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**Nanoscale Properties of Neural Cell Prosthetic and Astrocyte Response** D.A. FLOWERS, Wayne State University, MI, V.M. AYRES, Michigan State University, R. DELGADO-RIVERA, Rutgers University, NJ, I. AHMED, S.A. MEINERS, University of Medicine and Dentistry of New Jersey — Preliminary data from in-vivo investigations (rat model) suggest that a nanofiber prosthetic device of fibroblast growth factor-2 (FGF-2)-modified nanofibers can correctly guide regenerating axons across an injury gap with aligned functional recovery. Scanning Probe Recognition Microscopy (SPRM) with auto-tracking of individual nanofibers is used for investigation of the key nanoscale properties of the nanofiber prosthetic device for central nervous system tissue engineering and repair. The key properties under SPRM investigation include nanofiber stiffness and surface roughness, nanofiber curvature, nanofiber mesh density and porosity, and growth factor presentation and distribution. Each of these factors has been demonstrated to have global effects on cell morphology, function, proliferation, morphogenesis, migration, and differentiation. The effect of FGF-2 modification on the key nanoscale properties is investigated. Results from the nanofiber prosthetic properties investigations are correlated with astrocyte response to unmodified and FGF-2 modified scaffolds, using 2D planar substrates as a control.

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