Signal Transduction Through Integrin α2β1

Human Keratinocyte Stimulated by Basic Fibroblast Growth Factor

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Topical application of human recombinant basic fibroblast growth factor (bFGF) promotes wound healing. bFGF, however, has been reported to have little in vitro effects on keratinocytes compared to other cell types such as endothelial cells or fibroblasts. Normal human keratinocytes (NHK) formed lamellipodia only when they were stimulated with bFGF on the type 1 collagen-coated coverslips. Under these conditions, vinculin and GTP-loaded Rac (an activated form) were involved in the phenomenon. These results strongly suggest that integrinα2β1 may play a crucial role in this morphological change.

We examined the expressions of integrinα2β1 and the activation of FAK in bFGF-stimulated keratinocytes on type 1 collagen-coated coverslips by immunofluorescence microscopy, and also studied the expression of integrinα2β1 and vinculin, FAK activation and induction of actin stress fiber in the same way after the treatment with neutralizing antibody for integrinα2β1 or Rac1 inhibitor. Antibody or inhibitor inhibited NHK to form lamellipodia. Further analyses, pull-down assay to detect GTP-loaded Rac and cdc42 (an activated form) and Boyden chamber assay to examine keratinocyte migration, are now under investigation.

These in vitro studies partly clarify an intracellular signal transduction that bFGF exerts its stimulatory effect on keratinocyte migration under the presence of type 1 collagen as a scaffold.