



Effect of pulsed electromagnetic field therapy on the osteogenic and adipogenic differentiation of bone marrow mesenchymal stem cells

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Genet. Mol. Res. 14 (3): 11535-11542 (2015)

Received January 13, 2015

Accepted May 18, 2015

Published September 28, 2015

DOI <http://dx.doi.org/10.4238/2015.September.28.5>

ABSTRACT. We investigated the effects of pulsed electromagnetic fields (PEMFs) of 20 Hz/2 mT on the osteogenic and adipogenic differentiation of bone marrow stem cells (BMSCs). Sprague Dawley rat BMSCs were isolated and cultured *in vitro*. The BMSCs of the third passage were obtained and stimulated by PEMFs of 20 Hz/2 mT. The alkaline phosphatase (ALP) activity was measured according to the ALP assay kit manufacturer instructions, the BMSC osteogenic and adipogenic indicators were detected by semi-quantitative reverse transcription polymerase chain reaction (RT-PCR), and oil red O staining was used to observe the adipose-induced adipogenic differentiation of BMSCs. PEMFs of 20 Hz/2 mT significantly promoted the activity of ALP in the BMSCs ($P < 0.01$) and mRNA expression of osteogenic proteins (osteocalcin and osteopontin). The PEMFs inhibited the expression of adipogenic transcription factors such as adipokines and

adipocyte-binding protein-2, and the adipogenic differentiation of BMSCs. PEMFs of 20 Hz/2 mT can promote osteogenic differentiation and inhibit adipogenic differentiation in BMSCs.

Key words: Pulsed electromagnetic field; Osteocalcin; Osteopontin; Alkaline phosphatase; Bone mesenchymal stem cells