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TITLE

An Astrocyte Derived Extracellular Matrix Coating Reduces Astrogliosis Surrounding Chronically Implanted Microelectrode Arrays in Rat Cortex

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ABSTRACT

Available evidence suggests that the magnitude of the foreign body response (FBR) to implants placed in cortical brain tissue is affected by the extent of vasculature damage following device insertion and the magnitude of the ensuing macrophage response. Since the extracellular matrix (ECM) serves as a natural hemostatic and immunomodulatory agent, we examined the ability of an FDA-approved neurosurgical hemostatic coating and an ECM coating derived from primary rat astrocytes to reduce the FBR surrounding a penetrating microelectrode array chronically implanted in rat cortex. Using quantitative methods, we examined various components of the FBR in vitro and after implantation. In vitro assays showed that both coatings accelerated coagulation in a similar fashion but only the astrocyte-derived material suppressed macrophage activation. In addition, the ECM coating derived from astrocytes, also decreased the astrogliotic response 8 weeks after implantation. Neither coating had a significant influence on the intensity or spatial distribution of FBR biomarkers 1 week after

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