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THE ROLE OF HEMATOPOIETIC CELL-DERIVED MULTIPOTENT STEM CELLS IN SKIN TISSUE REPAIR AND REGENERATION

Yunyuan Li
University of British Columbia, Canada

Non-healing and chronic wounds cause tremendous suffering and debilitation .To look for new strategies to improve healing of damage skin tissue and understand the mechanism underlining a complex wound healing process, in last a few years, we have conducted a serial of studies to identify healing promoting factors. We found that the macrophage colony-stimulating factor (M-CSF) released from proliferating skin cells could induce a subset of hematopoietic cells to be dedifferentiated into multipotent stem cells. Interestingly, hematopoietic cell-derived, stage specific embryonic antigen (SSEA)-1 and-3 positive, multipotent stem cells were transiently present in the wound site after skin injury. In this study, we further explored the roles of these hematopoietic cell-derived multipotent stem cells to repair injured skin and hair regeneration in a mouse model. Hematopoietic cell-derived multipotent stem cells were generated by culture mouse splenocytes in a medium containing M-CSF. Skin excisional wounds were generated by punch biopsy in mice which received nothing (control) or one million splenocyte-derived stem cells by intra-dermal or tail vein injection simultaneously. Injected stem cells expressing GFP or labeled with a fluorescent dye DiI were used for cell tracing. Immunofluorescent staining was used to identify the cell source in healing skin tissue. Results revealed that addition of M-CSF or its antibody to increase or reduce the number of hematopoietic cell-derived stem cells at the wound site could accelerate or slow skin wound healing in mice. We also demonstrated that injected hematopoietic cell-derived stem cells could be differentiated into fibroblasts, keratinocytes and blood vessel-like structures *in vivo*. These blood cell-derived skin cells were the major contributions of healing skin. Furthermore, our results suggested that hematopoietic cell-derived multipotent stem cells could participate in new hair follicle regeneration. In conclusion, hematopoietic cells are the major contributions and cell source for skin tissue repair and hair regeneration.

Note:

BIOGRAPHY

Yunyuan Li has completed his PhD in 2005 from the University of Alberta, Canada. He is a senior researcher at Burn and Wound Healing Research Laboratory in the University of British Columbia. He has published over 40 papers. Recently, his research interests were focused on the roles of hematopoietic cell-derived multipotent stem cells in skin wound healing, hair follicle regeneration and inflammation.

yunyuan.li@ubc.ca