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Neural Prosthesis Seminar

"Growth Factor Gene Therapy for Neurodegenerative Disorders"

Friday, May 16, 2014 • 8:00 AM

Kulas Auditorium, 5th Floor, Lakeside

University Hospitals

Mark H Tuszynski, MD, PhD

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Abstract

Neural stem cells (NSCs) expressing GFP were embedded into fibrin matrices containing growthfactor cocktails and grafted to sites of severe spinal cord injury. Grafted cells differentiated into multiple cellular phenotypes, including neurons, which extended large numbers of axons over remarkable distances. Extending axons formed abundant synapses with host cells. Axonal growth was partially dependent on mammalian target of rapamycin (mTOR), but not Nogo signaling. Grafted neurons supported formation of electrophysiological relays across sites of complete spinal transection, resulting in functional recovery. Two human stem cell lines (566RSC and HUES7) embedded in growth-factor-containing fibrin exhibited similar growth, and 566RSC cells supported functional recovery. Thus, properties intrinsic to early-stage neurons can overcome the inhibitory milieu of the injured adult spinal cord to mount remarkable axonal growth, resulting in formation of new relay circuits that significantly improve function. These therapeutic properties extend across stem cell sources and species.

For more information, please contact Cheryl Dudek at (216) 231-3257

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