

## عنوان مقاله:

Enhanced Osteogenic Differentiation of Mesenchymal Stem Cells Using Electromagnetic Field and Platelet Rich Plasma Modified Scaffolds

## محل انتشار:

بیستمین کنگره بین‌المللی بیولوژی تولید مثل و پانزدهمین کنگره بین‌المللی سلول های بنیادی (سال: 1398)

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## خلاصه مقاله:

Background: Recent developments in bone tissue engineering have heightened the need for development of safer and more rapid techniques along with cost-effective strategies. Utilization of autologous products has become additionally desirable and is increasingly growing. Recently, activated platelet rich plasma (PRP) has been widely used in the field of bone tissue engineering owing to its huge number of growth factors involved in osteogenesis and bone regeneration. Electromagnetic field (EMF) has proven to have inductive effects on some determination pathways of stem cells. Based on studies, biophysical and biochemical stimuli can facilitate cell differentiation. In the present study, the effect of EMF, as a biophysical factor, and PRP, as a biochemical factor, alone and in combination with each other on osteogenic differentiation has been investigated. Materials and Methods: To accomplish this, we coated Poly-ethersulfone/ Polyvinyl alcohol (PES/PVA) nanofibrous scaffolds with PRP and, cultured adipose derived stem cells (AD-SCs) on the scaffolds with electromagnetic field exposure, for 14 days. Then, common osteogenic markers were assayed by Real Time PCR. Alkaline phosphate (ALP) activity, calcium mineral deposition and Alizarin red staining were performed. Results: The results revealed that the best osteogenic differentiation occurred when cells were cultured on PRP coated PES/PVA scaffold. The exposure of electromagnetic field and presence of osteogenic factors did not show synergistic or additive effects. Among various combinations of already approved osteo-inductive factors, namely PRP, EMF and exogenous osteogenic factors, the best result was achieved by the simplest and least cost strategy, i.e. merely by PRP coating of the surface. Conclusion: PRP modified PES/PVA scaffolds by itself can maximally induce osteogenesis without the need for any external physical and/or biochemical stimulations. The major contribution of this paper to the current research on bone regeneration is to establishing the effects of PRP-coated scaffold on osteogenesis.

## کلمات کلیدی:

Bone Tissue Engineering, Adipose Derived Mesenchymal Stem Cell, Electromagnetic Field, PRP, Nanofibrous Scaffold

## لینک ثابت مقاله در پایگاه سیویلیکا:

