Alaa T Alshareeda et al., J Tissue Sci Eng 2017, 8:4(Suppl)
DOI: 10.4172/2157-7552-C1-040

The effect of MSCs on vascularization and function of liver carcinoma cells

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Hepatocellular carcinoma (HCC) considers the third cause of cancer deaths worldwide and is regularly diagnosed at progressive stages. Thus, there is a need to develop the ability to diagnose, prevent, and treat HCC. Angiogenesis is essential process which has a role in the growth of a tumor. Mesenchymal stromal cells (MSC) play an important role in repairing liver injury because of their multipotency and low immunogenicity. The aim of this study is to induce angiogenesis by Matrigel using different source of MSC as angiogenesis stimulator. In addition, the aim is to fabricate HepG2 and MSC cell sheets using temperature-responsive culture dishes in order to investigate the effect of MSCs on the function of HCC. HepG2 cultured with human umbilical cord (UC)-MSC did not induce angiogenesis or express endothelial marker CD31 unlike HepG2 cultured with bone marrow (BM)-MSC. Two forms of cell sheets were observed "extended" and "shrunk" sheets. HepG2+ human UC-MSCs sheets were more shrinkable in comparison with rat or human BM-MSCs. Cell sheet of UCMSCs co-cultured with HepG2 increased the secretion of Albumin and urea as compared to HepG2 cell sheet. Our data suggests that under *in vitro* conditions, the ability of BM-MSC to form tube without the presence of endothelial cells, thus, BM-MSC cell sheets can be used in a potential application as an engineered tissue. In addition, MSC especially UB-MSCs can be applicable for acute liver diseases in clinical settings. The findings of this study would provide important theoretical foundation for future research on the regulation of HCC.

Biography

Alaa T Alshareeda current research interests include the therapeutic potential of human placenta mesenchymal stem cells (MSC) in treating breast cancer and the effect of MSC on angiogenesis using cell sheet technology. Cell sheet technology allows a gentle harvesting of cultured cells in intact 3D format (cell sheet) that maintains deposited extracellular matrix (ECM) and cell–cell interactions in addition, by using this technology, the poor cell survival of the standard method of injection of dissociated cell suspensions can be significantly improved. She completed her PhD at Nottingham University focusing on the assessment of DNA-Double Strand Break Repair (DSBR) in breast cancer and her undergraduate study at King Saud University. She has collaborated actively with researchers in several universities including Nebraska University (USA) during her PhD and Tokyo Women Medical University (TWMU; Japan) as a Postdoctoral researcher. In TWMU, she investigated the effect of different sources of MSC (umbilical cord and bone marrow MSC) on liver function and developed a liver cancer in rats using cell sheet technology.

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