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Effect of platelet-rich-plasma (PRP) and MTA on angiogenesis of dental pulp stem cells transferred to polymeric scaffolds

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Introduction: Stem cells are considered to be clonogenic, self-renewable and multipotent entities and thus can generate several differentiated cell types and play an important role in rebuilding tissues. Platelet-rich plasma (PRP) is fabricated from autologous blood and extensively used to promote soft and hard tissue healing. Mineral trioxide aggregate (MTA) is a biocompatible material with numerous clinical applications in endodontics such as pulp capping, pulpotomy, perforation repair, root-end fillings, and apexification. This study investigated effect of Platelet-Rich-Plasma (PRP) and MTA on angiogenesis of dental pulp stem cells transferred to polymeric scaffolds.

Materials & Methods: Dental pulp stem cells have been prepared in a form of equipped and the cell count was increased to 2 million cells. After passing the preparation processes, the polymeric wells that were made by poly caprolactone (PCL) and containing MTA, were inserted in plates and 100/000 cells were transferred to them. After 24 hours, PRP was added to the chambers of the case group. After 14 days of incubation, the cells were transferred to flow cytometry center for assessment of CD31 and VEGFR2 as the angiogenesis factors. The collected data of this study was analyzed statistically with SPSS.17 software.

Results: Findings show that on the Pcl-Cs-MTA scaffold in presence of PRP, human dental pulp stem cells can express 46+12/4% of VEGFR2. Meanwhile, the expression of this factor on cells cultured on Pcl-Cs scaffold alone was 29/1+4/3%. Furthermore, the factor CD31 was expressed 12/7+4/9% on the Pcl-Cs-MTA scaffold in presence of PRP. However, this factor was expressed only 10+4/1% on Pcl-Cs scaffold alone. This increase is significant in receptors of VEGFR2 but not in the receptors of CD31.

Conclusions: The present study showed that angiogenesis of pulp stem cells is increased in the presence of PRP and MTA. Therefore, it can be concluded that PRP and MTA can be used to enhance angiogenesis in pulp 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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