

The effect of different platelet-rich plasma concentrations on proliferation and differentiation of human periodontal ligament cells *in vitro*

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Received 31 August 2006; revision accepted 1 November 2006

Abstract. *Objectives:* The use of platelets and platelet products has become increasingly popular clinically as a means of accelerating endosseous wound healing. It is likely that growth factors released by activated platelets at the site of injury play a role in periodontal regeneration by regulating cellular activity. The purpose of this study was to evaluate the biological effects of platelet-rich plasma (PRP) on human periodontal ligament cells (hPDLCs) *in vitro*. *Materials and methods:* Primary cultures of hPDLCs were obtained from healthy premolars. PRP was isolated by two-step centrifugation. Two main growth factors present in the thrombin-activated PRP (platelet-derived growth factor [PDGF-AB] and transforming growth factor- β 1 [TGF- β 1]) were evaluated using ELISA assay. Activated PRP or the combination of recombinant human TGF- β 1 (rhTGF- β 1) and PDGF-AB (rhPDGF-AB) were added to hPDLCs in different concentrations to assess cell proliferation and osteogenic differentiation. *Results:* PRP contained high levels of TGF- β 1 and PDGF-AB. Cell attachment, proliferation and ALP activity were enhanced by addition of PRP or rhTGF- β 1 and rhPDGF-AB combination to the cell cultures, while the stimulatory potency of PRP was much greater than the latter. These stimulatory effects presented in a dose-dependant manner, it seemed that PRP with 50~100ng/ml TGF- β 1 was an ideal concentration. *Conclusions:* PRP can enhance hPDLC adhesion, proliferation and induce the differentiation of hPDLC into mineralized tissue formation cell; thereby contribute to the main processes of periodontal tissue regeneration. For economical and biological reasons, PRP has more clinical beneficial than analogous growth factors.