INVESTIGATION OF CYTOTOXIC RESPONSE OF HEALTHY AND PATHOLOGICAL HUMAN MYOCARDIUM-MESENCHYMAL STEM CELLS

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Cardiomyopathies are a heterogeneous group of myocardial diseases associated with mechanical or electrical disorders of cells causing inappropriate functioning of the left ventricle [1]. Dilated cardiomyopathy (DCM) is agreed to be most common form of cardiomyopathy responsible for 40-50% of cases of heart failure leading to requirement of heart transplantation [2]. Many toxic causes, including drugs, environmental agents, substances of abuse or natural toxins and other are involved in pathophysiological mechanisms of DCM [3]. Therefore, in this study the molecular mechanisms of human healthy and dilated myocardium-derived mesenchymal stem cells (hmMSC) response to chemical and mechanical toxic exposures have been investigated. hmMSC have been isolated from human healthy and dilated myocardium biopsies, after cultivated in IMDM growth media with 10 percent FBS and were subjected to different concentrations of toxic environment mimicking naphoquinone and to an extra mechanical overload using Flexcell equipment. Healthy and pathological hmMSC response to toxic exposures have been investigated by cell viability kit CCK-8, apoptosis detection, pro and anti-oxidant mechanisms have been investigated as well. The cell viability protecting compounds and mechanisms have been also investigated.

Data of this study showed that healthy and pathological hmMSC differently responded to the toxic exposures with more prominent effect on healthy compared to the pathological cells. The obtained data also showed that possible to influence cell death-surviving mechanisms in order to improve cell regenerative potential. Investigation and targeted regulation of diseased human heart cell protection mechanisms will allow to broaden their application for therapeutic purposes searching new DCM preventing means.

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