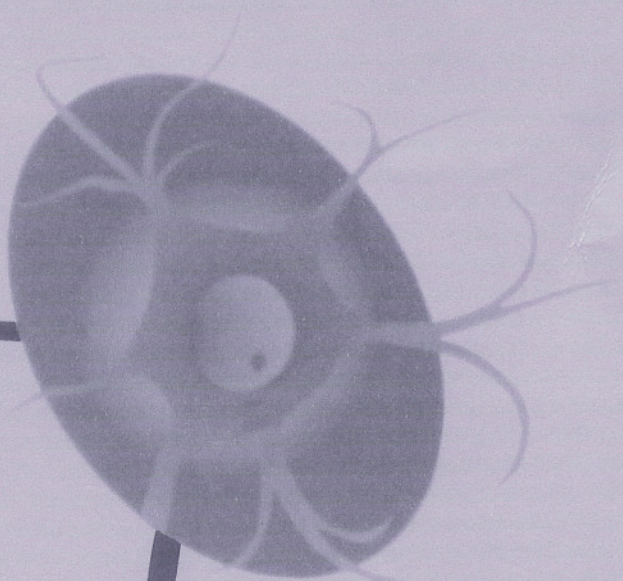
Experimental NEUROBIOLOGY



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ABSTRACTS

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ASSESSMENTS OF TISSUE-DEFORMATION AND VASCULATURE DAMAGE FOLLOWING INSERTION OF SILICON NEURAL PROBES INTO RAT BRAIN

P-207

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The full potential of invasive silicon electrode array is presently limited by biological reactive responses that begin immediately upon insertion. The size of these responses may be impacted by many insertion-associated parameters (e.g. insertion speed, device size, tip design, etc.). To investigate these parameters, we developed a measurement system that permits qualitative observations and quantitative analysis. Time-lapse images were collected to show vascular damage and tissue deformation during insertion of single-shank device into the brain slices in vitro. We also used a multi-axis force sensor to measure the impact force associated with inserting into the cerebral cortex of rats in vivo. Results demonstrate the utility of this experimental model and indicate its value for guiding future device designs insertion methods.

Key Words: Silicon neural probe, Insertion speed, Vascular damage, Tissue deformation, Impact force

CONTROL ON THE GROWTH OF NEURITES BY TOPOGRAPHIC CUE IN PRIMARY HIPPOCAMPAL NEURON

P-208

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Neuronal cells to respond to submicron-scale groove structure. On the grooved structure of particular dimension, it has been reported that neuronal cells grew perpendicular to the groove direction. We used holographic photo-responsive polymer to form a submicron-scale surface relief grating structure. A sinusoidal groove pattern is built up by holographic interference of 488 nm Ar ion laser beams. The primary hippocampal neurons cultured on the surface of the polymer film grew extending their neurites in a perpendicular orientation to the groove direction. This suggests that laser holography can be used to control the neurites orientation and growth. The holographic grating and photo-responsive polymer will raise the possibility of controlling neural network formation between living cells by light.

Key Words: Primary hippocampal neuron, Topography, Photo-responsive polymer, Contact guidance