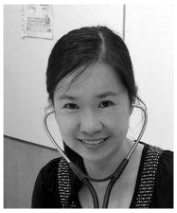
Title: Efficacy of Umbilical Cord Lining Mesenchymal Stem Cells for Wound Healing in Diabetic Murine Model

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Abstract

Purpose: This study investigates the healing potential of Cord Lining Mesenchymal Stem Cells (CLMSC) in full-thickness dermal wounds of db/db diabetes mice.
Method: 20 mice were randomly assigned to two arms; the control group received placebo treatment (sham media) while experiment group received CLMSC via intra-peritoneal (IP) injection. Two full-thickness wounds, each sized 10mm X 10mm, were created on the back of the mice. Wound area were analysed weekly with ImageJ TM software. Tissues were harvested at point of termination for immune-profiling and histological analysis. Pro-inflammatory and anti-inflammatory cytokines were quantified to determine the immunomodulation properties of the CLMSC.
Result: The CLMSC-treated wounds, compared with the control group, showed a significant increase in the percentage of wound closure from day 14 onwards and eventually achieved 100% closure of the wound sooner that the control group by an average of 3.7 days. The mice treated with CLMSC have a shorter wound closure time (mean closure day: 19.8 days) as compared to the control group (mean closure day: 23.5 days). Our histology analysis of repair revealed that CLMSC treatment enhanced re-epithelization with a fully differentiated multi-layered epithelium developed from Day 21 onwards, while the epithelium regenerated in control group was not fully differentiated at the same time point. Our systemic analysis on immunomodulation indicated an upregulation of pro-inflammatory serum cytokines (GM-CSF and IFN-gamma) in CLMSC treatment group during the first 7 days of injury to allow infiltration of inflammation cells. There is upregulation of anti-inflammatory serum cytokines (IL-10) to halt the inflammatory activity after 7 days of injury.
Conclusion: Our preliminary findings are indicative of the positive effect of CLMSCs on diabetic wound healing, with the potential of CLMSC as an anti-inflammatory agent.



Lim Fui Ping is a lecturer at the Alice Lee Centre for Nursing Studies, National University of Singapore. She obtained her Master degree in Nursing at the University of Sydney, Australia and is presently pursuing her doctorate degree at Department of Surgery, Yong Loo Lin School of Medicine, National University of Singapore. She has a long-standing interest in translational research, and in the development of novel cell-based therapies to improve wound healing, with a particular focus on chronic and non-healing wounds..

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