

# Introduction

## Welcome to the Next Generation of Acne Research

This issue of *Seminars in Cutaneous Medicine and Surgery* is devoted to summarizing some recent advances in acne research. I had set for myself 2 goals as guest editor of this issue: (1) to select topics that are at once timely, intriguing, and controversial; and (2) to introduce to the readership a few investigators who are making their mark in acne research. Their names may not be ones that the majority of the readership has heard in the past, but they are undoubtedly ones they are likely to hear in the near future.

The bacterium *Propionibacterium acnes* plays a central role in our current concept of acne pathogenesis. Yet its precise role in the development of acne lesions remains controversial. Is it present as a commensal or a pathogen? Does it function as a bystander or an instigator? In recent years, important advances have been made in our knowledge about this organism and the immunologic and inflammatory responses to it. For one, investigators in Germany, led by Holger Brüggemann, PhD, have successfully sequenced the genome of *P. acnes*. This important leap forward now grants us a glimpse into this organisms' molecular machinery, both structural and functional, allowing us to theorize more rationally how elements of this bacterium can contribute to the evolution of acne vulgaris. In his article, Dr. Brüggemann provides a unique tour of the *P. acnes* genome, drawing intriguing insights into acne pathogenesis along the way.

Intrinsic to the pathogenetic role of *P. acnes* in acne development is the host immune response to the organism, both adaptive and innate. It is the role of the innate immune response that has garnered much attention in recent years, due in large part to contributions by Jenny Kim, MD, PhD, and her colleagues. They have helped to identify how immunologic markers called Toll-like receptors are used by the innate immune system to recognize microbial pathogens and initiate immune responses to them. In her article, Dr. Kim introduces the reader to the Toll-like receptors, emphasizes their importance in mediating inflammatory cutaneous diseases such as acne, and highlights their potential as rational therapeutic targets.

Is acne a primary inflammatory disease? Early models of

acne pathogenesis focused on the importance of hyperproliferation and structural occlusion of the follicular infundibulum, relegating inflammatory reactions to a downstream position after follicular rupture. During the past few years, however, insights into the role of inflammation in acne lesion development have changed that early thinking. It is now becoming clear that inflammatory mechanisms are not only present throughout the life of acne lesions but also appear to be responsible for their initiation as microcomedones and resolution as scars. Drs. Diana Holland and Anthony Jeremy from the University of Leeds have been a driving force behind elucidating these inflammatory events for many years. They provide an outstanding overview of the biochemical and cellular mechanisms underlying the role of inflammation in acne pathogenesis and acne scarring.

For more than 30 years, the role of diet (in particular, chocolate) in acne has been consigned to the realm of myth, largely based on a single article published in 1969. There has been a revisiting of this purported myth of late, merging new insights into hormonal influences on acne with our expanding knowledge of the endocrinologic effects of diet. Loren Cordain, PhD, and colleagues recently shed new light on this topic with an intriguing study of acne from the perspective of medical anthropology by assessing the prevalence of acne among non-Westernized societies with non-Westernized diets. Dr. Cordain authors an insightful review of how the dermatology literature was shaped by these early studies and how significant endocrinologic mechanisms hold important implications for the role of diet in acne.

Oral isotretinoin is regarded by many dermatologists as the most important therapeutic advance in medical dermatology in the past 30 years. Although its efficacy in the treatment of acne is well-recognized, substantial issues regarding its safety remain unresolved and continue to be a popular focus of the lay press. In particular, concern over the putative association between isotretinoin use and depression and suicidal behavior has made the subject one of intense controversy. We provide here a systematic review of the more rigorous studies to date in the scientific literature examining this issue, high-

lighting their findings as well as identifying potential limitations to their interpretation.

The ability of androgens to stimulate sebocytes as well as follicular keratinocytes is well-accepted in acne pathophysiology. The use of oral contraceptives to modulate androgen activity in women with acne is a familiar practice for many dermatologists. Julie Harper, MD summarizes some of the more recent efficacy and safety data for hormonal therapy for acne with oral contraceptive pills.

Dermatology has seen a great proliferation of laser and light therapies for the treatment of a variety of cutaneous conditions, including acne. Drs. Bhardwaj, Rohrer, and Arndt provide an excellent overview of the proposed mechanisms of action of these modalities and summarize important clinical studies of their efficacy and safety. In

addition, the authors identify important areas of future investigation for these treatments and lend a pragmatic eye to the evaluation of their cost-effectiveness in the management of acne vulgaris.

I hope that the readership finds this selection of articles by these outstanding authors to be valuable, relevant, and intriguing. I further hope that these reviews will stimulate and inspire young investigators to join this new generation of acne researchers.

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