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Paper Title: Activity- and Spatial-dependent Variations in Axonal Conduction Recorded from Microtunnel Electrodes

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Abstract

Axons are not simple transmission cables in neuronal networks, but they are directly involved in information processing. We developed a novel culture device that aims to assess axonal conduction properties. The microdevice consists of microtunnels directly fabricated on high-density microelectrode array. Neuron growth and axon separation were confirmed by immunofluorescent staining and neural activity recording. Several dozens of electrodes were detected from each tunnel and signals had enough S/N ratio to handle each spike event. Activity- and spatial-dependent variations in conduction velocity were observed. These results suggest that our microdevice is feasible to study axonal information processing.
