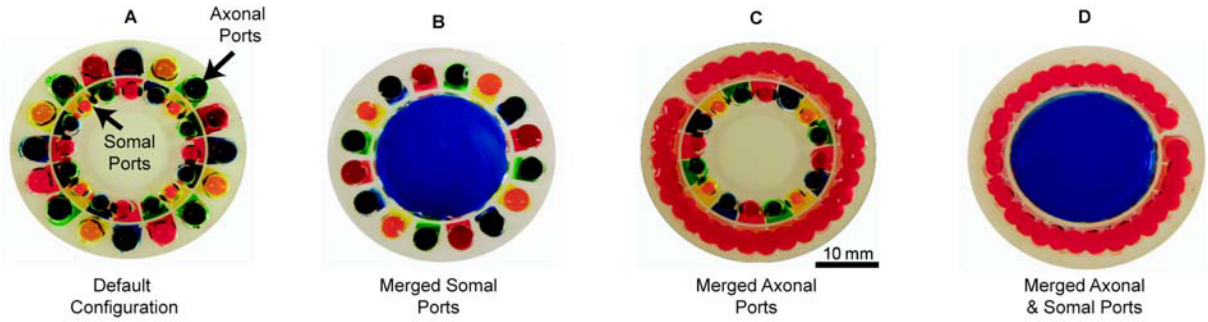
Circular compartmentalized microfluidic platform: Study of axon-glia interactions

Suneil Hosmane,[a] In Hong Yang,[a] April Ruffin, [b] Nitish Thakor*[a] and Arun Venkatesan*[b]

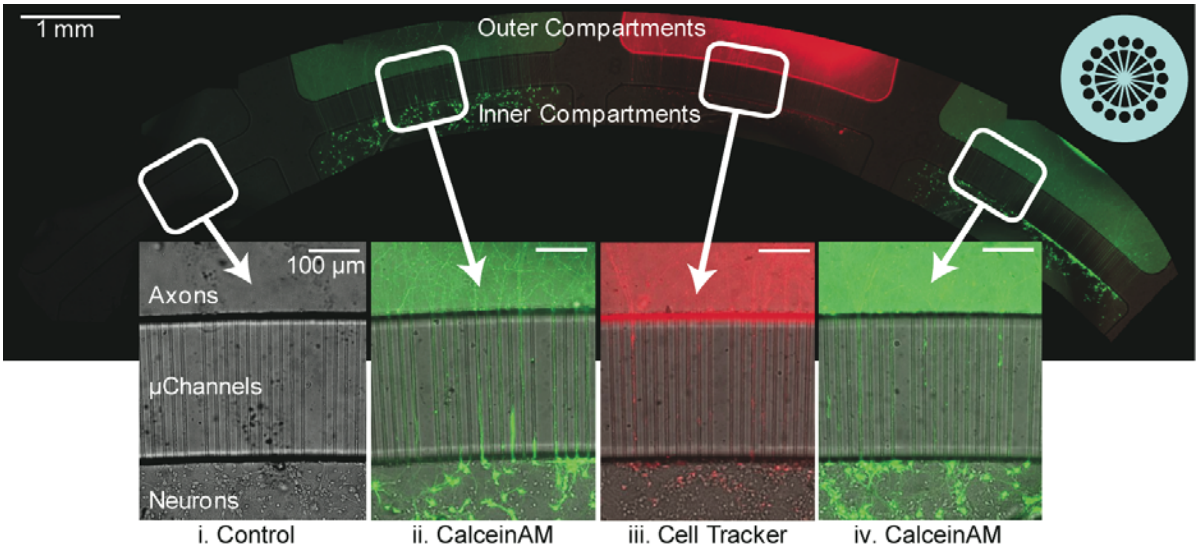
Supplementary Figures:



ESI Fig. 1 Fluidic isolation can be achieved by modulating the fluid levels between microchannel-connected compartments in the configurable microfluidic platform. Time course experiments were conducted with 25 μM Cell Tracker Red (MW = 600 Da) with increasing hydrostatic pressures (10 Pa, 20 Pa, 30 Pa, and 40 Pa) to experimentally determine the minimal force required to attenuate molecular diffusion through the microchannels. A hydrostatic pressure ≥ 20 Pa was able to prevent the dye from traversing the microchannel over the course of 24 hrs.



ESI Fig. 2 Devices can be customized through the use of commercially available dermal biopsy punch tools after PDMS replication. The four major device modalities **(A-D)** are depicted here, filled with color dye to aide in visualization.



ESI Fig. 3 Multiple experiments can be performed in the circular platform. Four consecutive labeling experiments (i) Control, (ii) 5uM CalceinAM (Green), (iii) 5 uM Cell Tracker Red, (iv) 5 uM CalceinAM (Green) were performed in a fully segmented device configuration (top right). The top image shows the entire experimental area and each inset (i-iv) shows magnified views of each experiment. Analytes were added to the axonal side and prevented from diffusing across the microchannel features by modulating the hydrostatic pressure between the somal (inner) and axonal (outer) compartments. In these experiments, the fluid volume was adjusted such that the somal compartment had a 3 mm higher volume than the axonal compartment. Dye introduced into the axonal compartments entered axons and retrogradely labelled neuronal cell bodies.