

3rd International Conference and Exhibition on Cell & Gene Therapy

October 27-29, 2014 Embassy Suites Las Vegas, USA

Cord blood derived unrestricted somatic stem cells ameliorate experimentally induced chronic liver fibrosis

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Cord blood derived Unrestricted Somatic Stem Cells (CBUSCs) with their multipotentiality hold great promise in liver regeneration. In this study the therapeutic potentiality of USSCs in two experimental models of chronic liver injury was evaluated. First Experimental model (50 mice): Thirty *Schistosoma mansoni* infected mice were IV injected with USSCs 1×10^6 cell/mouse. Ten were infected untreated (pathological control) and 10 healthy mice (negative control). 2nd experimental model (30 hamsters): Twenty were injected with repeated doses of CCl₄ to induce liver fibrosis; 10 were treated with intrahepatic injection of 3×10^6 USSCs and the other 10 were untreated pathological control. Ten healthy hamsters served as negative control. Animals were sacrificed 3 months after treatment. The extent of liver fibrosis before and after USSCs injection was assessed histopathologically using H&E and sirius red staining and by measuring serum levels of ALT, AST, albumin and bilirubin. Liver sections were immunohistochemically stained for detection of human hepatocyte markers; Hep Par1, α -fetoprotein, CK-18, CK-7 and OV6. Phenotypic and molecular characterizations of CBUSCs showed high expression levels of CD44, CD90, CD73 and CD105 and were negative for CD34, CD45 and HLA-DR and also showed high expression of transcripts for *Oct4* and *Sox2*. In both models transplantation of CBUSCs resulted in engraftment of the fibrosed livers with newly formed hepatocytes evidenced by positive immunostaining with human Hep Par1, α -fetoprotein, CK-18, CK-7 and OV6. Transplanted liver sections showed diminished hepatic fibrosis with significantly lower fibrotic index as well as significantly improved liver functions compared to the pathological control ($p < 0.001$).

Conclusions: Our results provide hope that CBUSCs could be introduced as multipotent stem cells with great potentiality in regenerative medicine and strengthens the concept of cellular therapy for the treatment of liver fibrosis.

This work is extracted from the project 1410 supported by the Science and Technology Development Funds (STDF), Cairo, Egypt

Biography

Hanan Gamal El-Baz is a Professor of Immunology, and President of Theodor Bilharz Research Institute (TBRI), Cairo, Egypt. She graduated and received her MSc and Medical Doctorate in Clinical Pathology and Immunology from the Faculty of Medicine, Cairo University. She had Postdoctoral studies in Germany in the Institute of Immunology, Heidelberg University, Institute of Transplantation Immunology and Cell Therapeutics, Düsseldorf University; Cell Therapy Laboratory, Fraunhofer Institute for Interfacial Biotechnology, Stuttgart University and Institute of Tissue Engineering, Lukaskrankenhaus, Neuss. She established and supervised the Tissue Engineering & Cell Therapy Unit in TBRI since 2009. She has many publications in the fields of immunodiagnosis, tumor immunology and stem cell research.

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