

عنوان مقاله:

The effect of platelet-rich plasma on human mesenchymal stem cell-induced bone regeneration of canine alveolar defects with calcium phosphate-based scaffolds

محل انتشار:

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خلاصه مقاله:

Objective(s): Autologous bone transplantation known as the “gold standard” to reconstruction of osseous defects has known disadvantages. This study was designed to explore the effects of hydroxy-apatite/tricalcium-phosphate (HA/TCP) and platelet-rich plasma (PRP) on the osteogenesis ability of human adipose-derived mesenchymal stem cells (hAdMSCs) in vitro and in vivo. **Materials and Methods:** hAdMSCs were incubated with HA/TCP granules and/or PRP in vitro and then, cell proliferation and differentiation was assessed by MTT assay, AZR S staining and SEM examination. In vivo, four cylindrical defects were drilled in the mandibular bones of 5 mongrel dogs and divided randomly into the following groups: I-autologous crushed bone, II- no filling material, III- HA/TCP and PRP, IV- PRP-enriched hAdMSCs seeded on HA/TCP granules. Inserted hAdMSCs were labeled to trace their contribution to bone tissue regeneration. Finally, cell tracing and tissue regeneration were evaluated by immunohistochemistry and histomorphometry methods, respectively. **Results:** In vitro, co-incubation with HA/TCP granules significantly reduced

proliferation and osteogenic differentiation ability of hAdMSCs; while PRP application promoted these capacities ($P < 0.05$). In vivo, PRP-enriched hAdMSCs seeded on HA/TCP granules induced considerable bone formation in osseous defects ($P < 0.05$). It was obviously shown that hAdMSCs were incorporated into the newly-formed bone. Conclusion: Based on this study, application of stem cells could offer a helpful therapeutic tool in bone tissue regeneration. Although inserted hAdMSCs were identifiable throughout the newly-formed bone tissue, their few number could be an indicator of indirect role of hAdMSCs in tissue regeneration.

کلمات کلیدی:

Adipose tissue, Bone, Dog, Osteogenesis, Stem cells, Tissue engineering

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