Official Journal of TESMA
Regenerative Research
www.regres.tesma.org.my
E-ISSN 2232-0822
Tissue Engineering and Regenerative Medicine Society of Malaysia

Regenerative Research 7(1) 2018 111-112

THE EFFECTS OF UMBILICAL CORD-DERIVED MESENCHYMAL STEM CELLS ON FOCAL ADHESION AND HLA EXPRESSION OF HUMAN CORNEAL EPIHTELIAL CELLS

Mohamed Salih Elnour , Rafeezul Mohamed, Siti Hawa Ngalim, Bakiah Shaharuddin*

Regenerative Medicine Cluster, Advanced Medical and Dental Institute, Universiti Sains Malaysia, Pulau Pinang, Malaysia

ARTICLE INFO

Published: 26th August 2018
*Corresponding author:
Bakiah Shaharuddin
Email: bakiah@usm.my

KEYWORDS

Telomerase immortalized Corneal epithelial cells;
Umbilical cord mesenchymal stem cells;
HLA antigen;
Actin;
Vinculin

SUMMARY

Introduction: MSCs are rich in paracrine secretions of many bioactive molecules and have shown immunosuppressive activity, making it suitable for allogeneic transplantation (Baraniak *et al*, 2010). MSCs could be harvested from corneal limbal tissues and possessed immunobiological properties (Shaharuddin et al, 2016), which proved MSCs' roles in corneal regeneration. Actin determines the structure and function of the cytoskeleton in cells (Hofmann and Laneroue, 2001). MSCs facilitate and increase the formation and release of focal adhesions which will help in corneal cells adhesion and migration. We aim to investigate the role of umbilical cord derived-MSC (UC-MSC) in corneal regeneration and the immunomodulatory effects of UC-MSC in cytokine-stimulated corneal epithelial cells. Successful corneal wound healing includes cell migration, proliferation and adhesion (Ljubimove and Saghizadeh, 2016).

Materials and Methods:
UC-MSC was sourced and immunophenotyped at a cord blood bank (Cryocord Sdn. Bhd), and satisfied the minimum requirement of a human MSC as outlined by the International Society for Cellular Therapy (ISCT). Immunofluorescence analysis of phalloidin and vinculin were conducted to study the focal adhesion and migration of human telomerase immortalized corneal epithelial cells (HTCEC) and the indirect co-cultures of HTCEC/UC-MSC in transwell. For Human Leukocyte Antigen (HLA) expression, corneal epithelial cells were treated with proinflammatory cytokine (IFN-g) at 5,10 and 15 ng/ml, the HLA Class I and II expressions were then detected by FACS analysis.

Results:
Actively spreading HTCEC culture exhibited strong fluorescence for cytoplasmic F-actin. At 3 days treatment with UC-MSC**,** HTCEC/UC-MSC indirect co-cultures showed marked expression of phalloidin and vinculin. At a dose of 5 ng/ml of interferon-gamma (IFN-g), HTCEC expressed HLA class II. Preliminary results showed post treatment of HTCEC for 3 days with UC-MSC showed downregulation of the expressions of HLA class I and Class II.

Discussion:

Actin is involved in muscle cell contraction and associated with corneal cell motility, adhesion, and cell-shape changes. It improves corneal cell migration. Vinculin links between the focal adhesions and the actin cytoskeleton. Corneal epithelial cell migration and adhesion improved by Actin and Vinculin upregulation.

During inflammatory conditions, HTCEC expressed HLA Class II which played a significant role in tissue allorecognition.

MSCs reduced the expression of HLA class I and II on pro-inflammatory cytokine stimulated HTCEC. UC-MSCs suppress T cell activation, reduced local inflammation and revoked the IFN-g induced HLA expression on HTCEC.

Conclusion:

UC-MSC improved the adhesion and migration of HTCEC. Stimulation of HTCEC with 5 ng/ml of IFN-g results in of HLA Class II expression.

Acknowledgement:

This project was funded by Fundamental Research Grant Scheme, Ministry of Higher Education (203.CIPPT.6711509).

Thank you very much to Cryocord SDN. BHD for providing the UC-MSC.