



SKIN BEAUTIFUL DERMACEUTICALS

## *The Science Behind Topical DMAE Amine*

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**ABSTRACT:** Dimethylaminoethanol (DMAE) has been used in anti-aging formulations but few scientifically based data address its efficacy. The aim of this study was to evaluate the effects of DMAE-based formulations on hairless mice and human skin. Formulations containing with or without DMAE were applied to the dorsum of hairless mice. Histopathological and histometric evaluations were carried out after seven days. Formulations were also applied to the ventral forearm and the lateral periorcular area of human volunteers. Stratum corneum water content and skin mechanical properties were analyzed using Corneometer and Cutometer, before and after a single and repeated application. Histometric evaluations showed that formulations with or without DMAE increased the viable epidermis thickness, but **only the DMAE-supplemented formulation led to increased dermal thickness. DMAE also induced increase in collagen fiber thickness**, which was observed in the histopathological study. After the single and the 8-week period application on human skin, formulations with and without DMAE enhanced the stratum corneum water content in the forearm skin. Mechanical properties were not significantly modified. So, we can suggest that DMAE action is related to its effects on the dermis as observed in the histopathological and histometric studies and showed hydration effects on skin.

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**BACKGROUND/AIMS:** Beyond subjective assessments, the effect of skin tensors is difficult to assess. The present 2-phase randomized double-blind split face study was designed to compare the effect of a gel containing 3% 2-dimethylaminoethanol (deanol, DMAE) with the same formulation without DMAE. **METHODS:** In a first pilot study, sensorial assessments and measures of the skin distension under suction were performed in eight volunteers. In a second study conducted in 30 volunteers, shear wave propagation was measured. **RESULTS:** Large interindividual variations precluded any significant finding in the first study. The DMAE formulation showed, however, a significant effect characterized by increased shear wave velocity in the direction where the mechanical anisotropy of skin showed looseness. **CONCLUSION:** The DMAE formulation under investigation increased skin firmness.

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Skincare formulations for the improvement of aging skin are increasingly important consumer products. Here, we review available data on one such agent - 2-dimethylaminoethanol (DMAE) or deanol - that has recently been evaluated in a placebo-controlled trial. DMAE is an analog of the B vitamin choline and is a precursor of acetylcholine. Although the role of acetylcholine as a neurotransmitter is well known, growing evidence points to acetylcholine as a ubiquitous cytokine-like molecule that regulates basic cellular processes such as proliferation, differentiation, locomotion, and secretion in a paracrine and autocrine fashion. Indeed, this modulatory role may contribute to the cutaneous activity of DMAE. In a randomized clinical study, 3% DMAE facial gel applied daily for 16 weeks has been shown to be safe and efficacious ( $p < 0.05$ ) in the mitigation of forehead lines and periorbital fine wrinkles, and in improving lip shape and fullness and the overall appearance of aging skin. These effects did not regress during a 2-week cessation of application. Beneficial trends ( $p > 0.05$  but  $\leq 0.1$ ) were noted in the appearance of coarse wrinkles, under-eye dark circles, nasolabial folds, sagging neck skin, and neck firmness. Application was found to be well tolerated, with no differences in the incidence of erythema, peeling, dryness, itching, burning, or stinging between the DMAE and placebo groups. An open-label extension of the trial showed that the long-term application of DMAE gel for up to 1 year was associated with a good safety profile. The acute skin-firming effects of DMAE have been confirmed by quantitative measures of cutaneous tensile strength. In vitro studies in peripheral blood lymphocytes indicate that DMAE is a moderately active anti-inflammatory agent. Although its mechanisms of action in the skin remain to be elucidated, evidence suggests that the skin is an active site of acetylcholine synthesis, storage, secretion, metabolism, and receptivity. Muscarinic acetylcholine receptors have been localized to keratinocytes, melanocytes and dermal fibroblasts, whereas nicotinic acetylcholine receptors have been found in keratinocytes. The role of acetylcholine and the role of DMAE as a modulator of acetylcholine-mediated functions in the skin remain to be elucidated. Thus, **the benefits of DMAE in dermatology include a potential anti-inflammatory effect and a documented increase in skin firmness with possible improvement in underlying facial muscle tone.** Studies are needed to evaluate the relative efficacy of DMAE compared with other skin-care regimens (e.g., topical antioxidant creams, alpha-hydroxy acids).

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