

Researchers seek 'safety lock' against tumor growth after stem cell transplantation

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Recent studies have shown that transplanting induced pluripotent stem cell-derived neural stem cells (iPS-NSCs) can promote functional recovery after spinal cord injury in rodents and non-human primates. However, a serious drawback to the transplantation of iPS-NSCs is the potential for tumor growth, or tumorigenesis, post-transplantation.

In an effort to better understand this risk and find ways to prevent it, a team of Japanese researchers has completed a study in which they transplanted a human glioblastoma cell line into the intact spinal columns of laboratory mice that were either immunodeficient or immunocompetent and treated with or without immunosuppressant drugs. Bioluminescent imaging was used to track the transplanted cells as they were manipulated by immunorejection.

The researchers found that the withdrawal of immunosuppressant drugs eliminated [tumor growth](#) and, in effect, created a 'safety lock' against [tumor formation](#) as an adverse outcome of [cell transplantation](#). They also confirmed that withdrawal of immunosuppression led to rejection of tumors formed by transplantation of induced [pluripotent stem cell](#) derived neural stem/progenitor cells (iPS-NP/SCs).

Although the central nervous system has shown difficulty in regenerating after damage, transplanting neural stem/progenitor cells (NS/PCs) has shown promise. Yet the problem of tumorigenesis, and increases in teratomas and gliomas after transplantation has been a serious problem. However, this study provides a provisional link to immune therapy that

accompanies cell transplantation and the possibility that inducing immunorejection may work to reduce the likelihood of tumorigenesis occurring.

"Our findings suggest that it is possible to induce immunorejection of any type of foreign-grafted tumor cells by immunomodulation," said study co-author Dr. Masaya Nakamura of the Keio University School of Medicine. "However, the tumorigenic mechanisms of induced pluripotent neural stem/progenitor cells (iPS-NS/PCs) are still to be elucidated, and there may be differences between iPS-NS/PCs derived tumors and glioblastoma arising from genetic mutations, abnormal epigenetic modifications and altered cell metabolisms."

The researchers concluded that their model might be a reliable tool to target human spinal cord tumors in preclinical studies and also useful for studying the therapeutic effect of anticancer drugs against malignant tumors.

"This study provides evidence that the use of, and subsequent removal of, immunosuppression can be used to modulate cell survival and potentially remove tumor formation by transplanted glioma cells and provides preliminary data that the same is true for iPS-NS/PCs." said Dr. Paul Sanberg, distinguished professor at the Center of Excellence for Aging and Brain Repair, University of South Florida. "Further study is required to determine if this technique could be used under all circumstances where transplantation of [cells](#) can result in tumor formation and its reliability in other organisms and paradigms."

The study will be published in a future issue of *Cell Transplantation*.

More information: www.ingentaconnect.com/content...tent-CT-1152 Itakura

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

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