Review Article

Effect of Gene Transfected Adipose Mesenchymal Stem Cells-derived Exosomes (AMSCs-dE) Versus Nontransfected AMSCs-dE in Doxorubicin Induced Cardiomyopathy of Male Albino Rat

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ABSTRACT

Malignancy is considered a common reason for mortality worldwide, doxorubicin (DOX) is one of the anthracyclines, which frequent drugs are given in various malignant conditions as treatment. Subsequent cardiomyopathy is to a large degree caused by overproduction of reactive oxygen species. Calcium ions storage inside the sarcoplasmic reticulum (SR) is influenced by cardiac sarcoplasmic reticulum calcium ion ATPase2a (SERCA2a). This study was designed to evaluate and compare the efficacy of SERCA2a gene modified AMSCs-dE to nontransfected AMSCs-dE, in doxorubicin induced cardiomyopathy of adult male albino rat. Thirty-one adult male albino rats were randomly divided into control group and Dox group that further subdivided into three Dox, AMSCs-dE and SERCA2a AMSCs-dE subgroups. Measurements of serum ccreatine kinase CK-MB after Dox injection and before sacrifice. Two months after the experiment, cardiac muscle specimens were collected and subjected for histological examination using hematoxylin and eosin and Masson's trichrome. Immunohistochemical staining by PCNA and connexin 43 immunostaining was carried out. Expression of both TNF and SERCA2a proteins and genes were done using Western blot (Wb) analysis real-time polymerase chain reaction (PCR) respectively. Fluorescent Microscopic demonstration of nontransfected and transfected exosomes labeled with PKH26 and GFP respectively in culture and cardiac muscle.

Results and Conclusion: Revealed that DOX induced myocarditis progressing to degenerative and fibrotic changes in cardiac muscle that regressed in response to AMSCs-dE therapy. However, SERCA2a gene modified AMSCs-dE treatment reversed the mentioned parameters to nearly its normal level.

ISSN: 1110-0559, June 2024, Vol. 8, No. 1.

 DOI: 10.21608/JMH.2024.392626