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

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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. The aim of our study was to investigate the *in vitro* UC MSCs hepatic differentiation potential. 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. 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. 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

Noha M Abd El Fadeal is currently pursuing her PhD in Medical Biochemistry and Molecular Biology from Suez Canal University, Egypt. She has completed her MSc in Biochemistry and Molecular Biology in the year 2013. Presently, she is working as an Assistant Lecturer of Medical Biochemistry at SCU and a Member of Oncology Diagnostic Unit since 5 years.

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