Vitamin A

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Vitamins as hormones.

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Vitamins A and D are the first group of substances that have been reported to exhibit properties of skin hormones, such as organized metabolism, activation, inactivation, and elimination in specialized cells of the tissue, exertion of biological activity, and release in the circulation. Vitamin A and its two important metabolites, retinaldehyde and retinoic acids, are fat-soluble unsaturated isoprenoids necessary for growth, differentiation and maintenance of epithelial tissues, and also for reproduction. In a reversible process, vitamin A is oxidized IN VIVO to give retinaldehyde, which is important for vision. The dramatic effects of vitamin A analogues on embryogenesis have been studied by animal experiments; the clinical malformation pattern in humans is known. Retinoic acids are major oxidative metabolites of vitamin A and can substitute for it in vitamin A-deficient animals in growth promotion and epithelial differentiation. Natural vitamin A metabolites are vitamins, because vitamin A is not synthesized in the body and must be derived from carotenoids in the diet. On the other hand, retinoids are also hormones - with intracrine activity - because retinol is transformed in the cells into molecules that bind to and activate specific nuclear receptors, exhibit their function, and are subsequently inactivated. The mechanisms of action of natural vitamin A metabolites on human skin are based on the time- and dose-dependent influence of morphogenesis, epithelial cell proliferation and differentiation, epithelial and mesenchymal synthetic performance, immune modulation, stimulation of angiogenesis and inhibition of carcinogenesis. As drugs, vitamin A and its natural metabolites have been approved for the topical and systemic treatment of mild to moderate and severe, recalcitrant acne, photoaging and biologic skin aging, acute promyelocytic leukaemia and Kaposi's sarcoma. On the other hand, the critical importance of the skin for the human body's vitamin D endocrine system is documented by the fact that the skin is both the site of vitamin D (3)- and 1,25-dihydroxyvitamin D (3) [1, 25(OH) (2)D (3)]-synthesis and a target organ for 1,25(OH) (2)D (3). 1,25(OH) (2)D (3) is not only essential for mineral homeostasis and bone integrity, but also for numerous further physiologic functions including regulation of growth and differentiation in a broad variety of normal and malignant tissues, including cells derived from prostate, breast and bone. In keratinocytes and other cell types, 1,25(OH) (2)D (3) regulates growth and differentiation. Consequently, vitamin D analogues have been introduced for the treatment of the hyperproliferative skin disease psoriasis. Other newly detected functions of vitamin D analogues include profound effects on the immune system as well as protection against cancer and other diseases, including autoimmune and infectious diseases, in various tissues. Current investigation of the biological effects of vitamin D analogues are likely to lead to new therapeutic applications that, besides cancer prevention, may include the prevention and treatment of infectious as well as of inflammatory skin diseases. This review summarizes existing knowledge on vitamins A and D, the major vitamin-hormones of the skin.

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Topical vitamins.

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Vitamins are a natural constituent of human skin and are part of a system of antioxidants that protect the skin from oxidative stress. There has been an increased interest in the use of natural antioxidants such as vitamins to help restore dermal antioxidant activity. Vitamins A, C, E, and B3 have been shown to have potent antioxidant and anti-inflammatory properties, but to achieve optimal effectiveness, products must be delivered in appropriate formulations. Products containing alpha-tocopherol (vitamin E), L-ascorbic acid (vitamin C), retinol (vitamin A), and niacinamide (vitamin B3), are effective for the treatment of photoaging. These compounds have also shown effectiveness in the treatment of inflammatory dermatoses, acne, and pigmentation disorders and wound healing. There is emerging evidence that combinations of vitamins have additive effects that provide enhanced efficacy compared with individual compounds.

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Does the plasma level of vitamins A and E affect acne condition?

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BACKGROUND: Vitamin A and E are lipid soluble antioxidants that are necessary for our health. Deficiency in these vitamins can cause serious diseases. Administration of vitamin A and E to patients with acne was shown to improve their acne condition. AIMS: To test the relationship between plasma vitamin A and E levels and acne. METHODS: Plasma vitamin A and E concentrations were determined by high performance liquid chromatography in 100 newly diagnosed untreated patients with acne and were compared with those of 100 age-matched healthy controls. Patients were carefully graded using the Global Acne Grading System. RESULTS: We found that plasma vitamin A concentrations in patients with acne were significantly lower than those of the control group (336.5 vs. 418.1 mug/L, respectively) P = 0.007. We also found that plasma vitamin E concentrations in patients with acne were significantly lower than those of controls (5.4 vs. 5.9 mg/L) P = 0.05. In addition, we found that there is a strong relationship between decrease in plasma vitamin A levels and increase in the severity of acne condition. Patients with severe acne had significantly lower plasma concentrations of vitamins A and E than did those with lower acne grade and the age-matched healthy controls. DISCUSSION: Based on our results, we conclude that low vitamin A and E plasma levels have an important role in the pathogenesis of acne and in the aggravation of this condition.

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