

Nerve Regeneration – Selected Excerpts

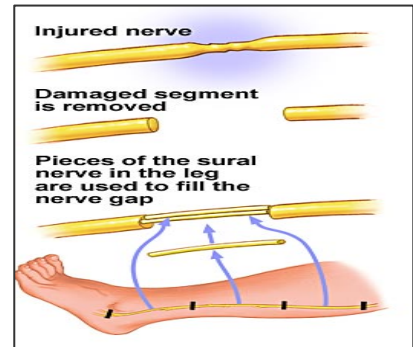
Peripheral Nervous System

The peripheral nervous system consists of the nerves that branch out from the brain and spinal cord, forming the communication network between the CNS and other parts of the body. There are mainly two types of nerves—sensory nerves and motor nerves.

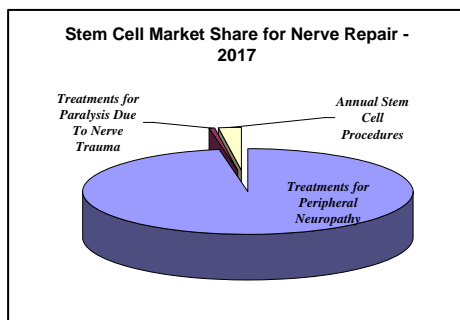
Types of Nerve Injuries

Traumatic nerve injuries usually occur by pressure, stretching, or cutting of the nerves, leading to an interruption in the signals being transmitted between the brain and the skin or muscles. While there is no single classification system for nerve injuries, the two most commonly proposed classifications are the Seddon classification system and the Sunderland system.

According to the Seddon classification, nerve injuries are classified into three categories based on whether there is continuity of the nerve or not.



Nerve Regeneration and Recovery

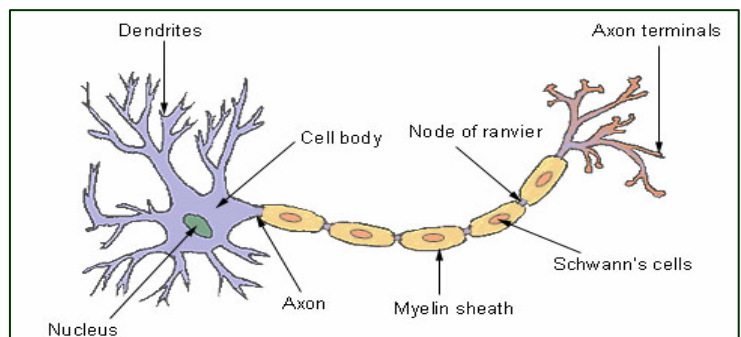


Nerve coaptation procedures are the most widely performed surgeries for severe nerve injuries, such as transection injuries. Nerve coaptation procedures involve sewing the nerves back together as they were before the injury, using microsurgery techniques. Although microsurgical techniques have improved in recent years, this procedure only partially restores nerve function. A full restoration of function after nerve transection still remains unattainable.

Stem Cell Approach for Nerve Regeneration

Stem cells hold significant promise for either augmenting or replacing several of the therapeutic approaches outlined above. In various animal studies, human stem cells have been shown to be able to differentiate into neurons, glia, keratinocytes, smooth muscle cells, and melanocytes in vitro. More recently, embryonic and adult stem cells have been shown to have the capability to home in on nerve inflammation, mediate that inflammation, and regenerate various types of nerve cells.

A very recent study (February 2007) published online by researchers at Johns Hopkins University laboratory overturned, for example, a long-held belief that the spinal cord could not allow nerve regeneration. The study was designed to answer the question of whether stem cells could repair nerves damaged by disease. Dr. Vassilis Koliatsos, associate professor of neuropathology at Johns Hopkins, was quoted in *PLoS Medicine* (Vol. 4, No. 2, e39, February 13, 2007) as saying that this study "establishes a new doctrine for regenerative neuroscience."



For the complete *Stem Cell Market Analysis and Forecast 2006-2016*, [click here](#).