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The potential of adipose derived stem cells for the treatment of recessive dystrophic epidermolysis bullosa

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Background: Recessive dystrophic epidermolysis bullosa (RDEB) is one of the most severe forms of epidermolysis bulosa, one of the congenital blistering diseases. Mutations in *COL7A1* that encodes type VII collagen (Col7) (the main constituent of the anchoring fibrils that connecting the epidermal basement membrane to the dermis) underlie RDEB pathogenesis. On the other hand, adipose-derived stem cells (ADSCs) are highly useful in regenerative medicine, since they can be obtained in large quantities using relatively noninvasive methods. Moreover, we clarified that keratinocyte progenitor cells reside in ASCs.

Objective: To determine the utility of ADSCs from a healthy donor in an allogeneic transplantation for repairing basement membrane alterations in patients with RDEB, we examined Col7 expression in ADSCs that differentiated into keratinocyte-like cells.

Methods: ADSCs were co-cultured with fibroblasts on type IV collagen in a medium containing all-trans retinoic acid and bone morphogenetic protein 4. At day 14 of culture in keratinocyte serum-free medium, the cells were harvested and subjected to immunofluorescence, flow cytometry, real-time PCR, and western blotting.

Results: Approximately 45% of ADSCs were immunostained positively for anti-human cytokeratin 10, and approximately 80% were stained positively for Col7. Flow cytometry, real-time PCR, and western blotting also confirmed that differentiated ADSCs expressed higher levels of Col7.

Conclusion: We showed that 45% of ADSCs differentiated into keratinocyte-like cells and expressed higher levels of Col7. These findings support the therapeutic potential of ADSCs, not only for wound healing, but also for the correction of Col7 deficiencies.

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