

〈原 著〉

長波長紫外線 (UVA) 曝露による皮膚の即時型色素沈着における メラニン単量体の関与とビタミン C エチルの有効性

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Involvement of Melanin Monomers in the Skin Persistent UVA-Pigmentation and Effectiveness of Vitamin C Ethyl on UVA-Pigmentation

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Abstract

We have discovered that melanin, which is dark brown in color and is a well-known cause of pigment spots and freckles, can also be produced outside of melanocytes (pigment-producing cells) by ultraviolet (UV) A radiation. Melanin is usually produced in melanocytes; however, this research proved that colorless melanin monomers (melanin precursors) accumulating in the basal layer of the epidermis, outside of melanocytes, turn into melanin by direct exposure to UVA radiation, and the brownish pigmentation remains in skin exposed to high doses of UVA for several weeks. Melanin is produced from one of the amino acids called tyrosine as a starting material through various premelanins. We conducted *in vitro* and *in vivo* experiments and found that 5,6-dihydroxyindole-2-carboxylic acid (DHICA) and 6-hydroxy-5-methoxyindole-2-carboxylic acid (6 H 5 MICA) accumulate in the keratinocytes and supernatants co-cultured with melanocytes, and readily respond to UVA to produce brownish melanin. We developed an *in vitro* and *in situ* method to evaluate ingredients, which inhibit melanization of DHICA and 6 H 5 MICA caused by UVA radiation. We found that vitamin C ethyl (ethyl ascorbic acid) is an effective ingredient to inhibit the pigment formation from DHICA and 6 H 5 MICA, and to prevent pigmentation of the basal layer of the epidermis caused by UVA. Clinical study proved that the effectiveness of vitamin C ethyl on UVA-induced persistent pigmentation. Making use of this technology, we have promoted the development of whitening skincare products.

Key words: ethyl ascorbic acid, DHICA, 6 H 5 MICA, melanin, UVA.