

December 03-04, 2018
Amsterdam, NetherlandsLars-Peter Kamolz et al., Int J Appl Sci Res Rev 2018, Volume: 5
DOI: 10.21767/2394-9988-C2-004

COMPARATIVE STUDY OF REGENERATIVE EFFECTS OF MESENCHYMAL STEM CELLS DERIVED FROM PLACENTAL AMNION, CHORION AND UMBILICAL CORD ON DERMAL WOUNDS

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Objective: Mesenchymal stem/stromal cells derived from human term placentas (PMSCs) are novel therapeutic agents and more topical than ever. Here we evaluated the effects of three types of PMSCs on wound healing in an *in vivo* mouse model: amnion-derived MSCs (AMSCs), blood vessel-derived MSCs (BV-MSCs) from the chorionic plate and Wharton's jelly-derived MSCs (WJ-MSCs) from the umbilical cord.

Methods: We topically applied PMSCs onto skin wounds in mice using the dermal substitute Matriderm® as carrier and evaluated wound healing parameters. In addition, we investigated the effects of all PMSC types under co-application with placental endothelial cells (PLECs). After eight days, we compared the percentage of wound closure and the angiogenic potential between all groups.

Results: AMSCs, BV-MSCs and WJ-MSCs significantly induced a faster healing and a higher number of blood vessels in the wound as compared to controls (Matriderm®-alone). PLECs did not further improve the advantageous effects of PMSC-treatment. Quantitative data and 3D analysis by high resolution episcopic microscopy confirmed a lower density of vessels in Matriderm®/PMSCs/PLECs co-application compared to Matriderm®/PMSCs treatment.

Conclusion: Results indicate that all three PMSC types exert similar beneficial effects on wound closure and neovascularization in our mouse model.

Practice: Using Matriderm® as carrier for PMSCs propagates rapid cell migration towards the wound area that allows a fast and clinically practicable method for stem cell application.

Implications: These promising effects warrant further investigation in clinical trials.

Biography

Lars-Peter Kamolz has studied Medicine at the University of Vienna, Medical School, Vienna, Austria (MD). Moreover, he has studied Quality and Process-Management at the Department for Knowledge and Communication Management at Danube University in Krems, Austria. He is a board-certified Plastic, Aesthetic and Reconstructive Surgeon (ÖGPÄRC). In 2012, he became a Professor and Head of the division of Plastic, Aesthetic and Reconstructive Surgery at Department of Surgery, Medical University of Graz Furthermore, he is the Head of the Research Unit for Safety in Health and Deputy Chief Medical Officer of the LKH-University Hospital in Graz. Since 2018, he is also the Director of COREMED-Cooperative Centre for Regenerative Medicine, Joanneum Research Forschungsgesellschaft mbH, Graz, Austria.

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