Nehal G Heteba et al., J Cell Sci Ther 2018, Volume: 9
DOI: 10.4172/2157-7013-C1-041

Effect of stem cells, ascorbic acid and gene transfected stem cells in experimentally induced type I diabetic myopathy

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Background & Objectives: Sarco/endoplasmic reticulum Ca2+-ATPase (SERCA) inhibition was proved in streptozotocin (STZ)-diabetic rats. The present study aimed at investigating and comparing the therapeutic effect of combined bone marrow mesenchymal stem cells (BMMSCs) with ascorbic acid (AA) and SERCA1a gene transfected MSCs in STZ induced skeletal myopathy of male albino rat.

Methods: Rats were divided into group I of 4 control rats, group II (Diabetic) of 7 rats given intraperitoneal (IP) injection of STZ 50 mg/kg, group III (BMMSCs) of 7 rats given STZ and BMMSCs intravenous (IV), group IV (BMMSCs and AA) of 7 rats given STZ, BMMSCs and AA 500 mg/Kg and group V (SERCA 1a transfected BMMSCs) of 7 rats given STZ and SERCA1a transfected BMMSCs. The rats were sacrificed after 8 weeks. Gastrocnemius specimens were subjected to histological, morphometric, biochemical and statistical studies.

Results: Diabetic rats revealed atypical widely separated and disorganized muscle fibers, loss of striations, some dark nuclei, markedly congested vessels and dense cellular infiltration. Disrupted atypical fibers with no obvious striations and multiple macrophages were evident. A significant increase in the area of atypical fibers, the mean blood glucose level and a significant decrease in the mean area of pale nuclei, mean area % of CD105 and CD34 +ve cells and of mean PCR values were recorded. The morphological, morphometric and biochemical changes regressed by therapy.

Conclusions: The therapeutic effect was found to be more remarkable by combined MSCs and AA administration and most remarkable by SERCA1a modified MSCs injection.

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