MedicalXpress

Study: Spinal cord can repair itself

February 14 2007

U.S. scientists say they have disproved the long-held theory that the spinal cord is incapable of repairing itself. The Johns Hopkins University researchers say human nerve stem cells they transplanted into damaged spinal cords of rats have survived, grown and in some cases connected with the rats' own spinal cord cells.

Human nerve stem cells transplanted into rats' damaged spinal cords have survived, grown and in some cases connected with the rats' own spinal cord cells in a Johns Hopkins laboratory, overturning the long-held notion that spinal cords won't allow nerve repair.

A report on the experiments will be published online this week at *PLoS Medicine* and "establishes a new doctrine for regenerative neuroscience," says Vassilis Koliatsos, M.D., associate professor of neuropathology at Johns Hopkins. "The spinal cord, a part of the nervous system that is thought of as incapable of repairing itself, can support the development of transplanted cells," he added.

"We don't yet know whether the connections we've seen can transmit nerve signals to the degree that a rat could be made to walk again," says Koliatsos, "We're still in the proof of concept stage, but we're making progress and we're encouraged."

In their experiments, the scientists gave anesthetized rats a range of spinal cord injuries to lesion or kill motor neurons or performed sham surgeries. They varied experimental conditions to see if the presence or absence of spinal cord lesions had an effect on the survival and

maturation of human stem cell grafts. Two weeks after lesion or sham surgery, they injected human neural stem cells into the left side of each rat's spinal cord.

After six months, the team found more than three times the number of human cells than they injected in the damaged cords, meaning the transplanted cells not only survived but divided at least twice to form more cells. Moreover, says Koliatsos, the cells not only grew in the area around the original injection, but also migrated over a much larger spinal cord territory.

Three months after injection, the researchers found evidence that some of the transplanted cells developed into support cells rather than nerve cells, while the majority became mature nerve cells. High-powered microscopic examination showed that these nerve cells appear to have made contacts with the rat's own spinal cord cells.

Source: Johns Hopkins University