Original article

UDC: 602.9:611.018.4
doi: 10.5633/amm.2019.0408

VASCULOGENIC POTENTIAL OF ADIPOSE-DERIVED MESENCHYMAL STEM CELLS *IN VITRO* INDUCED INTO OSTEOBLASTS APPLIED WITH PLATELET-RICH PLASMA IN AN ECTOPIC OSTEOGENIC MODEL

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Bone tissue deficiencies can be caused by fractures, bone loss or tumors. Insufficient vascularization is the main problem in successful bone tissue regeneration. In order to improve vascularization during bone tissue regeneration, a promising methods have been developed in the field of bone tissue engineering (BTE) by using adipose-derived stem cells (ADSCs). The aim of this study was to examine vasculogenic potential of ADSCs in vitro induced into osteoblasts (OBs) combined with platelet-rich plasma (PRP) and bone mineral matrix (BMM) in ectopic osteogenic implants, and compare it with implants consisting of uninduced ADSCs, PRP and BMM. ADSCs isolated from mice epididymal adipose tissue cultivated up to the third passage were divided into two groups: ADSCs in vitro induced into OBs and ADSCs expanded without osteoinduction. Based on biological triad principle, two types of implants were composed: implants containing BMMC, PRP and ADSCs in vitro induced into OBs (BPO implants), and implants containing BMMC, PRP and uninduced ADSCs (BPU implants). The BPO implants had higher expression of endothelial-related genes compared to the BPU implants. Additionally, VCAM-1 immunoexpression increases during in vivo experimental period in the BPO implants, while in the BPU implants VCAM-1 immunoexpression decreases during in vivo experimental period. Therefore, vasculogenic potential of ADSCs in vitro induced into OBs and combined with PRP and BMM in ectopic osteogenic implants is higher compared to the implants composed of uninduced ADSCs, PRP and BMM, which makes implants enriched with ADSCs induced into OBs good candidates for improving vascularization in bone tissue-engineered constructs.

Acta Medica Medianae 2019;58(4):57-65.

Key words: *ectopic osteogenesis, ADSCs, osteogenic differentiation, endothelial-related gene expression, PRP*