EuroSciCon

June 17-18, 2019
London, UK

13th Edition of International Conference on

Advances in Tissue Engineering and Biomaterials Science

M. Basile et al., J Biomedical Sci 2019, Volume 08

Chemotactic properties of human amniotic fluid-derived stem cells (hAFSCs) in bone healing

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Current treatment of large bone defects is based on autologous or allogenic bone grafts that still have several limitations. In the past few years, human amniotic fluid stem cells (hAFSCs) were evaluated for their osteogenic potential in the repair of bone defects due to the absence of ethic controversy and risk of teratocarcinoma formation. Thus, the aim of this study was to investigate the role of hAFSCs in the regeneration of critical-size bone defects in calvaria mouse model. For this purpose, we transduced hAFSCs with cherry red fluorescent protein and used a recipient transgenic mouse model carrying GFP fluorescent reporter to follow the fate of hAFSCs transplanted in vivo into Healos® construct and distinguish donor and host cells at the implant site. Our results showed that transduced hAFSCs can be tracked in vivo directly at the site of transplantation. Cherry red fluorescent hAFSCs were not present in the implant site after 3 and 6 weeks. Instead, the presence of a greater number of GFP-positive cells in the scaffold at the same time-intervals indicates that hAFSCs can recruit host cells during the repair process. Moreover, we observed that hAFSCs are able to attract mouse bone marrow stromal cells (mBMSCs) in vitro, suggesting a possible chemotactic property of their releasing soluble factors. These observations help clarify the role of hAFSCs in bone tissue repair.

Biography

Mariangela Basile graduated in 2015 in Pharmaceutical Chemistry and Technology, UdA Chieti, Italy. In 2013 active collaboration in conducting scientific research into Department of Pharmacy, General Pathology Unit, UdA Chieti, Italy. Since 2016 PhD student in Translational Medicine, Cell Biology Lab, Dept. of Medicine and Ageing Sciences, Inst. of Normal Human Morphology, UdA Chieti, Italy. In 2017/2018, research assistant at Center for Regenerative Medicine and Skeletal Development, Reconstructive Science Department, UConn Health Center, Farmington, Connecticut, USA.

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