

Platelet-Rich Plasma Enhances Human Osteoblast-Like Cell Proliferation and Differentiation

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Purpose: Platelet-rich plasma (PRP) is widely used to promote tissue healing. However, there is no concrete evidence for the biological effects of PRP. This study evaluated the biological effects of PRP on the proliferation and differentiation of 2 human osteoblast-like cell lines.

Materials and Methods: Human osteosarcoma cell lines HOS and SaOS-2 were used in this study. PRP was prepared from freshly drawn human venous blood containing a large number of platelets. The MTT assay was used to examine the effects of PRP on osteoblast viability. To evaluate the growth and differentiation, alkaline phosphatase activity was assessed and the expression of procollagen type I, osteopontin, and osteoprotegerin mRNA was measured using semiquantitative reverse transcriptase-polymerase chain reaction. Further, core binding factor alpha 1 (cbfa1/Runx2/AML3/Pebp α A), a critical regulator of osteoblast differentiation, was also determined.

Results: The administration of PRP enhanced the viability of HOS and SaOS-2 cells in a dose-dependent manner. Alkaline phosphatase activity was suppressed during the cell growth phase, but was strongly enhanced when the cells reached confluence. Semiquantitative reverse-transcription polymerase chain reaction analysis showed that PRP enhanced the levels of procollagen type I, osteopontin, osteoprotegerin, and core binding factor alpha 1 (cbfa1) mRNA.

Conclusion: These results suggest that PRP has a favorable effect on human osteoblast-like cells, and acts both to enhance bone regeneration and as an activator in wound healing.

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