Platelet-Poor and Platelet-Rich Plasma Stimulate Bone Lineage Differentiation in Periodontal Ligament Stem Cells

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Resumen

Background: Plasma-derived fractions have been used as an autologous source of growth factors; however, limited knowledge concerning their biologic effects has hampered their clinical application. In this study, the authors analyze the content and specific effect of both platelet-rich plasma (PRP) and platelet-poor plasma (PPP) on osteoblastic differentiation using primary cultures of human periodontal ligament stem cells (HPLSCs).

Methods: The authors evaluated the growth factor content of PRP and PPP using a proteome profiler array and enzyme-linked immunosorbent assay. HPLSCs were characterized by flow cytometry and differentiation assays. The effect of PRP and PPP on HPLSC bone differentiation was analyzed by quantifying calcium deposition after 14 and 21 days of treatment.

Results: Albeit at different concentrations, the two fractions had similar profiles of growth factors, the most representative being platelet-derived growth factor (PDGF) isoforms (PDGF-AA, -BB, and -AB), insulin-like growth factor binding protein (IGFBP)-2, and IGFBP-6. Both formulations exerted a comparable stimulus on osteoblastic differentiation even at low doses (2.5%), increasing calcium deposits in HPLSCs.

Conclusions: PRP and PPP showed a similar protein profile and exerted comparable effects on bone differentiation. Further studies are needed to characterize and compare the effects of PPP and PRP on bone healing in vivo.

Palabras clave

Palabras clave de autor: Calcification, physiologic; cell differentiation; mesenchymal stromal cells; periodontal ligament; platelet-rich plasma; regeneration
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