Stem cells used to reverse paralysis in animals

January 28 2009

A new study has found that transplantation of stem cells from the lining of the spinal cord, called ependymal stem cells, reverses paralysis associated with spinal cord injuries in laboratory tests. The findings show that the population of these cells after spinal cord injury was many times greater than comparable cells from healthy animal subjects. The results open a new window on spinal cord regenerative strategies. The study is published in the journal *Stem Cells*.

The transplanted cells were found to proliferate after spinal cord injury and were recruited by the specific injured area. When these cells were transplanted into animals with spinal cord injury, they regenerated ten times faster while in the transplant subject than similar cells derived from healthy control animals.

Spinal cord injury is a major cause of paralysis, and the associated trauma destroys numerous cell types, including the neurons that carry messages between the brain and the rest of the body. In many spinal injuries, the cord is not actually severed, and at least some of the signal-carrying nerve cells remain intact. However, the surviving nerve cells may no longer carry messages because oligodendrocytes, which comprise the insulating sheath of the spinal cord, are lost.

The regenerative mechanism discovered was activated when a lesion formed in the injured area. After a lesion formed in the transplant subject, the stem cells were found to have a more effective ability to differentiate into oligodendrocytes and other cell types needed to restore neuronal function.

Currently, there are no effective therapies to reverse this disabling condition in humans. However, the presence of these stem cells in the adult human spinal cords suggests that stem cell-associated mechanisms might be exploited to repair human spinal cord injuries.

Given the serious social and health problems presented by diseases and accidents that destroy neuronal function, there is an ever-increasing interest in determining whether adult stem cells might be utilized as a basis of regenerative therapies.

"The human body contains the tools to repair damaged spinal cords. Our work clearly demonstrates that we need both adult and embryonic stem cells to understand our body and apply this knowledge in regenerative medicine," says Miodrag Stojkovic, co-author of the study. "There are mechanisms in our body which need to be studied in more detail since they could be mobilized to cure spinal cord injuries."

Source: Wiley