

LE Magazine August 2003

REPORT

Fighting Back Against Skin Aging
By Maria Rabat

Skin distortion is often the most visible sign of human aging. The passage of time can wreak havoc on the face; leaving wrinkles, age spots and sagging skin in its wake.

Americans spend billions of dollars each year on creams and lotions in the quest for smooth and healthy-looking skin.¹

Cosmetics manufacturers flood the market with a plethora of products that promise to deliver results. The problem is that most commercial companies do not understand the multiple pathological mechanisms involved in skin aging. The result is skin care products that provide only limited effects and fail to address the unsightly alterations associated with aging skin.



This article discusses findings from scientific studies showing that skin aging can be postponed and partially reversed.

Although the aging process may seem relentless and inevitable, there are a number of compounds that have been scientifically proven to protect repair mechanisms in skin cells and boost their healing properties. One group of compounds is antioxidants that counteract the damaging effects of free radicals. Other critical agents required for healthy skin are youth hormones (such as DHEA and melatonin) and natural moisturizing factors to protect against dehydration.



The most potent antioxidants that help protect against skin aging are vitamins A, C and E and other nutrients found in fruits and vegetables. Regrettably, the skin is exposed to many natural and environmental hazards. This makes it virtually impossible to maintain optimal antioxidant levels through the oral ingestion of healthy foods or supplements.

An increasing number of scientific studies support the value of applying antioxidants directly to the surface of the skin to combat free radical damage. These findings suggest that "topical application of antioxidants may result in a sustained antioxidant capacity of the skin," and conclude that "regular application of skin care products containing antioxidants may be of the utmost benefit in efficiently preparing our skin against external stressors occurring during daily life."^{2a, 2b}

Skin rejuvenating nutrients

The positive effects resulting in the topical application of vitamin C were singled out in a recent investigation where it was proven to stimulate collagen production. A double-blind study published last year confirmed vitamin C's efficacy in improving the overall look and feel of the skin. Clinical evaluation of wrinkling, pigmentation, inflammation and hydration was performed prior to the study and at weeks 4, 8 and 12 on individuals who applied topical vitamin C complex on one-half of the face and placebo gel to the opposite side. The results showed a statistically significant improvement to the skin on the vitamin C side, with biopsies showing increased collagen formation and reduced wrinkling.³

Several studies suggest that topical vitamin E, particularly alpha tocopherol (a form of vitamin E), decrease skin roughness, length of facial lines and wrinkle depth. In one particular study, it was determined that "alpha tocopherol can act as a scavenger of free radicals,"^{2a} thereby arresting the free radical sequence and the ultimate destruction of collagen fibers.

Vitamin A has also undergone a fair amount of scientific scrutiny. A study involving 72 people of varying age groups tested the efficacy of vitamin A and its role in stimulating skin cell renewal. Researchers found that a seven-day topical application of vitamin A increased collagen synthesis and reduced the appearance of wrinkles and fine lines.⁴ And further studies have shown that topical application of vitamin A can protect the epidermis (outer layer of the skin) and the most delicate areas of the skin against free

radical attack by actually absorbing ultraviolet light and preventing it from doing its damage.⁵

Scientists first discovered the importance of alpha lipoic acid in the 1950s, and recognized it as an antioxidant in 1988. Alpha lipoic acid deactivates free radicals, and because it can penetrate any part of a cell that needs protection, it is thought to safeguard a cell's DNA. Alpha lipoic acid also aids in the exfoliation process (by loosening the bonds between dead cells so that they slough off more rapidly), and acts as an anti-inflammatory (by decreasing the swelling of skin tissue).⁶

RNA, long considered a vital component of cell renewal, is yet another potent wrinkle fighter. Not only does this antioxidant enhance cellular energy - which keeps cells stronger and makes them less prone to damage and easier to repair - but it also intensifies the skin cells' ability to take in and use oxygen. This improved metabolism accelerates the movement of young cells to the surface of the skin, where they replace older cells. The overall effect is tighter skin with less wrinkles.⁷

Vital skin hormones

Antioxidants aren't the only weapons available to us in the fight for smooth, radiant skin. The sleep hormone (melatonin) and the anti-stress hormone (DHEA) are both found in human skin, and although the exact roles of both are still under scrutiny, researchers have identified several mechanisms through which these hormones protect against skin aging and maintain the overall health of the skin.⁸

A study in the *Journal of Surgical Research* established the extraordinary ability of topically applied DHEA to protect skin's delicate blood vessels.⁹ Safeguarding the blood vessels prevents progressive tissue destruction and accelerated aging, and is necessary for transportation of essential nutrients from the bloodstream, via the capillary network, to the living cells of the skin. Because DHEA has been linked to collagen regulation and production, decreased levels of the hormone are associated with the phenomenon of skin aging.¹⁰



A German study proved melatonin's potency as a free radical scavenger. Its antioxidant properties actually beat out the super powerful vitamin C, which came in a close second.¹¹ Research from the Department of Dermatology at the University of Zurich demonstrated the efficacy of melatonin in protecting us from the destructive hydroxyl free radical. A distinct dose response relationship was observed between the topical dose of melatonin and the degree of UV-induced damage. The researchers concluded that melatonin enhances the skin's ability to repair itself from free radical damage suffered from photoaging, incurred during daylight hours. ¹²

Studies have indicated that DHEA and melatonin are absorbed by skin when applied topically.¹³ It has been shown that DHEA activity is 85% to 90% greater when applied topically than when taken orally. The hormone preserves the skin's ability to react to cancer-causing and skin-destructive pollutants found in the environment. And as an anti-inflammatory agent, DHEA also aids in the healing process of already damaged skin.



How free radicals cause wrinkles

Free radical damage has been linked to as many as 60 illnesses, including cancer, heart disease, Alzheimer's disease and immune system disorders. And it also plays a significant role in the aging process of our skin. Over the years, the skin's collagen suffers mercilessly from free radical attack. Normal, healthy collagen proteins gently mesh with each other, giving skin its softness and elasticity. Once damaged, these proteins become crosslinked and hard, and ultimately collapse on themselves, preventing them from holding water and remaining plump.* The overall effect is a confusion of crosslinked collagen fibers, manifested on the skin's surface as wrinkles.**

* Chung JH, et al. Modulation of skin collagen metabolism in aged and photoaged human skin in vivo. *J Invest Dermatol.* 2001 Nov;117(5):1218-24.

** Sander CS, et al. Photoaging is associated with protein oxidation in human skin in vivo. *J Invest Dermatol,* 2002 April; 118 (4): 615-25.

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Guarding against moisture loss

Women typically use face creams to replace moisture lost to aging. It becomes increasingly difficult to keep the skin moist once a woman reaches menopause because of a reduction in the hormones that signal oil production in the sebaceous glands.



Most commercial face creams are oil-based and work by blocking the release of water from the skin. That may work with younger skin, but as we age, the skin loses its ability to even attract moisture. Instead, aging skin needs to be replenished with its natural moisturizer complex to attract and retain water. One of the natural humectants (agents that attract and hold water) in young skin is NaPCA (the sodium salt of pyrrolidone carboxylic acid). The ability of the skin to hold moisture is directly related to its NaPCA content. Aged skin is depleted of the compound, as well as other humectants, needed to retain water. NaPCA, which is manufactured in human skin by an amino acid conversion, functions to naturally draw moisture and hold it in place within the skin. It is the most powerful, non-toxic humectant known and the most important humectant in the skin.

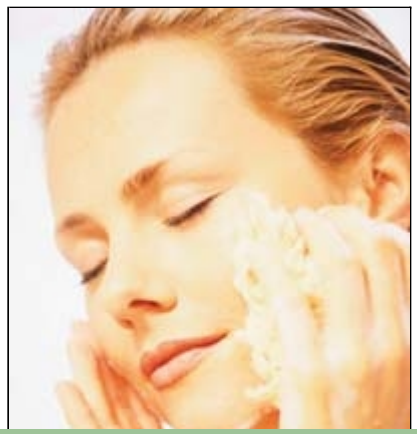
Hyaluronic acid is yet another natural component of healthy skin. The network of collagen fibers below the skin is filled with a composition of water, protein complexes and hyaluronic acid. This jelly-like mixture is necessary for transportation of essential nutrients from the bloodstream, via the capillary network, to the living cells of the skin. Hyaluronic acid is found in great abundance in young skin, but over time, free radical production destroys our hyaluronic acid reserves. By the time we reach our 50th birthday, we've already lost close to half of the hyaluronic acid that we had in our youth. Replenishing the skin with hyaluronic acid can help facilitate healing, repair and antioxidant capacity.¹⁴

Without proper moisture, nutrients can't be delivered to the skin, compromising the entire process of cell renewal. A patented moisturizer made from soybean oil, called Ceraphyl® NGA, not only reduces dryness in the upper layers of the skin, but it also seems to enhance the efficacy of topically applied antioxidants, particularly vitamins A, C and E, thereby ensuring proper nutrient absorption and the vital processes of repair and renewal.

The combined qualities inherent in NaPCA and hyaluronic acid, contained in a Ceraphyl® NGA moisture base, approximates the skin's natural moisturizing capabilities. Optimal protection against age-induced skin dehydration is best achieved by replenishing the skin with a moisture complex that best matches it's own. A true nighttime moisturizer should address the needs of aging skin by effecting a change, both in its texture and appearance.

A comprehensive battle plan

The skin is a sophisticated organ, designed to safeguard us from external dangers, such as bacteria and other environmental stresses. Think of your skin as a suit of armor that protects your internal organs from the hazards of daily living. If any cream or lotion is to penetrate this barrier and nourish the layers underneath, it needs to be specifically formulated to circumvent the armor. For any skin care cream to deliver on its promise, it must first be designed to operate within the confines of our physiology. And our physiology, with particular regard to aging skin, is a complex system that works best when we work with it. The following article describes pioneering research that has led to the development of a night cream that penetrates deep into the lower layers of the skin to guard against the multiple adverse consequences of aging.



Lifestyle modifications make for beautiful skin

Experts recommend a diet rich in fruit and vegetables to help skin stay looking its best. Leafy green vegetables and other brilliantly colored foods like blueberries, tomatoes and carrots contain antioxidants which can stabilize free-radicals-destructive cellular structures that have been implicated in everything from cancer to wrinkles and aging skin.* Health care professionals recommend drinking plenty of water, consuming antioxidants and avoiding cigarettes and excessive alcohol consumption to keep the skin looking healthy and youthful. And it goes without saying that we should limit our sun exposure. Nothing ages the skin faster than excessive sun damage.



* Martinez-Florez S, et al. Flavonoids: properties and anti-oxidizing action. J Nutr Hosp 2002 Nov-Dec;17(6):271-8.

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