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Abstract

ELF induced stem cell differentiation

Antonella Lisi, Settimio Grimaldi, Livio Giuliani, Enrico D’Emilia and Alessandro Giacomello
ISPESL-Venezia, ISPESL-DIPIA, INMM, **Università La Sapienza**

In order to increase the reliability and the clinical feasibility of the Cardiac Stem Cells (CSCs) employment for cardiac cell therapy we need new methods that allow a modulation of the differentiation process with a minimal cell manipulation. CSCs can be clonally expanded from myocardial biopsies; these cells are spontaneously shed from human surgical specimens and murine heart samples in primary culture. This heterogeneous population of cells expresses c-kit. The cells are self-renewing, clonogenic and multipotent giving rise spontaneously to cardiomyocytes, smooth muscle cells and endothelial cells. In suspension culture they form multicellular clusters dubbed Cardiospheres (CSps, *Messina et al. Circ Res. 2004*). Modulation of the cardiac stem cells (CSCs) differentiation with minimal cells manipulation is one of the main **goals** for the clinical applicability of cell therapy for heart failure. We have demonstrate that CSCs, obtained from human endomyocardial biopsy specimens, self-assemble into multi-cellular clusters known as cardiospheres (CSps) that engraft and partially regenerate infarcted myocardium. We assessed the hypothesis that exposure of CSps or CSs-derived-cells (CDCs) to extremely low frequency magnetic field (LFMF) tuned to calcium ion cyclotron energy resonance could modulate their differentiation to cardiac phenotype.