Cell Transplantation study shows bone growth from implanted tooth and dental pulp stem cells

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Researchers in Japan have completed a study showing that stem cells derived from deciduous canine teeth and dental pulp can be grafted and produce bone regeneration between parents and offspring. Their results are published in the current issue of *Cell Transplantation* (20:7), now freely available on-line.

"Bone defects can occur for a number of reasons, and autogenous bone grafting - using the patient's own bone - has been a standard approach to treatment," said study corresponding author Dr. Yoichi Yamada of the Center for Genetic and Regenerative Medicine at the Nagoya University School of Medicine. "However, considering severe invasiveness in self-donor bone sites, and the limited supply of autogenous bone, alternative donor sources are needed."

The researchers note that previous studies have shown that oral and maxillofacial dental tissues contain a variety of stem cells, such as dental pulp stem cells and stem cells from deciduous teeth. Stem cells, they note, can be easily extracted from deciduous teeth, which are routinely lost in childhood and generally discarded.

"Stem cells from human exfoliated deciduous teeth were identified as a novel population of stem cells, capable of differentiating into various cell types, such as osteoblasts, odontoblasts, adipocytes and neural cells," explained Dr. Yamada.

Their study extracted deciduous teeth from canine puppies and grafted them onto parent canine mandibles as an allograft. After four weeks, bone defects were prepared on both sides of the host mandible. The newly formed bone was evaluated at two, four and eight weeks. When compared to controls, the study group demonstrated well-formed mature bone and neovascularization.

The researchers reported that stem cells derived from dental pulp "display increased immunosuppressive activity when compared to bone marrow mesenchymal cells" and will likely have "immunosuppressive activity with potential clinical applications in allogenic in vivo stem cell transplantation, particularly for calcified tissue reconstruction."

Their pre-clinical study could pave the way for stem cell therapy in othropedics and oral maxillofacial reconstruction, concluded Dr. Yamata.

"This study highlights the promise of obtaining stem cells from unusual sources, such as teeth, and their potential benefit in familial treatments for bone reconstruction" said Dr. Julio Voltarelli, professor of Clinical Medicine and Clinical Immunology at the University of Sao Pãulo, Brazil, and section editor for *Cell Transplantation*. "Due to their potential to also become other cell types such as neural cells, it will be interesting to see what future studies reveal about the possible uses of these cells."

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