

Adipose Stem Cells as Alternatives for Bone Marrow Mesenchymal Stem Cells in Oral Ulcer Healing

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Abstract

Objectives: Adipose tissue is now recognized as an accessible, abundant, and reliable site for the isolation of adult stem cells suitable for tissue engineering and regenerative medicine applications. **Methods & Results:** Oral ulcers were induced by topical application for formocresol in the oral cavity of dogs. Transplantation of undifferentiated GFP-labeled Autologous Bone Marrow Stem Cell (BMSCs), Adipose Derived Stem Cell (ADSCs) or vehicle (saline) was injected around the ulcer in each group. The healing process of the ulcer was monitored clinically and histopathologically. Gene expression of vascular endothelial growth factor (VEGF) was detected in MSCs by Reverse Transcription-Polymerase Chain Reaction (RT-PCR). Expression of VEGF and collagen genes was detected in biopsies from all ulcers. **Results:** MSCs expressed mRNA for VEGF. MSCs transplantation significantly accelerated oral ulcer healing compared with controls. There was increased expression of both collagen and VEGF genes in MSCs-treated ulcers compared to controls. **Conclusions:** MSCs transplantation may help to accelerate oral ulcer healing, possibly through the induction of angiogenesis by VEGF together with increased intracellular matrix formation as detected by increased collagen gene expression. This body of work has provided evidence supporting clinical applications of adipose-derived cells in safety and efficacy trials as an alternative for bone marrow mesenchymal stem cells in oral ulcer healing.

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