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Fatty Acids and Inflammatory Skin Diseases

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Preface

Inflammatory disorders of the skin represent the most common diseases in the general population. The mechanisms of their induction, persistence and possible pharmacological control are still a matter of current investigation. Among the molecule families involved in cutaneous inflammation, lipids, in particular fatty acids and its derivatives, play an important role.

Fatty acids represent major constituents of the skin lipid layer in maintaining barrier function, which is disturbed under inflammatory conditions. We know from studies of deficiencies in nutrition and special diets that unsaturated fatty acid forms are of particular importance. Diets containing unsaturated fatty acids can improve healing and have been used for many years as supplements to treat patients with skin inflammation.

Our knowledge about the molecular mechanisms of involvement of dietary fatty acids in healthy skin physiology and pathophysiology has increased substantially in the last 15 years. It became evident that not only the physical behavior of the outer surfaces, such as membrane fluidity, is strongly influenced by its fatty acid composition. In addition, some unsaturated fatty acids, in particular arachidonic acid, represent the basis of an enormous number of proinflammatory lipid mediators including prostaglandins and leukotrienes. Furthermore, several lipid mediators also act as antiinflammatory compounds.

Skin cells have the capacity to produce a unique and rather characteristic pattern of proinflammatory and antiinflammatory fatty acid derivatives – among them some very recently discovered mediators – which are strongly regulated by different enzymes that control their production and metabolism. Proinflammatory fatty acid metabolites have long been proven to play a role in two major skin diseases, psoriasis and atopic dermatitis. This led to the development of drugs that interfere with the synthesis of these mediators or inhibit their biological functions, and which have been investigated for clinical use at least in part.

This volume is intended to summarize our knowledge about the role of fatty acids and their derivatives in skin physiology and skin pathophysiology, with a particular focus on proinflammatory fatty acid derivatives. New concepts outlined in

this volume may stimulate research in fatty acid synthesis regulation, research that modern molecular biological approaches and modern fatty acid detection technology make possible on a high scientific level. Findings may show the way to novel future strategies for pharmacologic intervention in inflammatory skin diseases.

Jens-Michael Schröder