Synopsis of Original Research Paper

Involvement of ER Stress in the wound healing of skin

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Recently, accumulating reports have suggested the importance of endoplasmic reticulum (ER) stress signaling in the differentiation of several tissues and cells, including myoblasts and osteoblasts. Secretory cells are easily subjected to ER stress during maturation of their secreted proteins. Skin fibroblasts produce and release several proteins, such as collagens, matrix metalloproteinases (MMPs), the tissue inhibitors of metalloproteinases (TIMPs) and glycosaminoglycans (GAGs), and the production of these proteins is increased at wound sites. It is well known that differentiation of fibroblasts into myofibroblasts is one of the key factors for wound healing. In this study, we examined the effects of ER stress signaling on the differentiation of fibroblasts, which is required for wound healing, using constitutively ER stress-activated primary cultured fibroblasts. The cells expressed positive α-smooth muscle actin signals without TGF-β stimulation compared with control fibroblasts. Gel-contraction assays suggested that ER stress-treated primary fibroblasts caused stronger shrinkage of collagen gels than control cells. These results suggest that ER stress signaling could accelerate the differentiation of fibroblasts to myofibroblasts at injured sites. The present findings may provide important insights for developing therapies to improve wound healing.