

Bone marrow stem cell co-transplantation prevents embryonic stem cell transplant-associated tumors

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Transplanted embryonic stem cells are recognized as a potential treatment for patients suffering from the effects of spinal cord injury (SCI). However, in studies using embryonic stem cells transplanted into SCI laboratory animals, a serious drawback has been the development of tumors following transplantation.

Publishing in the current issue of [Cell Transplantation](#) (Vol. 18 No.1), a team of Japanese researchers describe their study that demonstrates a way to eliminate the problem of tumor growth by co-transplanting [bone marrow](#) stem cells (BMSCs) along with [embryonic stem cells](#).

"Our study results suggest that co-transplanting BMSCs induce undifferentiated embryonic stem cells to differentiate into a neuronal lineage by neurotrophic factor production, resulting in suppression of tumor formation in SCI model mice," said corresponding author Dr. Masahide Yoshikawa of the Nara Medical University. "The known multipotency of BMSCs during differentiation and their known ability to produce neurotrophic factors, such as nerve growth factor, led us to speculate that co-transplantation of ES cells and BMSCs would provide an advantage over transplantation of ES cells alone."

A control group of mice that only received ES cells developed tumors at the grafted site and their behavioral improvement ceased after three weeks. No tumors developed in the co-transplantation group and

behavioral improvement continued over the five-week study.

To date, no effective [medical therapy](#) has been available for SCI patients. While ES cells have been thought to represent a potential resource for therapy, the hurdle of tumor formation has impeded efforts. Co-transplantation of BMSCs appears to overcome the tumor hurdle, suggesting to the researchers that their success can provide a path toward human trials.

"The entire mechanism of suppressed tumor development following co-transplantation remains to be elucidated," says Dr. Yoshikawa. "We considered that the BMSCs played an important role in preventing tumors and speculate that one of the mechanisms by which BMSCs promote the differentiation of ES cells is related to secreted soluble factors, including neurotrophic factors."

According to Dr. Yoshikawa, the transplanted BMSCs survived in the grafted site for at least five weeks after transplantation and maintained their ability to produce NGF.

"These findings are extremely important and emphasize the need for additional study on how embryonic stem cells may be used to treat human neurological problems in the not too distant future," commented Section Editor Dr. John Sladek, professor of pediatrics and neuroscience at the University of Colorado School of Medicine.

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

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