

Rebuilding the Spinal Cord

George Dib

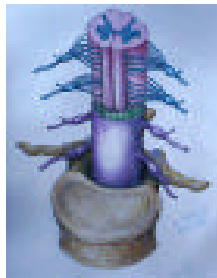
Biomedical Engineering Seminar 482

Spinal Cord:

The spinal cord is about 18 inches long and extends from brain to about the waist. The nerves that lie within the spinal cord are upper motor neurons (UMNs) and their function is to carry the messages back and forth from the brain to the spinal nerves along the spinal tract. The spinal nerves that branch out from the spinal cord to the other parts of the body are called lower motor neurons (LMNs). These spinal nerves exit and enter at each vertebral level and communicate with specific areas of the body. It has sensory function and a motor function.

What is SCI ?

Spinal Cord Injury (SCI) is damage to the spinal cord that results in a loss of function such as mobility or feeling. Causes are trauma or disease (polio, spina bifida.). SCI can be divided into two types of injury - complete and incomplete. A complete injury means that there is no function below the level of the injury no sensation and no voluntary movement. Both sides of the body are equally affected. An incomplete injury means that there is some functioning below the primary level of the injury. A person with an incomplete injury may be able to feel parts of the body that cannot be moved, or may have more functioning on one side of the body than the other.



Is there Cure?

Now there is no cure. Researchers are attacking this problem, and there have been many advances in the lab.

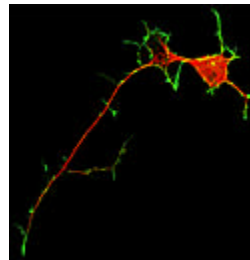
1.Instualtion: Great number of nerves was uncut in a damaged nerve, but lacking their insulating by a protein called myelin. 4-amino pyridine (4-AP, or fampridine), an

experimental drug was known to jam holes in the cell that are normally sealed by the myelin wrapping. 4-AP will not heal SCI, and cannot substitute for all the functions of myelin a continuous dose may improve some symptoms, such as bowel, urinary and sexual function. The benefits of 4-AP may improve life for those with SCI.

2.First hope: The nerves in central nerves system incapable of regenerating unlike the nerves of the peripheral nervous system. Damaged CNS nerve cells could regrow if they were provided with a bridge made of tissue from the PNS. Something in the CNS was preventing growth, but that something was absent in the PNS.

3.Stem cells: They line the cavities of the ventricles and spinal cord, which hold the spinal fluid. Stem cells identified so far are general, multipurpose cells, uncommitted to any specific fate

Give rise to many and maybe all of the different cell types in the adult brain. Human safety trials have been done with fetal cell transplants, but few of those cells turn into



neurons. When the spinal cord is injured. They then turn into the support cells that make up much of the scar in spinal cord injuries. New approach could

be in inducing them neurons instead of supporting cells.

<http://www.sci.net/>

<http://www.staff.uiuc.edu>

<http://www.accessexcellence.org/>