

〈原 著〉

IV 型, VII 型コラーゲン産生促進剤, ブナの芽エキスと
ウロキナーゼ-プラスミン系酵素阻害剤, ペパーミント
エキスによる表皮基底膜構造形成の促進

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**Basement Membrane Formation is Enhanced by Types IV and VII
Collagen-Increasing Factor, Beech Bud Extract and an Inhibitor
of the Urokinase-Plasmin System, Peppermint Extract**

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Abstract

The basement membrane (BM), located at the dermal-epidermal junction (DEJ), plays important roles not only in adhesion between epidermis and dermis, but also in controlling skin functions. Disruption and reduplication of the BM have been reported in sun-exposed sites of skin. Such BM damage is thought to disorder dermal-epidermal communication and skin homeostasis. Therefore, BM care could be an effective approach to keep skin healthy, and to prevent skin aging. Since BM structures are rarely observed at the DEJ of skin-equivalents (SE), which are prepared by culturing human keratinocytes on top of contracted type I collagen gel containing human fibroblasts, SEs have been used to evaluate substances that accelerate repair or regeneration of damaged BM structure. In the SEs, we found that urokinase (uPA), a plasminogen activator, and plasmin were present in culture medium; they might impair the assembly of BM in SE by degrading non-collagenous domains of BM components. Peppermint extract was found to inhibit the uPA-plasmin system and to enhance BM formation in SE. Moreover, we hypothesized that substances increasing types IV and VII collagens (components of lamina densa and anchoring fibrils, respectively) might facilitate BM formation in SEs, since soybean lysolecithin enhances BM formation in SE by increasing deposition of laminin 5, which forms anchoring filaments as reported previously. Among various agents and plant extracts tested, we found that beech bud extract enhanced synthesis of types IV and VII collagens in human cultured fibroblasts and improved BM formation in SEs. A mixture of soybean lysolecithin, beech bud extract and peppermint extract was found to enhance deposition of BM components and to improve greatly the continuity of lamina densa at the DEJ of SEs. These results suggest that types IV and VII collagen-increasing factor and a urokinase-plasmin system inhibitor may be useful for BM care by enhancing BM repair.

Key words: basement membrane, skin-equivalent models, type IV collagen, type VII collagen, urokinase-plasmin system.