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Efficacy of vascular endothelial growth factor and MTA on angiogenesis of dental pulp stem cells transferred onto polymeric scaffold

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Introduction: Stem cells are considered to have self-renewal and multipotential entities and thus can generate several differentiated cell types and regenerating tissues. Vascular endothelial growth factor (VEGF) plays a central role in angiogenesis, promoting the formation of new capillaries. Mineral trioxide aggregate (MTA) is a biocompatible material that has a wide range of clinical applications, including pulp capping, root perforation repair, and root-end filling. This study investigated effect of VEGF and MTA on angiogenesis of dental pulp stem cells transferred onto polymeric scaffold.

Materials & Methods: Dental pulp stem cells have been prepared in a form of equipped and increased to 2 million cells. After passing the preparation procedure, polymeric wells that made by poly caprolactone chitosan (PCL-CS) polymer, inserted in plates and 105 cells transferred to the palates. VEGF was added to the chambers of the experimental groups. After 14 days of incubation, the cells were transferred to flowcytometry center for assessment of CD31 and VEGFR2 as the angiogenesis factors.

Results: In the PCL-CS-MTA scaffold group, in the presence of VEGF, human dental pulp stem cells can express 90+8% of VEGFR2. While the expression of this receptor on cells cultured on PCL-Cs scaffold alone was 1/2+0/9%. Furthermore, the CD31 receptor expression was 71/4± 6/6% on the PCL-Cs-MTA, however, CD31 expression in control group was 5±1/2%. The increase in both receptor expression was statistically significant ($p<0.05$).

Conclusion: The present study shows that angiogenesis of dental pulp stem cells is increased in the presence of VEGF on the polymeric scaffold with MTA. Consequently, it seems that VEGF and MTA have the ability of enhancing angiogenesis in pulp stem cells.

Biography

Mohammad Samiei is an Assistant Professor of Endodontics at Tabriz University of Medical Sciences. He has a great experience in the field of Dentistry. He is a course Director, Lecturer and Instructor in Department of Community Dentistry.

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