Symposium: New concepts in dermatopharmacology

New concepts in dermatopharmacology of vitamin D

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The beneficial aspects of vitamin D in bone health are well established. However, in the last several years there has been considerable interest in the biomedical research community regarding the link between vitamin D metabolism and the risk of a variety of infectious, inflammatory, and autoimmune diseases.

Pre-vitamin D is synthesized in the skin upon exposure to UVB and is modified, mostly in the liver, to 25D, then converted, mostly in the kidney by the 25-hydroxyvitamin D-1α-hydroxylase, to the bioactive form, 1,25D. Clinical measurement of circulating 25D is used to identify vitamin D insufficiency, given that 1,25D levels aregenerally maintained by parathyroid feedback, except in cases of more severe vitamin D deficiency. Intriguingly, deficiency of 25D, rather than 1,25D, is associated with immune dysfunction in vivo and recent investigations have identified mechanisms by which 25D regulates immune responses in vitro. In human macrophages the autocrine function of the 25-hydroxyvitamin D-1α-hydroxylase and the vitamin D-24-hydroxylase, which converts vitamin D into inactive metabolites, is regulated by both Toll-like receptor and T cell cytokine signals. These findings provide insight into how the intracellular vitamin D metabolism regulates human immune responses and contributes to the pathogenesis of human disease.