

The role of bone marrow-derived mesenchymal stem cells

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Abstract

Background: Mesenchymal stem cells (MSCs), a subpopulation of adult somatic stem cells, are an attractive stem cell source in regenerative medicine because of their multipotentiality. In this study, the effects of MSCs transplantation on oral ulcer healing were examined.

Methods: Mesenchymal stem cells were isolated from bone marrow aspirates of dogs by dish adherence and expanded in culture. Oral ulcers were induced by topical application of formocresol in the oral cavity of dogs. Either autologous MSCs or vehicle (saline) was injected around the ulcer. 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. Expression of VEGF and collagen genes was detected in biopsies from all ulcers.

Results: Mesenchymal stem cells 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 with controls.

Conclusion: Mesenchymal stem cells transplantation may help 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.

Keywords: bone marrow; mesenchymal stem cells; oral ulcer

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