

COSMECEUTICAL CRITIQUE

Taurine

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By [Leslie S. Baumann, MD](#)

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Taurine, also known as 2-aminoethanesulfonic acid, is a naturally occurring beta-amino acid (which has a sulphonic acid group instead of carboxylic acid, differentiating it from other amino acids) yielded by methionine and cysteine metabolism in the liver.^{1,2} An important free beta-amino acid in mammals, it is often the free amino acid present in the greatest concentrations in several cell types in humans.^{1,2} Dietary intake of taurine also plays an important role in maintaining the body's taurine levels because of mammals' limited ability to synthesize it.¹



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Notably in terms of dermatologic treatment options, the combination product taurine bromamine is known to impart antioxidant, anti-inflammatory, and antibacterial activities.³ And taurine itself is associated with antioxidant, anti-inflammatory, antifibrotic, and immunomodulatory characteristics,^{1,4} and is noted for conferring antiaging benefits.⁵

Acne and other inflammatory conditions

The use of topical taurine bromamine, the physiological product of hypobromous acid and taurine, is one of the new emerging approaches to treating acne.^{6,7}

In response to the problem of evolving antibiotic resistance, Marcinkiewicz reported in 2009 on the then-new therapeutic option of topical taurine bromamine for the treatment of inflammatory skin disorders such as acne. The author pointed out that *Propionibacterium acnes* is particularly sensitive to taurine bromamine, with the substance now known to suppress H₂O₂ production by activated neutrophils, likely contributing to moderating the severity and lowering the number of inflammatory acne lesions. In a 6-week double-blind pilot clinical study, Marcinkiewicz and his team compared the efficacy of 0.5% taurine bromamine cream with 1% clindamycin gel in 40 patients with mild to moderate acne. Treatments, which were randomly assigned, occurred twice daily through the study. Amelioration of acne symptoms was comparable in the two groups, with more than 90% of patients

improving clinically and experiencing similar decreases in acne lesions (65% in the taurine bromamine group and 68% in the clindamycin group). Marcinkiewicz concluded that these results indicate the viability of taurine bromamine as an option for inflammatory acne therapy, particularly for patients who have shown antibiotic resistance.³

Wide-ranging protection potential

In 2003, Janeke et al. conducted analyses that showed that taurine accumulation defended cultured human keratinocytes from osmotically- and UV-induced apoptosis, suggesting the importance of taurine as an epidermal osmolyte necessary for maintaining keratinocyte hydration in a dry environment.²

Three years later, Collin et al. demonstrated the dynamic protective effects of taurine on the human hair follicle in an in vitro study in which taurine promoted hair survival and protected against TGF-beta1-induced damage.¹

Taurine has also been found to stabilize and protect the catalytic activity of the hemoprotein cytochrome P450 3A4, which is a key enzyme responsible for metabolizing various endogenous as well as foreign substances, including drugs.⁸

Penetration enhancement

In 2016, Mueller et al. studied the effects of urea and taurine as hydrophilic penetration enhancers on stratum corneum lipid models as both substances are known to exert such effects. With inconclusive results as to the roots of such activity, they speculated that both entities enhance penetration through the introduction of copious water into the corneocytes, resulting from the robust water-binding capacity of urea and the consequent osmotic pressure related to taurine.⁹

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