PREZENTARE ORALA

Magnetic Stimulation of Adipose Derived Stem Cells Improves the Chronic Wounds and Bone Regeneration Management

Bianca Galateanu[1,2], Ariana Hudita[1], Mirela Serban[1], Ionut Radu[3], Eugenia Vasile[4], Catalin Zaharia[3], Silviu C. Badoiu[5,6], Dana Jianu[7,8], Marieta Costache[1]*

[1] Department of Biochemistry and Molecular Biology, University of Bucharest, Romania

[2] Research Institute of University of Bucharest, University of Bucharest, Romania

[3] Advanced Polymer Materials Group, University Politehnica of Bucharest, Romania

[4] University Politehnica of Bucharest, Romania

[5] Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

[6] Burns Unit, Agrippa Ionescu Hospital, Bucharest, Romania

[7] Proestetica Medical S.R.L., Bucharest, Romania

[8] International Society of Regenerative Medicine and Surgery, Bucharest, Romania

** presenting author*

Background: Regenerative strategies often involve the use of chemical stimulators such as growth factors and cytokines together with autologous stem cells therapy. However, physical factors such as the magnetic stimulation also exhibit a very promising solution for the management of chronic wounds and bone fractures. Additionally, many studies have shown that the magnetic field might improve the tissue resident stem cells proliferation and differentiation status.

Methods: Human adipose derived stem cells (hASCs) were isolated from subcutaneous adipose tissue, by enzymatic digestion from healthy patients undergoing elective liposuction. All donors provided their written consent to participate in the study. hASCs were propagated for 5 passages *in vitro* and then seeded at an initial density of 10^6/sample on top of polymeric composites designed either for bone regeneration or wound healing applications. These biomaterials were built using a polymeric component, magnetite and hydroxyapatite (only for bone regeneration purposes). The obtained hASCs/biomaterials bioconstructs were then maintained in standard conditions of culture, with and without exposure to the magnetic field generated by Neodymium magnets place under each well of a 12 well culture plate. Cell morphology and viability, as well as their proliferative status were investigated by fluorescence microscopy and spectrophotometric assays.

Results and conclusions: Our results show that the magnetic field significantly improved hASCs viability and proliferative status inside 3D polymeric composites. Additionally, we observed that the magnetic field guided the orientation of the cytoskeleton actin filaments.

Acknowledgements: This research was financed by the University of Bucharest Research Institute (ICUB), through „Young Researchers Grant, competition 2016" Project