Transplants and Grafts

Nerve Regeneration May Be Enhanced by Implantation of Decellularized Nerve Allografts and Neurotrophic Factors

Traumatic injury to peripheral nerves is a frequent and important cause of long-term disability after battlefield injuries. This is particularly evident in long segment nerve injuries where autologous nerve transplants are not possible. Researchers at the University of Pittsburgh (Pittsburgh, Pennsylvania), Axogen, Inc. (Alachua, Florida) and MedGenesis Therapeutix, Inc. (Victoria, British Columbia, Canada), have advanced research in the development of nerve conduits with drug delivery systems, which are now being evaluated in non-human primates with five to seven centimeter median nerve injuries. Research has consisted of assessing a novel polymer nerve guide with an internal glial cell line-derived neurotrophic factor releasing mechanism to help encourage peripheral nerve regeneration (Figure 1). Researchers have implanted this conduit into a five-centimeter non-human primate median nerve defect. Preliminary results in this model suggest that this conduit is capable of enhancing hand functional recovery, as well as reinnervation of the target muscle, the abductor pollicis brevis muscle (*Marra 2016, 2017a, 2017b*).

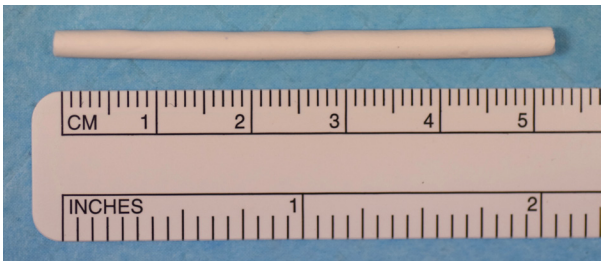

FIGURE 1: Nerve Guide for Promoting Peripheral Nerve Regeneration (Figure used with permission from the authors)

These results will need to be confirmed in larger samples before any definitive conclusions can be drawn. However, if future results are consistent, these findings could have enormous clinical utility, potentially enhancing the regenerative potential of many clinically available conduits. By enhancing nerve regeneration, researchers hope that deficits resulting from nerve injuries can lead to better functional and sensory outcomes for a number of different patients experiencing these injuries. The project is near completion, and the data show that successful reinnervation of these injuries has been achieved with improved functional recoveries. The researchers have translated earlier rodent data into commercial partnerships to develop and manufacture advanced drug eluting nerve conduits for pre-clinical and clinical studies.

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