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***In vivo* repair of bone defect with PGLA/HA/CS scaffold and MSCs on rats**Seyedeh Niloufar Rafiee Alavi and Seyed Keihan Mostafavi  
Iran University of Medical Sciences, Iran

Human mesenchymal stem cells (hMSCs) are a very attractive option for cell engineering. In addition, as hMSCs does not cause immune response, its nonautologous application is also possible. This study discusses the application of hMSCs seeded in PGLA/CS/HA scaffold in femur bone defect model in rats. After separating the cells from human bone marrow sample, they were cultured on the constructed scaffold. Then some tests were performed on the constructed tissue, which were: Electron microscopy studies, to determine cells adherence to scaffold and the tissue's morphology, MTT test to determine the scaffold's biocompatibility and measuring Alkaline-phosphatase amounts to check the quantity of differentiated hMSCs to osteoblasts. After forming the bone defect model on rats, the bone defect was filled with scaffold and MSCs in one group and with scaffold alone, in another. Also, there was a third, control group for comparison. After 12 weeks of implanting the tissue in rats, CT scan radiography revealed the new bone was only formed at the two ends of femur bone in the control group and filling was much more in the other two groups, one with scaffold alone and another with scaffold and cells. Although, the difference between the amount of newly formed bone in the group with both scaffolds and MSCs was statically significant from the two other groups. Electron microscopy revealed desirable adherence and polygonal morphology which indicates cell differentiation. MTT test's results showed proper biocompatibility and increased cell proliferation. Alkaline phosphatase amounts indicated elevated osteoblast's activity. Histological studies illustrated formation of lamellar bone in the two test groups and the thickness was more in the group with both scaffold and hMSCs. No immunological reaction was observed in the two groups. In conclusion, PLGA/HA/CS scaffold improves cell adherence, cell proliferation, biocompatibility, differentiation of MSCs to osteoblasts and osteogenesis in both *in vitro* and *in vivo* condition.

**Biography**

Seyedeh Niloufar Rafiee Alavi studying medicine at Iran University Of Medical sciences.

niloufar.raf@hotmail.com

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