IJAE

Italian Journal of Anatomy and Embryology

Official Organ of the Italian Society
of Anatomy and Histology

68° Congresso della Società Italiana di Anatomia e Istologia

68TH Meeting of the Italian Society of Anatomy and Histology

Ancona 18-20 september 2014

Vol. 119
N. 1 (Supplement)
2014
ISSN 1122-6714
FIRENZE UNIVERSITY PRESS

IJAE
Vol. 119, n. 1 (Supplement): 66, 2014
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Rat Cardiac progenitor cells and their application in cell therapy

Valentina Di Felice[1], Claudia Serradifalco[1], Francesca Rappa[1], Rosario Barone[1], Patrizia Di Marco[2], Roberto Puleio[2], Giovanni Cassata[2], Verin Lucia[3], Motta Antonella[3], Claudio Migliaresi[3], Guercio Annalisa[2], Giovanni Zummo[1]

[1] Department of Experimental Biomedicine and Clinical Neurosciences, University of Palermo, 90127 Palermo, Italy
[2] Istituto Zooprofilattico Sperimentale della Sicilia, 90129 Palermo, Italy
[3] Department of Materials Engineering and Industrial Technologies, and Biotech Research Center, University of Trento, 38050 Trento, Italy

Cardiovascular diseases are characterized by the progressive loss of functional cells and the subsequent heart failure. When the pharmacological approach no longer complies with the disease evolution, organ transplantation appears to be the only treatment able to rescue the patient life. Cell therapy promises to be clinically efficient and would allow circumventing many limitations of organ transplantation, such as organ low availability, major surgical procedures, high costs and longterm immunosuppression [1].

We designed porous Poly-Lactic Acid (PLLA) and Fibroin scaffolds to deliver CPCs in the heart, we isolated and characterized CPCs for the expression of c-Kit, MDR-1 and Sca-1 by flow cytometry, we tested their degree of differentiation in vitro studying the expression of all known rat sarcomeric proteins by real-time PCR and their differentiated morphology on Electron Microscopy samples [2]. A particular attention was given to the expression of microRNA, because their role in the differentiation process of cardiac precursors is emerging.

We also tested the host reaction to scaffolds, CPCs, and CPCs/scaffolds. In vivo, almost all the used scaffolds induced a foreign body reaction in nude mouse and rats, but not in SCID mice. Cardiac stem cells a T cell-mediated immune response induced in nude mice, letting us suppose that, differently from Mesenchymal Stem Cells, they express MHC molecules on their surface.

The degree of differentiation, the expression of ECM and integrin proteins, and the expression of several sarcomeric proteins were dependent on the type of scaffold and the polymer used.

References

[1] Di Felice et al. (2013) Stem cell populations in the heart and the role of Isl1 positive cells. Eur J Histochem. 57 : e14.
[2] Di Felice et al. (2013) Silk fibroin scaffolds enhance cell commitment of adult rat cardiac progenitor cells. J Tissue Eng Regen Med. Apr 17 (published online).

Keywords
Cardiac progenitor cells, biomaterials, cell therapy.