allied academies Joint Event on
International Conference on
CARDIOLOGY AND CARDIOVASCULAR MEDICINE
&
International Conference on
STEM CELLS AND REGENERATIVE MEDICINE
June 18-19, 2018 | Osaka, Japan
Ghmkin Hassan, Biomed Res 2018, Volume 29 | DOI: 10.4066/biomedicalresearch-C2-005

PLATELET LYSATE INDUCES CHONDROGENIC DIFFERENTIATION OF UMBILICAL CORD DERIVED MESENCHYMAL STEM CELLS

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Purpose: Articular cartilage has poor repair ability and still confers a major challenge in orthopedics. Mesenchymal stem cells (MSCs) are multipotent stem cells with potential to differentiate into chondrocytes in the presence of transforming growth factor beta (TGF-β). Relevantly, platelet lysate (PL) contains many growth factors including TGF-β and ameliorates cartilage repair. Thus, we investigated the ability of PL to direct chondrogenic differentiation of MSCs along with other standard differentiation components in pellets culture system.

Methods: We isolated and expanded MSCs from human umbilical cords using PL supplement medium and characterized cells by immunophenotyping and differentiation potential to adipocytes and osteocytes. We further cultured MSCs as pellets in chondrogenic differentiation medium supplemented with PL. After 21 days, pellets were processed for histological analysis and stained with alician blue and acridine orange. Expression of SOX9 was investigated by RT-PCR.

Results: Although MSCs maintained their stemness characteristics in PL supplement medium, distribution of cells in pellets cultured in chondrogenic differentiation medium supplemented with PL was more similar to cartilage tissue-derived chondrocytes than negative control. In addition, intense alician blue staining indicated increased production of mucopolysaccharides in differentiated pellets, which also showed elevated expression of SOX9 detected by RT-PCR.

Conclusions: Our data suggest that MSCs could be differentiated to chondrocytes in the presence of PL and absence of exogenous TGF- β. Further research needs to be conducted to understand the exact potential role of PL in chondrogenic differentiation and chondrocyte regeneration.

BIOGRAPHY

Ghmkin Hassan obtained his master degree in biotechnology and molecular biology from Damascus University, Syria. Presently, he is a research scholar at Okayama University, japan. He was interested in isolation and optimizing stem cell culture conditions which was a part of "mesenchymal stem cell optimization culture conditions" in national commission for biotechnology Syria and his recent focus is on origin of cancer stem cells and its microenvironment.

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