

Periodontal stem cell transplantation shows promise

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Periodontal ligament stem cells (PDLSCs) have been found to be the most efficacious of three kinds of clinically tested dental tissue-derived stem cells, reports a study published in the current issue of *Cell Transplantation* (20:2).

According to researchers in Seoul, South Korea, transplantation of PDLSCs into beagle dogs modeled with advanced periodontal (gum) disease that affected their premolars and molars, which are morphologically similar to the corresponding areas in human dentition, was most effective. PDLSCs showed the best regenerating capacity of the periodontal ligament (which attaches the tooth to the alveolar bone in which the teeth sit), alveolar bone, cementum (material that comprises the surface of a tooth's root), peripheral nerve and blood vessels when compared to similar transplants using dental pulp stem cells (taken from the center of teeth) or periapical follicular stem cells (taken from the developing root).

"Periodontitis, characterized by bone resorption, periodontal pocketing and gingival inflammation, is the most common cause of [tooth loss](#) in adults and affects 10 to 15 percent of adults worldwide," said corresponding author Dr. Pill-Hoon Choung of the Seoul National University School of Dentistry. "Our study sought to evaluate the effectiveness of autologous [stem cell transplantation](#) (i.e. transplant of a patient's own cells) using three kinds of autologous dental stem cells similar to mesenchymal stem cells."

Past efforts at improving periodontal regeneration included xenogenic (from a different species) bone particle graft using growth factors, but the clinical results were generally unsatisfactory, said the researchers.

In their [stem cell transplant](#) study, Dr. Choung's group found PDLSCs to be most efficacious of the three cell types since they offered the best results with respect to the quality and quantity of regenerated tissues.

"PDLSCs made more calcium nodules and showed higher alkaline phosphatase (ALP) activity than did the other two stem cell varieties," added Dr. Choung.

The researchers concluded that further studies should investigate which factors influence the stabilization and differentiation in the diseased periodontal microenvironment and which factors make the three kinds of dental stem cells react differently in vivo.

"This study highlights the diverse sources of stem cells available in the tissues of the body for repair and how the optimal cell type for possible treatments needs to be determined - in this case for the treatment of dental-related disorders such as [gum disease](#)" 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.

More information: Park, J-Y.; Jeon, S. H.; Choung, P-H. Efficacy of periodontal stem cell transplantation in the treatment of advanced periodontitis. *Cell Transplant.* 20(2):271-285; 2011. It is freely available on-line at <http://www.ingentaconnect.com/content/cog/ct/>

Provided by Cell Transplantation Center of Excellence for Aging and

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