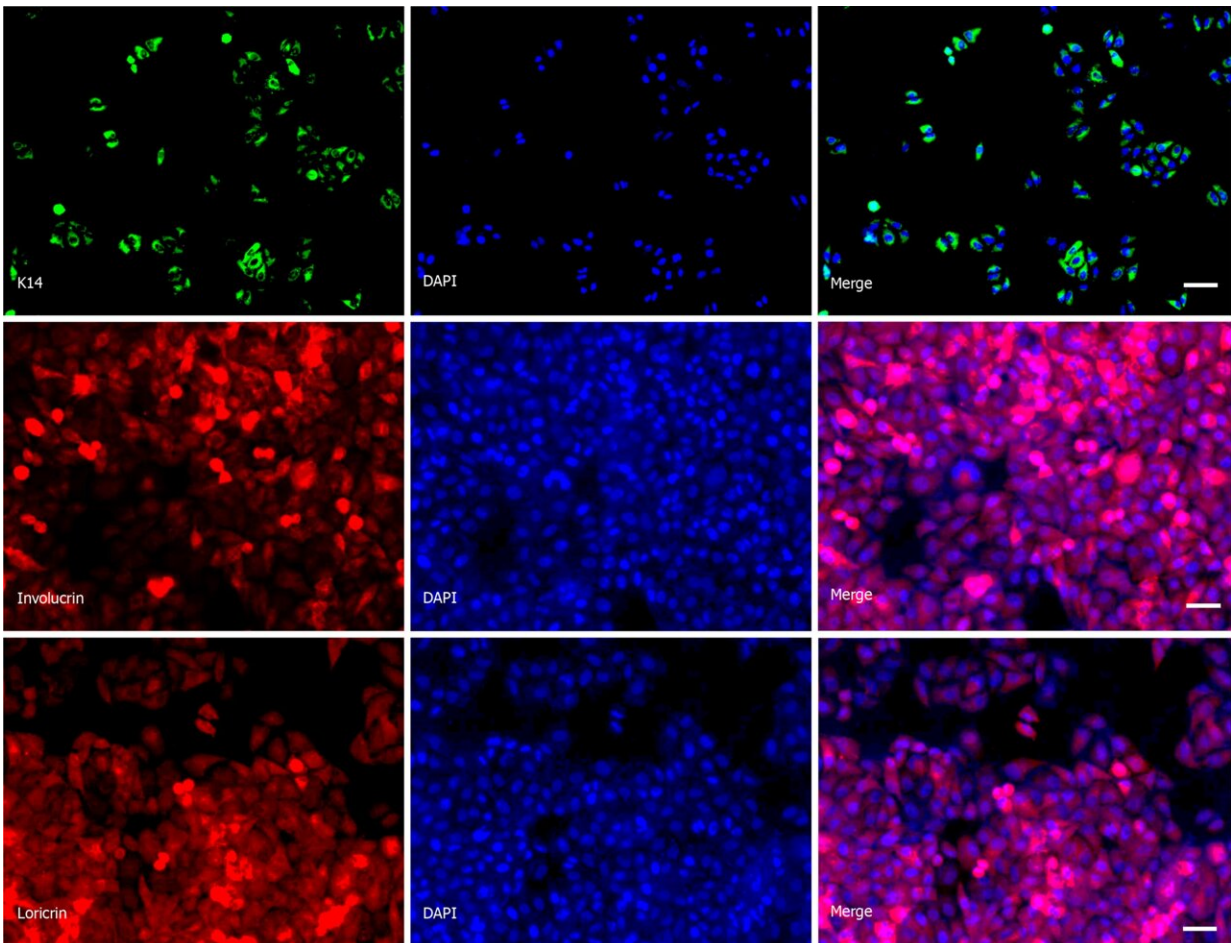


Transplanting human induced pluripotent stem cell derived keratinocytes speeds deep second-degree burn wound healing

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Human induced pluripotent stem cells successfully differentiated into keratinocyte. Retinoic acid (RA) and BMP-4 were used to induce differentiation of hiPSCs into keratinocyte. The images as immunofluorescence staining of

keratinocyte marker proteins K14, involucrin and loricrin at 14 d of induced differentiation, scale bar: 25 μ m. Credit: *World Journal of Stem Cells* (2023). DOI: 10.4252/wjsc.v15.i7.713

Current evidence shows that human induced pluripotent stem cells (hiPSCs) can effectively differentiate into keratinocytes (KCs), but its effect on skin burn healing has not been reported.

Recently, a research team set out to observe the effects of hiPSCs-derived KCs transplantation on skin burn healing in mice and to preliminarily reveal the underlying mechanisms.

The research is published in the *World Journal of Stem Cells*.

An analysis of differentially expressed genes in burn wounds based on GEO datasets GSE140926, and GSE27186 was established. A differentiation medium containing [retinoic acid](#) and bone morphogenetic protein 4 was applied to induce hiPSCs to differentiate into KCs. The expression of KCs marker proteins was detected using immunofluorescence staining. A model of a C57BL/6 mouse with deep cutaneous second-degree burn was created, and then phosphate buffered saline (PBS), hiPSCs-KCs, or hiPSCs-KCs with knockdown of COL7A1 were injected around the wound surface.

The wound healing, re-epithelialization, engraftment of hiPSCs-KCs into wounds, proinflammatory factor level, and the NF- κ B pathway proteins were assessed by hematoxylin-eosin staining, carboxyfluorescein diacetate succinimidyl ester (CFSE) fluorescence staining, enzyme linked [immunosorbent assay](#), and Western blotting on days 3, 7, and 14 after the injection, respectively. Moreover, the effects of COL7A1 knockdown on the proliferation and migration of hiPSCs-KCs were

confirmed by immunohistochemistry, EdU, Transwell, and damage repair assays.

The researchers found that hiPSCs-KCs could express the hallmark proteins of KCs. COL7A1 was down-regulated in burn wound tissues and highly expressed in hiPSCs-KCs. Transplantation of hiPSCs-KCs into mice with burn wounds resulted in a significant decrease in wound area, an increase in wound re-epithelialization, a decrease in proinflammatory factors content, and an inhibition of NF- κ B pathway activation compared to the PBS group. The in vitro assay showed that COL7A1 knockdown could rescue the inhibition of hiPSCs-KCs proliferation and migration, providing further evidence that COL7A1 speeds up burn [wound healing](#) by limiting [cell proliferation](#) and migration.

More information: Li-Jun Wu et al, Transplantation of human induced pluripotent stem cell derived keratinocytes accelerates deep second-degree burn wound healing, *World Journal of Stem Cells* (2023). [DOI: 10.4252/wjsc.v15.i7.713](https://doi.org/10.4252/wjsc.v15.i7.713)

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