

Keratinocyte-like Cells (KLCs): New Drug for Old Wounds

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ABSTRACT

Non-healing cutaneous wounds are the rising health threat and economic issue for society and patient's family as there are 7 million victims of chronic wounds creating an economic burden of >50 billion USD per year only in USA and approximately 37 million skin wounds globally. From the first successful skin graft by Reverdin in 1871, a variety of biological and synthetic skin substitutes have been developed but precise healing is still a dream by researchers. Cell based therapies have raised a hope in regenerative medicine in last decade and due to the limitations in keratinocyte grafting, stem cells especially mesenchymal stem cells (MSCs) have been proposed as promising candidates for cutaneous wound healing but their non-specific lineage differentiation and escape of cells from site of transplantation have made it critical for being applied in clinics. Keratinocytes-like cells (KLCs), generated by inducing MSCs could be a live drug for precise healing. In this work, we generated KLCs in vitro and found that these cells are very similar to human keratinocytes (hKCs), morphologically, physiologically and genetically (expression of cytokeratin 5, 10, 14, 18, 19, INV, P63). These cells also showed similarity in the expression of cell surface markers (α 6-integrin, CD71) and intracellular protein expression (involucrin, P63) with keratinocytes when subject to flow cytometry and western blotting. These cells were found potent enough to develop stratified epidermis like tissue (histological analysis) and were found proliferative (PDT) which will help to maintain the heterogeneous cellular population. Pre-clinical and clinical studies are required to confirm regenerative capabilities of KLCs.

Keywords: Keratinocytes, Mesenchymal Stem Cells, Keratinocyte-like Cells, Cutaneous Wound Healing, Stratified Epidermis