

Neural stem progenitor cell transplantation's potential to aid spinal cord injury tested

July 11 2011

A study published in the current issue of *Cell Transplantation* (20:5) investigating optimal routes for transplanting neural stem/progenitor cells (NS/PCs) in animal models of spinal cord injury (SCI) has demonstrated that intralesional (IL) injection conferred benefits over intravenous injection (IV) and intrathecal (IT) injection. The study, by a team of Keio University (Japan) researchers, is now freely available online.

"Spinal cord injury usually results in severe, paralytic damage because the adult central nervous system has little potential for regeneration after injury," said corresponding author Dr. Masaya Nakamura of the Keio University School of Medicine's Department of [Orthopedic Surgery](#).

"With cell transplantation of neural stem/progenitor cells being a promising strategy, our study sought to determine the best method of application for optimal cell survival and subject safety."

For their study, the researchers used a new reporter gene, called "ffLuc," a novel fusion protein, for bioluminescence (BLI) imaging in order to track the transplanted cells via MRI from injection site to spinal cord lesion.

"MRI signals from [dead cells](#) cannot be distinguished from those of living cells," noted Dr. Nakamura. "To overcome this difficulty, we used a BLI system that tracked only living cells."

After inducing SCI in mouse models, the researchers compared the

safety and efficacy results of IL, IT and IV injection methods for transplanting NS/PCs. IL grafting emerged as the best method since the IL-injected animals showed the best survival rates for grafted cells post-injection with no complications in the animals. IT injection showed low animal survival rates. IV injection resulted in no grafted cells migrating to the SCI lesion sites and many of the test animals died of a [pulmonary embolism](#) soon after injection.

"Taken together, our findings indicate that the best method for transplanting NS/PCs into the spinal cord injury site is by intralesional injection," summarized Dr. Nakamura.

"It is interesting that this study observed the greatest cell survival after neural stem cell transplantation directly into the lesion site after spinal cord injury" said Dr. Paul Sanberg, coeditor-in-chief of [Cell Transplantation](#) and executive director of the University of South Florida Center of Excellence for Aging and Brain Repair. "It will be of considerable importance to determine if this finding translates to increased recovery and also whether this translates to other disorders".

More information: Takahashi, Y.; Tsuji, O.; Kumagai, G.; Hara, C. M.; Okano, H. J.; Miyawaki, A.; Toyama, Y.; Okano, H.; Nakamura, M. Comparative study of methods for administering neural stem/progenitor cells to treat spinal cord injury in mice. *Cell Transplantation* 20(5):727-739; 2011. www.ingentaconnect.com/content/cog/ct/

Provided by Cell Transplantation Center of Excellence for Aging and Brain Repair

Citation: Neural stem progenitor cell transplantation's potential to aid spinal cord injury tested (2011, July 11) retrieved 10 April 2024 from <https://medicalxpress.com/news/2011-07-neural->

stem-progenitor-cell-transplantations.html

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