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# NU SKIN SCIENCE TECHNICAL BULLETIN: FIRMING INGREDIENTS

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## INTRODUCTION

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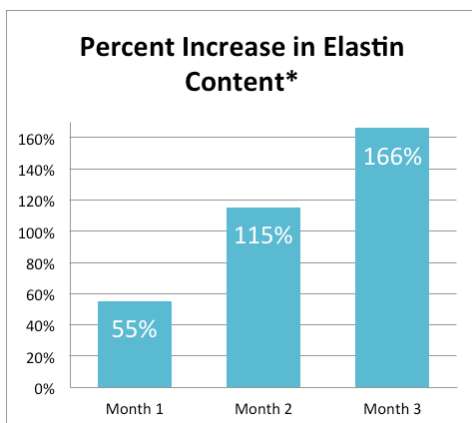
There are several variables and differing mechanisms that can contribute to an aging appearance. Age-related changes in skin physiology are influenced not only by our environment and biochemistry, but by changes in our gene expression as well.

With age, skin begins to become more lax under the chin, mouth, and eyes. Major changes in skin laxity result in deeper folds in the nasolabial area and sagging of the neck and chin becomes evident—a lack of skin elasticity is apparent and the look of youth starts to dwindle! A decrease in elastin production and an increase in elastin deterioration (separately and even more so in combination) may contribute to this lack of facial contour and an aged appearance. Elastin is a hydrophobic, cross-linked, random-coil protein composed of amino acid chains that, together, form rubber-band-like elastic fibers. Each elastin molecule is capable of uncoiling and recoiling or stretching (to a more extended conformation) when the fiber is subjected to a stretching force and relaxing (to a more compact conformation) when the force is removed. Collagen, another skin protein, provides the basic structure, whereas elastin provides the elastic nature to healthy skin.

## ETHOCYN®

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The ingredient Ethocyn® has been shown to enhance elastin production, resulting in improvement in facial and neck contours. It is effective for men and women, young and old. Ethocyn® at 0.5% in propylene glycol, followed by Ethocyn® 0.01% in a moisturizing base, was applied twice daily to 29 study participants between the ages of 40 and 77. Punch biopsies were taken and the elastin content of the skin was measured. Data showed an average of 166% increase in elastin content after three months of Ethocyn® application when compared to baseline. Similar results were seen in other studies (data not shown)\*. Studies with Ethocyn® have been conducted on different ethnic skin types with similar results—returning skin elastin levels to those typically found in 18 to 25-year-olds.\*



\*This clinical study was conducted at an independent research center commissioned by the ingredient manufacturer.

## A PROTECTIVE ANTIOXIDANT NETWORK

Free radicals are known to initiate a cascade of events that leads to the breakdown of skin structure and structural proteins, including elastin. Antioxidants calm free radicals, interrupting the damage they can cause. These ingredients can protect the outer layer of the epidermis from environmental stress that can result in damage. Cosmetic use of antioxidants helps protect the stratum corneum and assists with regeneration. This provides further protection to the underlying skin layers from the harm resulting from UV radiation and other environmental toxins.<sup>2</sup> Effectively fighting free radicals is an essential part of preventing skin aging and maintaining a youthful appearance.

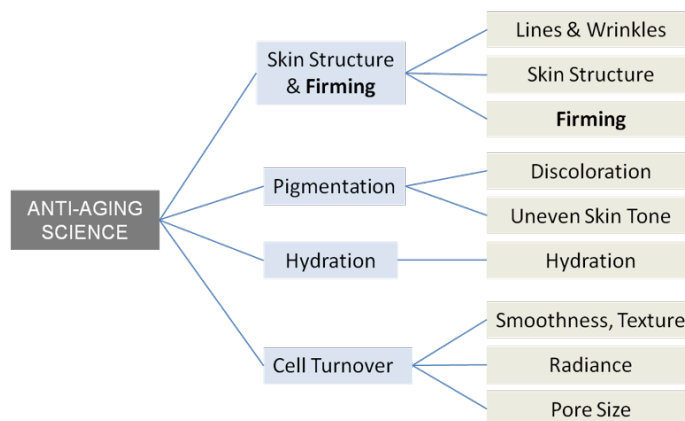
Antioxidants vary in their capacity to neutralize damaging free radicals and differ in their solubility that influences their location within cells.<sup>3</sup> Previous research has shown that antioxidants work optimally in a network to protect cellular health and viability<sup>4</sup>. Carotenoid antioxidants are large and sometimes referred to as “blotters.” Being lipid soluble, they are located around the cell membrane and provide the first line of defense by absorbing a large part of the free radicals’ load. Pairing these with powerful “redox” (regenerating) antioxidants, like CoQ10 and vitamin E, creates a synergistic protection to the skin. Antioxidants perform other functions that can benefit the skin, and some are even key components for the production of skin structural proteins. A network increases the availability of those key antioxidants to perform other functions, in addition to neutralizing free radicals.

## NU SKIN'S SCIENTIFIC APPROACH

Nu Skin's unique approach to personal care identifies and targets Youth Gene Clusters (YGC) utilizing gene research and clinical results to first identify the sources of aging and then validate visual results with clinical evaluations.

### GENE RESEARCH

Nu Skin Personal Care scientists identified key genes in the Skin Structure YGC whose expression—or lack thereof—relates to aging appearance specific to firm facial skin. The influence of different ingredients on the identified key genes was then evaluated *in vitro* using human full-thickness epidermal equivalents. These skin cultures contain normal human epidermal keratinocytes and normal human dermal fibroblasts. RNA extracted after 24 hours of culture incubation from both treated and untreated culture samples was used to conduct RT-PCR analyses. The ingredients that had the greatest impact on returning gene expression (of this firming subset) to that of a youthful gene expression profile were selected and identified as ingredient candidates for skin formulations.



There are many factors that can contribute to an aging appearance. As research in anti-aging continues to evolve, it provides novel understandings for scientists; however, the need for a multi-faceted approach remains unchanged. Combining these technologies—Ethocyn, an antioxidant network, and selectively screened gene active ingredients—into a final formula to target firmer looking skin, may provide a more comprehensive solution. The population of consumers interested in anti-aging continues to grow and they are demanding more efficacious solutions. Such solutions are able to achieve and bolster the delicate balance between protection from degradation and enhancement of production. Formulating products to target sources of aging helps meet these demands.

#### References:

1. Pugliese, PT. Advanced Professional Skin Care, pg 250.
2. Polla, A. Penetration of Cosmetics Into and Through the Stratum Corneum. *Cosmetics & Toiletries Science Applied* 2013, 128:2: 92–96.
3. Sies H, Stahl W. Vitamins E and C, beta-carotene, and other carotenoids as antioxidants. *Am J Clin Nutr.* 1995 Dec; 62(6 Suppl):1315S–1321S.
4. D Kern, B Fuller, E Soudant, T Schultz. Carotenoid effects on CoQ10 stability and biological activity in UV-irradiated human skin cells interim results presented at the American Academy of Anti-Aging Medicine in Chicago, 2005.

Portions of the bulletin were summarized from third party independent professional assessments and in-house clinical studies performed according to Standard Operating Procedures of the organization. Ethocyn is a registered trademark of BCS.



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