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BONE TISSUE ENGINEERING BASED ON BONE MARROW IN BLOOD CLOT LOADED ON MINERAL MATRIX CARRIER: EXPERIMENTAL STUDY IN SUBCUTANEOUS MICE MODEL

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Repair of bone defects can be supported by appropriate biomaterials, cells and regulatory signals, which is the basic principle of bone tissue engineering. The components of bone marrow and blood clot come in close contact with bone defects after injury. Since these structures represent the source of different cell types and regulatory signals, we wanted to examine their effect on osteoreparatory process in ectopic implants. Subcutaneous implantation was performed on male Balb/c mice. Bio-Oss® biomaterial in the function of mineral matrix carrier was loaded with blood diluted with bone marrow cell suspension (MMB-type implants) or only with blood diluted with saline (MB-type implants, control). Implant extraction was performed 2, 8 and 12 weeks after implantation. MMB-type implants were characterized with more pronounced beginning of resorption in comparison with MB-type implants. High cell density of connective tissue was also preserved during the 12-weeks observation period in MMB-type implants, as well as good vascularity, which was most pronounced 8 weeks after implantation. Osteoblast-like cells and osteon-like structures could be observed. These results suggest that bone marrow in synergy with blood clot might have a stimulating effect on osteoreparation process. *Acta Medica Medianae 2017;56(3):5-11.*

Key words: *bone marrow, blood clot, mineral matrix carrier, implant, osteoreparation process*