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The effect of nanoparticle labeled bone marrow-derived mesenchymal stem cells as a therapeutic strategy for experimentally induced liver fibrosis in albino rats

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Objectives: This study aims at exploring the therapeutic efficacy of superparamagnetic iron oxide nanoparticles (SPIO) labeled bone marrow derived mesenchymal stem cells (BM-MSCs) on carbon tetrachloride (CCl4) induced liver fibrosis in adult female albino rats.

Material and methods: MSCs were obtained from 10 male Sprague Dawley rats and 50 female rats were assigned into 2 groups; control group (CG) and experimental group (EG). EG was subdivided into three subgroups. Induction group by intraperitoneal injection of CCl4 for 8 weeks, MSCs treated + CCl4 group (MSCs+CCl4G) received SPIO- BM-MSCs simultaneously with CCl4 administration to assess the effect of SPIO-BM-MSCs on the prevention of progression of liver fibrosis with the persistence of the cause. MSCs treated group (MSCsG), received SPIO-BM-MSCs after withdrawal of CCl4. The rats were sacrificed after 8 weeks and assessed by histological examination, liver function tests, transforming growth factor-beta (TGF-ß1) immunofluorescence staining, PCR for quantification of the gene expression levels of matrix metalloproteinase-1(MMP-1) and tissue inhibitor of metalloproteinase-1 (TIMP-1).

Results: SPIO labeled MSCs were engrafted in the fibrotic liver and MSCs improved liver functions, enhanced the gene expression of MMP-1, whereas TIMP-1 gene expression was depressed. Histological and morphometric studies confirmed these results.

Conclusion: BM-MSCs prove to be a promising therapy for liver fibrosis.

Biography

Khalifa is an assistant lecturer of Histology and Cell Biology (23/9/2014- now), Department of Histology and Cell Biology, Faculty of Medicine, Alexandria University, Egypt. She is a member of the stem cell research group, Faculty of Medicine, Alexandria University, Egypt. (Oct 2015- present). In September 2014, she was registered for Doctorate Degree (MD) in Histology & Cell biology, Faculty of Medicine, University of Alexandria.

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