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Chondrogenic and possible pathologic effects of PRP on adipose derived MSCs

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Introduction: Application of activated Platelet-Rich Plasma (PRP) with its vast range of cytokines and growth factors has achieved a considerable attention for chondrogenic differentiation in tissue engineering fields. Therefore, the aim of this study was to investigate the effects of PRP on human adipose derived MSC chondrogenesis.

Material & Methods: MSCs were differentiated using different PRP concentrations (5% and 15%). Changes in gene expression levels for cartilage and bone specific markers (COLII, AGC, SMAD2, SOX9) and (RUNX, Osteocalcin), respectively, were appraised by real time PCR. Also chondrogenesis was assessed by measuring secreted glucosaminoglycan in the medium or that kept in cell ECM. The expression of pathologic markers was evaluated by measuring the VEGF, TNFα secretion and alkaline phosphatase activity and calcium deposition.

Results: The most secreted VEGF ($p<0.05$) in 5% and 15% concentration were anti-angiogenesis. The inflammation factor (TNF-α) quantity of 5% PRP was the lowest ($p<0.05$) on 21st day but chemotaxic characteristics of the mentioned group was the highest. The expression levels of AGC, SOX9, COLII and RUNX were significantly ($p<0.05$) down-regulated while Osteocalcin was up-regulated. In addition, hypertrophy was seen in chondrogenic differentiation.

Conclusion: Due to having vast range of biologic active factors, PRP based chondrogenesis of human adipose derived MSC is dose dependent and the undesired outcomes due to absence of regulatory factors, should be suppressed by further optimizing the formulation of chondrogenic differentiation media.

Biography

Arezou Pakfar holds a Master degree in Cellular and Molecular Biology at Islamic Azad University, Iran. Her thesis was about Tissue Engineering and Stem Cells. She is currently working as a Researcher at Stem Cell Technology Research Center since 2014.

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