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Differentiation of mesenchymal stem cells derived from umbilical cord blood into hepatocyte

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Background: The liver is a central multifunctional organ in our body. Hepatocyte dysfunction induced by viral hepatitis and cirrhosis may progress to liver failure. Stem cells (SCs) based therapy is a promising technique for the treatment of liver diseases. Umbilical cord-derived mesenchymal stem cells (UC MSCs) do not express the major histocompatibility complex class II antigens thus they are potentially favorable SCs source for liver transplantation.

Aim: The aim of our study was to investigate the in vitro hepatic differentiation potential of umbilical cord-derived mesenchymal stem cells.

Methods: MSCs were cultured and induced to differentiate under pro-hepatogenic conditions using mainly hepatic growth factor (HGF) and fibroblastic growth factor. Differentiated hepatocyte-like cells were investigated based on three main criteria including its morphology, expression of hepatocyte-specific genes and specific functionality.

Results: After 21 days of treatment, the differentiated cells acquired hepatocytes-like oval shape. Using reverse transcriptase-polymerase chain reaction (RT-PCR), the expression of hepatocyte-specific genes including albumin (ALB), α -fetoprotein (AFP) and cytokeratin-18 significantly increased in differentiated UC-MSCs compared to control untreated cells ($P < 0.05$). In addition, levels of albumin and AFP in the culture media showed a three folds increase in differentiated cells compared to control cells.

Conclusion: We conclude that this protocol for the in vitro differentiation of UC MSCs produced viable functional hepatocytes. Our future goal is to test the in vivo effectiveness in treating end-stage liver diseases.

Biography

Nagwan Abd el-Aziz Sabek completed her Ph.D in 2003 from Faculty of medicine, Suez Canal University, Egypt. has her expertise in performed and interpreted multiple real-time PCR assays in order to detect and characterize potential pathogens and ensure assay quality, restriction digest, electrophoresis, and spectrophotometric analysis. Her research interest also includes; tissue culture & Stem cell, Genetic & disease and DNA polymorphism. She is the member in Egyptian Medical society for Applied Genetic engineering & biotechnology. (2006) and Egyptian Society of Biochemistry & molecular biology (2007).

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