

Human Microbiome: An Exciting Opportunity to Develop Novel Treatments For Acne Vulgaris and Other Chronic Skin Diseases

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Acne is one of the most common skin diseases. It affects up to 85% of individuals worldwide, mainly adolescents, young adults and older women. There are four main factors that are thought to contribute to acne: Increased sebum production, follicular hyperkeratinization, colonization of follicles with *Cutibacterium acnes* and inflammation. Despite years of acne research, no novel products have been brought to market in the past 60 years and currently available treatments suffer from significant drawbacks: Lack of efficacy and side effects. They are mostly based on topical benzoyl peroxide, topical and oral antibiotics and retinoids. Human microbiome, the collection of all microbes on and in human bodies, represents an exciting new area of medical research. The research to date suggests that microbial dysbiosis in the gut and skin is linked to many chronic skin diseases. Restoring balance in the microbial ecosystem represents an opportunity to develop novel treatments against variety of skin disorders, including acne. Our research and product development efforts at Dermala Inc. are focused on exploring bacterial competition in the skin microbiome, including the antagonism between *C. acnes* and *S. epidermidis* and screening, formulation, testing and production of anti-inflammatory and antimicrobial metabolites (postbiotics) as new therapeutic candidates for the treatment of acne.

We have shown that topical formulations of selected *S. epidermidis* postbiotics reduce the number, size and severity of acne lesions without side effects in human studies, inhibit the growth of *C. acnes*, and decrease *C. acnes*-mediated inflammation. In addition, we focus on exploring the gut-skin-brain axis in the microbiome that connects gastrointestinal and skin health and the role of prebiotics, probiotics and postbiotics in reducing acne-associated inflammation and improving skin barrier function that translates into higher tolerability of topical acne treatments.