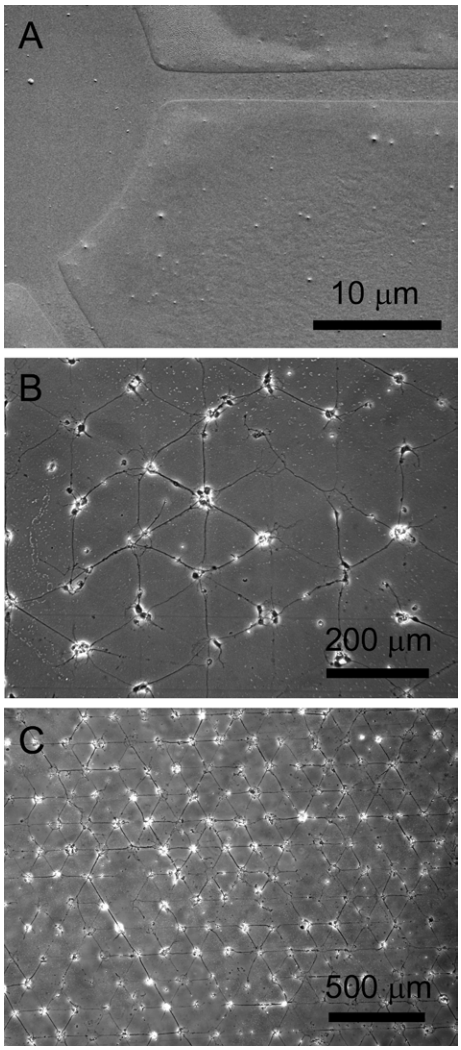
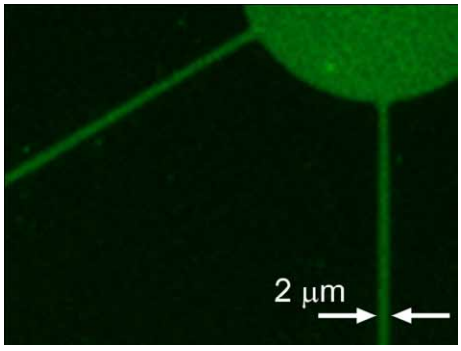
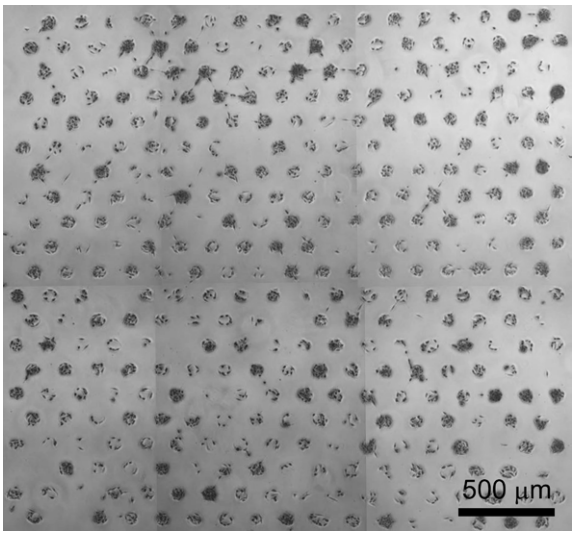
Electronic Supplementary Material (ESI) for Lab on a Chip



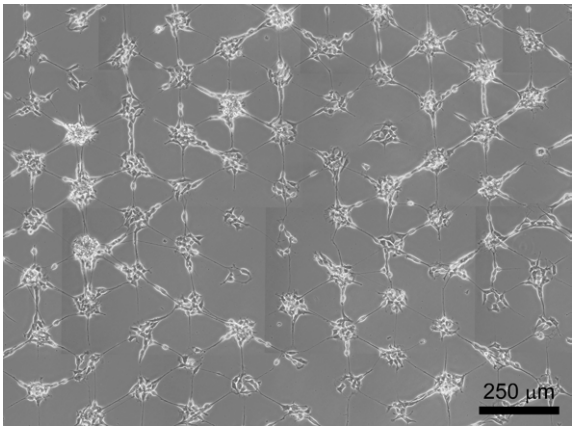
ESI Fig. 1 Primary neurons on a PDMS print. Thin-film PDMS print of micron-scale interconnecting tracks (A), an array of murine embryonic neurons following a week of patterned culture (B) and a large field image of the primary neuronal network (C).



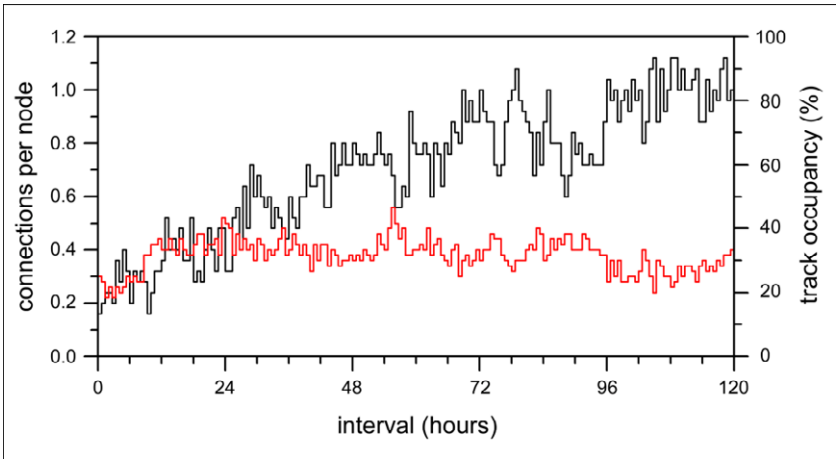
ESI Fig. 2 High resolution protein pattern. High magnification image of a FITC-labeled protein pattern. A bilayer membrane containing 2-μm-wide interconnecting tracks was used to mask the PEGylated substrate during plasma treatment.



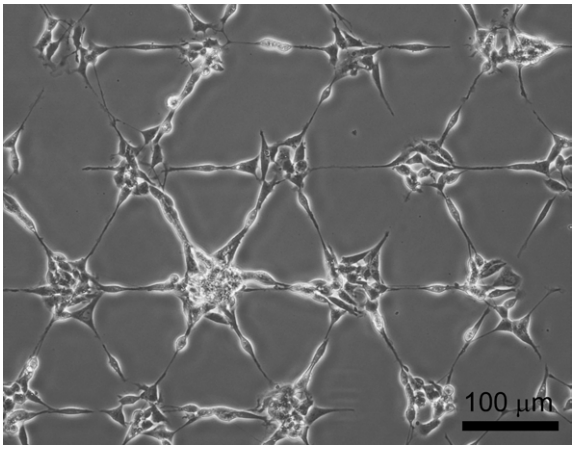
ESI Fig. 3 Neuron array. A complete 367-node array of differentiated human SH-SY5Y neurons following 24 hours of patterned culture.



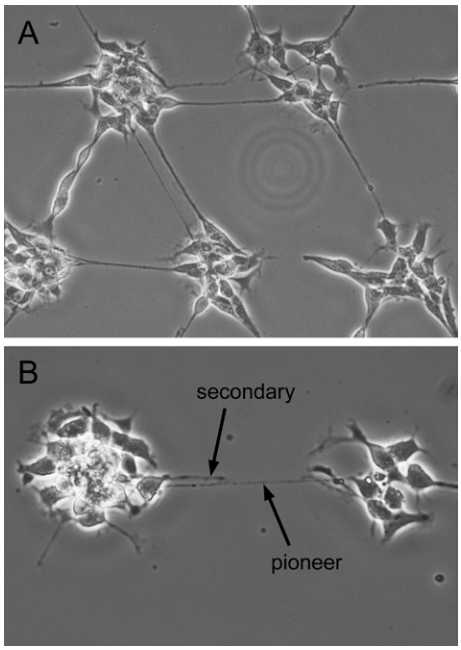
ESI Fig. 4 Neuronal network. Image compilation of a neuronal network containing 82 nodes with 111 neurite connections (1.35 cpn).



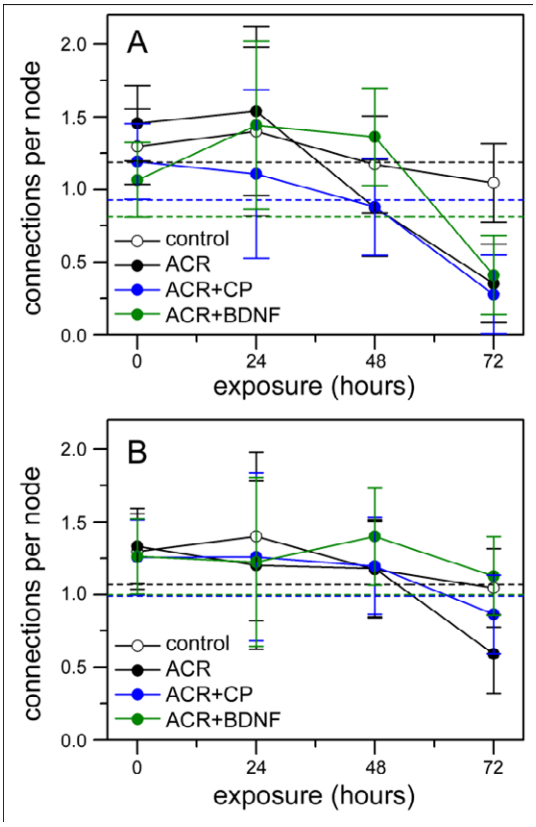
ESI Fig. 5 Network and migration dynamics. Dynamics of neuronal network formation (cpn, black) and internodal migration (track occupancy, red).



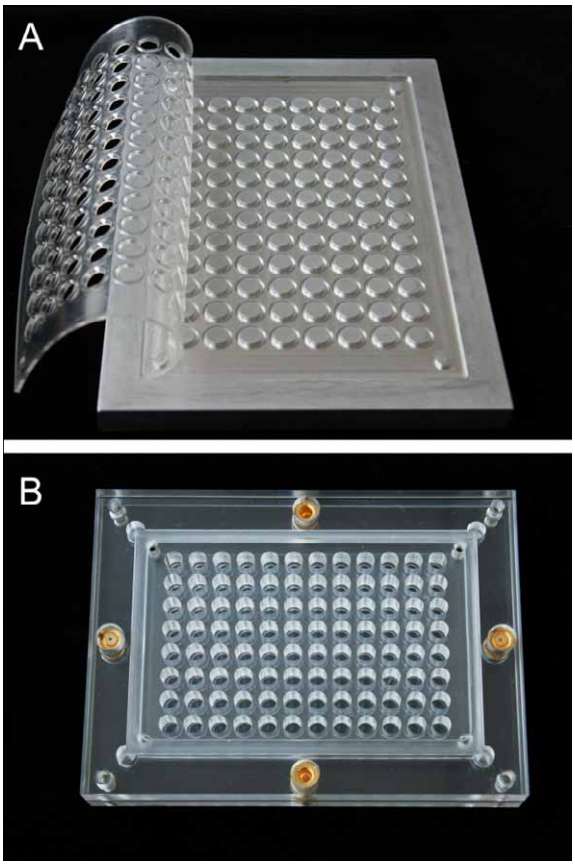
ESI Fig. 6. Adhesion to 4-µm-wide tracks. Arrays containing 4-µm-wide tracks lead to reduced node compliance with many neurons adhering to and migrating along the track features.



ESI Fig. 7. Multiple connections. A node pair can be connected by multiple neurites (A). Following the formation of a first pioneer connection, secondary connections can be formed (B).



ESI Fig. 8 Degeneration and protection. Dynamics of acrylamide (ACR) induced network degeneration and the protective effects of 1μM calpeptin (CP) and 100 ng/mL BDNF. Network integrity during exposure to 1.0 mM (A) and 0.5 mM acrylamide (B). Confidence intervals beneath the appropriately coloured dotted lines indicate a significant ($p<0.05$) reduction compared to the initial value (self-control comparison).



ESI Fig. 9. Magnetic packaging. A moulded 1-mm-thick PDMS gasket array (A) can be used with magnetic couples for packaging substrates within the frame of an industry standard 96-well plate (B).