

Multiple route bone marrow stem cell injections show promise to treat spinal cord injury

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Researchers from DaVinci Biosciences, Costa Mesa, California, in collaboration with Hospital Luis Vernaza in Ecuador, have determined that injecting a patient's own bone marrow-derived stem cells (autologous BMCs) directly into the spinal column using multiple routes can be an effective treatment for spinal cord injury (SCI) that returns some quality of life for SCI patients without serious adverse events.

Publishing in the current issue of *Cell Transplantation* (Vol. 17 No.12), the researchers reported on eight patients with SCI (four acute and four chronic) to whom they administered BMCs directly into the spinal column, [spinal canal](#) and intravenously for each patient and followed for two years using MRI imaging to assess morphological changes in the [spinal cord](#).

"Our objective in this study was to demonstrate that multiple route administration of BMCs for SCI is safe and feasible," said corresponding author Dr. Francisco Silva. "To date, we have administered BMCs into 52 patients with SCI and have had no tumor formations, no cases of infection or increased pain, and few instances of minor adverse events. We also found that patient quality of life improved."

According to Dr. Silva, presently there is no cure or effective treatment for spinal cord injury, a disorder affecting millions globally. Tissue loss from the primary injury and the complexity of cell types required for functional recovery lead the list of considerations. Once more, to be considered successful, any treatment should ultimately help to improve patient quality of life and demonstrate functional improvements.

"Autologous [stem cell transplantation](#) of BMCs can promote the growth of blood vessels and,

therefore, represent an alternative therapy," said Dr. Silva.

Following primary trauma to the adult spinal cord there is evidence of hemorrhage and blood flow is attenuated, he explained. The disruption of blood flow leads to [spinal cord infarction](#), the disruption of the blood-spinal cord injury barrier, swelling and the release of molecules influencing spinal cord perfusion and ischemia, a restriction in blood supply.

"BMCs are well known for their ability to grow blood vessels," explained Dr. Silva. "This angiogenesis is necessary for wound healing and establishing a growth permissive environment. We hypothesized that improved blood flow and oxygen supply could contribute to functional improvements for SCI transplanted with autologous BMCs."

In eight patients who received BMC transplants through various routes and followed for two years, the scientists reported several functional improvements, perhaps the most important of which was improved bladder control.

Finally, the researchers noted that one of their cases suffered a gunshot wound and that their study marked the first time a gunshot wound victim had received BMC transplants through multiple routes.

"It is important to note," concluded Dr. Silva, "that all of our patients with acute injuries improved significantly with no signs of deterioration or impediment of presumed spontaneous recovery."

According to Dr. Svitlana Garbuzova-Davis, a spinal cord researcher at the University of South Florida, the study highlights the value of using several different simultaneous routes for the

administration of [stem cells](#), as well as the benefit of the cells themselves.

"While it would be interesting to know the respective contribution of each route of administration, this study does appear to support the need to move to carry out double blind clinical trials of BMCs in SCI, especially if a non-invasive route could be used."

Source: Cell Transplantation Center of Excellence for Aging and Brain Repair

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