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Specific plant derived monoterpenes of thymol and terpineol act synergistically with cutaneous antimicrobial lipids to display potent efficacy against *Propionibacterium acnes*

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Acne is a multifactorial skin condition that has long been associated with changes in bacteria colonization. Cutaneous lipids, including certain free fatty acids derived from human sebaceous triglycerides and free long-chain sphingoid bases released from stratum corneum ceramides are potent and broad-acting antimicrobials contributing to skin's self-disinfecting property and host innate defense. Dysregulated expression of skin's antimicrobial lipids has been reported in acne condition and may be implicated in microbial dysbiosis. Here we report that long-chain sphingoid bases including C18 sphingosine, C18 phytosphingosine and C18 sphinganine, as well as sapienic acids (C16:1Δ6), the dominant sebaceous antimicrobial fatty acids, displayed potent antimicrobial efficacy against *Propionibacterium acnes*. Combination of cutaneous antimicrobial lipids with the plant derived monoterpenes of thymol and terpineol demonstrated a synergistic anti-*P. acnes* efficacy. Both the C18 sphingoid bases and sapienic acids perturbed the integrity of microbial cell membrane; a mechanism of action resembles that of thymol and terpineol. In contrast, no direct antimicrobial synergy was observed between cutaneous antimicrobial lipids and the skin-acting acne control agents such as salicylic acids and 6-[3-(1-adamantyl)-4-methoxyphenyl]-2-naphthoic acid. Our results demonstrated a potential synergistic antimicrobial benefit of thymol and terpineol with skin surface lipids to manage *P. acnes* and thereby aid in acne control.

Biography

Chung-Ching Chu has graduated from National Taiwan University with a BS in Life Science. She has obtained her MS degree in Immunology from Imperial College, London and then proceeded to complete her PhD in Immunology from St. John's Institute of Dermatology, King's College London. She has over 10 years' experience in human immunology research and has published in journals such as *Blood*, *Seminars in Immunology* and *Journal of Experimental Medicine*. She is presently a Senior Research Manager in Unilever R&D Shanghai, working to advance the science of skin biology and the efficacy of personal care products.

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