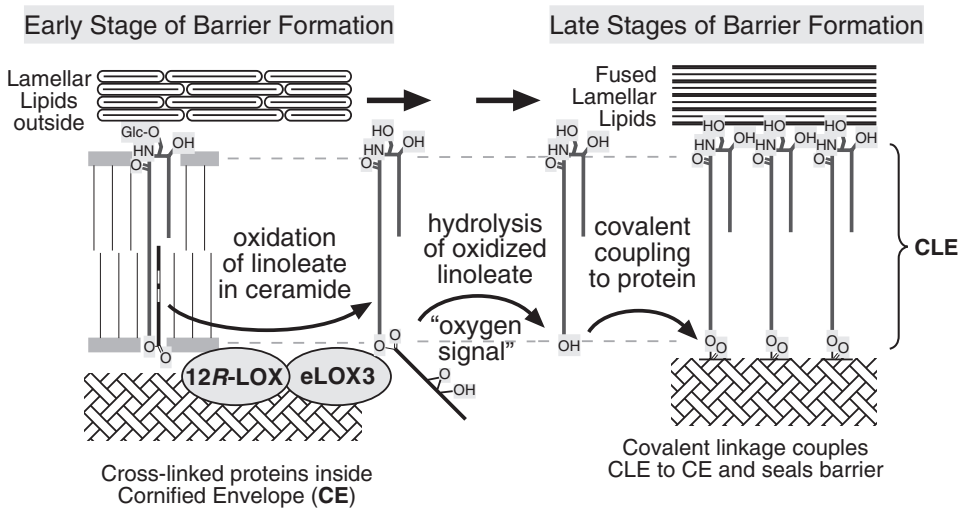
Papers of the Week

Essential and Skin-deep: The Beauty of Epidermal Lipoxygenases ♦

♦ See referenced article, *J. Biol. Chem.* 2011, **286,** 24046–24056

Lipoxygenases Mediate the Effect of Essential Fatty Acid in Skin Barrier Formation. A Proposed Role in Releasing omega-Hydroxyceramide for Construction of the Corneocyte Lipid Envelope



Skin barrier formation: essential fatty acids linked to essential enzyme activities.

As defined nearly a century ago, dietary deficiencies in polyunsaturated fatty acids (PUFAs) are hallmarked by the appearance of dry, scaly skin. Two epidermis-specific enzymes that act on PUFAs are the lipoxygenases ALOX12B and ALOXE3, and just within the past decade, a deficiency in either of these has been associated with disease states characterized by dry, scaly skin. The biochemical mysteries that connect these two observations and explain lipoxygenase functionality in skin hydration have remained obscure, but in their JBC Paper of the Week, Zheng *et al.* elucidate a conceptual framework for understanding how ALOX12B and ALOXE3 function concertedly to maintain the epidermal water barrier. Through high-resolution spectroscopic methods, the authors show that the enzymes together oxidize the PUFA moiety of a PUFA-ceramide linkage (*i.e.* the linoleoyl moiety of *O*-linoleoyl-ω-hydroxyceramides). Moreover, the sequential oxygenase reactions preface the hydrolytic release of the oxidized linoleoyl moiety from the ceramide component, the latter of which ultimately participates in the microarchitecture of the epidermal water barrier.

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