

# Skin Care and the Aging Process

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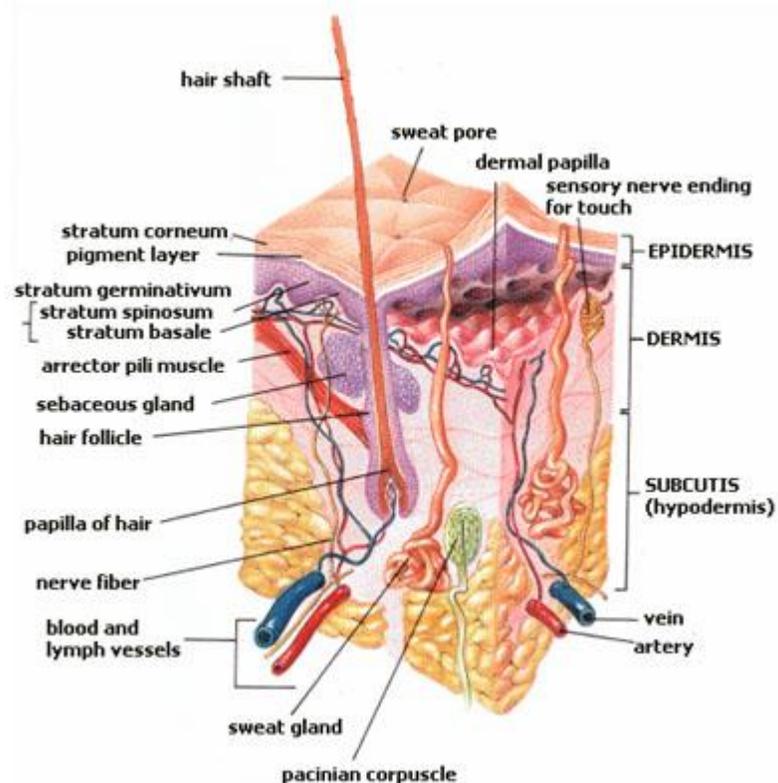
Thanks to advancements in the understanding of the aging process, researchers have developed a wide range of approaches, ranging from dietary change to oral and topical antioxidants that can prevent the signs of skin aging or treat them effectively. Whether your skin is in good shape now and you want to preserve it, or you have uneven pigment, poor skin tone with fine lines, enlarged pores, sagging, sallowness, or wrinkles, you can maintain or improve the health and vitality of your skin.

According to Dr Nicholas Perricone, (*pictured above*) a dermatologist professor at Yale and a leading-edge scientist who has done nearly 20 years of research on natural and systemic approaches to radiant skin, wrinkled, sagging skin is not the inevitable result of growing older. It is something that can be prevented and/or treated to a great extent.

## Your Skin: A Protective, Responsive Boundary

Skin is a vital organ, as important to our health as our hearts and livers. It regulates our temperature, and is also a barrier to pathogens and injuries from our environment. Because it is derived from the same embryonic layer as our brains and nervous systems, our skin acts as a kind of external brain—sensing our external environment and translating impressions to our inner selves, and then reflecting our response back to the outer world.

Our skin also mirrors our state of health, and is often the first place in our bodies to register emotions, fatigue, and stress of all kinds. Skin is also affected by external factors, such as sunlight and air pollution, and also by internal factors such as cigarette smoke and a diet that is low in the antioxidant vitamins B, C and E.



## The Anatomy of Skin

The skin has three layers: the epidermis, the dermis, and the innermost fat layer. The Epidermis: The outermost layer of the skin, called the stratum corneum, is comprised of dead skin cells that form as fresh cells made in the deeper layers of the skin push their way to the surface, flatten, and die. The stratum corneum is sloughed off continually as new cells take its place, but this sloughing process slows down with age. Complete cell turnover takes place every 28 to 30 days when we are young, while the same process takes 45 to 50 days when we're in our sixties. This is one of the reasons why the skin loses its freshness with age.

Underneath the stratum corneum is the basal layer of the epidermis, where new skin cells are produced. This layer also contains the cells known as melanocytes that produce melanin—the pigment that determines the color of the skin. The more pigment your skin has, the darker its tone.

**The Dermis:** The dermis lies underneath the epidermis and makes up about 90% of the thickness of the skin. This is the area that contains the nerves which sense pressure, temperature, and pain, and also sweat glands, hair follicles, sebaceous glands which produce oil, and also blood vessels. The sweat and sebaceous glands secrete a thin layer of perspiration and oil that forms a protective acid mantle on the skin. If you wash with products that aren't pH-balanced, you'll be removing this protective mantle, thus leaving yourself more vulnerable to infections and break-outs.

The dermis also contains the skin's collagen layer, a dense meshwork of fibers that give the skin elasticity and strength. Starting in our late twenties, this collagen layer begins to get thinner—with wide variation among individuals. In general, those with darker skin tone have thicker collagen, and are, therefore, more wrinkle resistant, than those with fair skin. By their late thirties and early forties, many women begin to notice that their skin becomes drier and more "crepey." This results from both decreased oil secretion by the sebaceous glands and from thinning of the collagen layer.

**The Fat Layer:** Beneath the dermis and epidermis lies the fat layer, which serves to insulate and protect our inner organs and acts as a sort of cushion that helps keep our skin plump.

## Why Skin Ages

The major cause of skin aging is sun damage, which we can easily appreciate by comparing the protected, smooth, wrinkle-free skin on our buttocks with the sun-exposed skin on our hands and our faces. But a lifetime of sun-aging is not the only factor that ages our skin. As we age, our body's ability to repair skin slows down considerably. As teenagers, our skin cells can repair themselves



easily and perfectly. But by the age of 50, we no longer seem to have the ability to repair our skin as well. The most widely accepted theory of why this happens and why skin and our bodies age over time is termed the free radical theory of aging. In short, free radicals are oxygen molecules that have lost an electron through interaction with other molecules. The resulting oxygen molecules are very unstable and reactive. In order to restore their missing electron, they steal them from other "healthy" molecules, thus creating more free radicals and in the process, damaging cells. The result in the body is like rust on steel.

The collagen layer of our skin is especially susceptible to free radical damage that arises from sun and pollution exposure, resulting in a process known as cross-linking. Cross-linking of the naturally supple collagen molecules makes them become stiff and inflexible, eventually resulting in skin that looks and feels "old and leathery." Free radicals that are produced when the sun hits the skin activate molecules known as transcription factors, which signal cellular DNA to produce proteins that are pro-inflammatory and harmful to the cell. This same process also produces collagen-digesting enzymes that can leave tiny defects in the skin which give rise over time to wrinkles. Antioxidants have been found to stop or even reverse free-radical damage, to stop sub-clinical inflammation, and even to help mend some types of scarring.



Use skin care products that contain alpha- or beta-hydroxy acid or glycolic acid.

The hydroxy acids work in the following three ways:

- 1) They help dissolve the "glue" that holds dead skin cells together, thus resulting in easier removal, so new plumper cells can rise to the surface.
- 2) They increase the hydration of the skin.
- 3) They encourage the repair of elastin and collagen in the skin and may even help thicken it a bit.

AHAs are naturally-occurring acids derived from substances such as milk (lactic acid), sugar cane (glycolic acid) and apples (malic acid).

Commercial products usually contain 5–10% fruit acids, concentrations that are low enough and safe enough for all skin types and tones. It's always best, however, to test any new skin care product first, either on the inner part of your elbow or just under your jawline, to make sure you're not sensitive to it. Glycolic acid has a structure and function similar to that of vitamin C and, like the other fruit acids, has been shown to help reduce fine lines and wrinkles, fade age spots, and moisturize the skin with regular use.

[Products ranging from 5 to 10% concentration are widely available](#) and have been shown to help the exfoliation and skin rejuvenation process in all skin types. They help normalize your skin whether it's dry or oily. If it's oily, they remove the top dead layer of cells, thus allowing oil to flow out of the follicle more easily, so that it can be removed without stripping away essential moisture. If your skin is dry, fruit acids remove the dry dead layer and stimulate cell renewal. If your skin is sensitive, start with a 5% product, test it on an inconspicuous patch of facial skin

(under your jaw) first. Then gradually work up to 10%, if tolerated. You may experience a slight stinging with some products until you get used to them.

Many fruit acid-containing lotions and creams are also available for the legs, arms, etc. It usually takes about two weeks before you'll notice a difference in your skin with regular use of an AHA. Start with an AHA at night only, and then after a week or more, apply it twice per day for maximum effect. In addition to the exfoliant properties of alpha, beta hydroxy and glycolic acids mentioned above, they also have antioxidant properties, and therefore work well in combination with other antioxidants.

## Topical Antioxidants for Skin



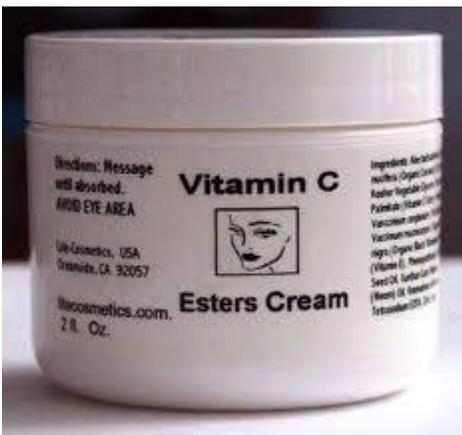
In order for a topical antioxidant to deliver effective results, it must be in a form that is maximally absorbed by the skin and have a pH at which its function will be optimal. Dr. John MacDonald, senior research scientist at USANA, states that a pH of 3.5–4.0 is generally the most effective range for optimal absorption and utilization for the fruit acids, for example.

Dr. Nicholas Perricone, has done extensive and pioneering work in the use of antioxidants to ameliorate skin damage and help prevent it in the future.

Though many different antioxidants are available in a variety of products, Dr. Perricone has found that topical vitamin C ester, which is fat soluble; alpha-lipoic acid, which is both water and fat soluble; and a substance known as DMAE are particularly effective, often producing visible results within a few days

## Vitamin C Ester

Research has shown that in the proper form, vitamin C, a powerful and ubiquitous antioxidant, can restore the smooth surface and youthful glow to aging skin. [Vitamin C](#) taken internally strengthens the body's white blood cells, our first line of defense against bacteria and viruses. Vitamin C also aids in the production of other essential body chemicals, such as [L-carnitine](#), which helps transport fat into the mitochondria of our cells where it is converted into energy. Vitamin C also helps produce neurotransmitters in the brain which communicate both within our brain and in our peripheral nervous systems. Literally thousands of studies have also documented vitamin C's role in protecting virtually every organ in our bodies from the effects of aging.



In the skin, vitamin C is essential for the production of collagen, that essential connective tissue that gives our skin its structure, elasticity, and underlying healthy glow. It also helps heal inflammation because it blocks the production of some of the inflammatory eicosanoids.

The problem with using natural vitamin C topically is that it is water soluble, and is very acidic, which is irritating to the skin. It also breaks down rapidly, losing its potency within 24 hours. This is why most products containing conventional vitamin C are not effective. But when vitamin C is combined with palm oil to create what is known as an ester, it becomes both fat soluble and non-acidic, while maintaining its antioxidant and collagen-enhancing abilities. Because vitamin C ester can penetrate the thin membrane that encases a cell, it offers maximum protection against free radicals in the place they do the most damage—the outer membrane of the cell. Studies have shown that vitamin C ester (also known as ascorbyl palmitate) is absorbed much more quickly and achieves levels that are ten times higher in the skin than natural vitamin C (L-ascorbic acid). Vitamin C ester is also stable and can be added to creams and lotions where it will keep its potency for months without turning rancid.

Dr. Perricone's research has shown that [vitamin C ester cream](#) may help refresh skin after long exposure to sun. And because vitamin C ester helps stimulate the growth of fibroblasts, the cells that help produce collagen and elastin in human skin, it has been shown to help reduce fine lines and wrinkles from sun exposure, to help firm sagging skin that is losing firmness because of damaged collagen, and also to soothe sunburned, inflamed, or irritated skin.

- Tocotrienols—A High-Potency Form of Vitamin E

Up until very recently, scientists felt that the tocopherols, particularly D-alpha tocopherol, were the most potent part of the vitamin E complex. Newer research has demonstrated that the tocotrienols, another part of the vitamin E complex, are the more effective forms of this powerful antioxidant group. Research has shown, for example, that tocotrienols inhibit peroxide formation—a measure of free radical damage—much more efficiently than does alpha tocopherol, the type of vitamin E that has been used in products for over 30 years. Topical application of vitamin E, for example, usually in the form of one of the tocopherols, has been shown to help prevent skin damage by increasing the levels of skin enzymes that help protect the skin from ultraviolet damage.

- Research suggests that the tocotrienols are 40 to 50 times more powerful than other forms of vitamin E. This new type of high-potency vitamin E is made using a special extraction process on rice bran oil and palm fruit oil, producing a liquid with high concentrations of [tocotrienols](#) which can be taken internally or easily mixed into creams, lotions, shampoos, or other cosmetics. Preliminary research shows that these products can help hair, severely dry skin, and fingernails. Look for the words "[high-potency E](#)" or "[HPE](#)" on the label of these products, to be

sure you are getting the right stuff.

- Alpha-Lipoic Acid (ALA)

Alpha-lipoic acid is a completely natural antioxidant molecule that is present in every cell of our bodies. Like vitamin C, it has been well-known to scientists for many years, but in the past ten years intensive research has shown how beneficial this substance can be, both when applied topically and taken orally. Here are the benefits of alpha lipoic acid (ALA):



- [ALA](#) is both water and fat soluble, which makes it a universal antioxidant, able to work both on the surface of cells and deep within them, as opposed to vitamin C (water soluble) and vitamin E (fat soluble), which can fight free radicals either on the surface or within the cell, but not both. As a result of this universal solubility, ALA can increase the positive effects of other antioxidants. The presence of ALA in cells helps preserve other levels, such as vitamin C, E, and glutathione, giving skin cells extra protection.
- ALA is the only antioxidant that can increase a cell's metabolism, which tends to slow down with aging. It helps the cell increase its energy production and capacity to heal.
- ALA plays a very special role when it comes to quelling inflammation, the condition that precedes lines and wrinkles. It prevents the cell from producing the types of eicosanoids (cytokines) that damage the cell in the first place. But it also does something else: It activates a factor within the cell that turns on enzymes that actually digest collagen that has already been damaged by free radicals. That is why the topical application of ALA results in remarkable fading and improvement in wrinkles and facial scars.
- ALA helps prevent the toxic effects of too much sugar in the cell. Excess cellular sugar attaches to just about every protein in the body in a process called glycation. When sugar attaches to collagen, it results in cross-linking of the collagen, which makes it stiff and inflexible—like a cooked egg white. Alpha lipoic acid helps reverse the attachment of sugar to collagen by allowing better metabolism of sugar by the cell, thus preventing the accelerated aging of collagen from sugar's toxic effects.
- ALA helps promote the healthy production of nitric oxide, a substance that helps control blood flow to the skin (which is also the basis for the effect of the drug Viagra®, increasing blood flow to the penis). This increased blood flow decreases swelling and edema, thus reducing under-eye puffiness. It also gives the skin the healthy glow of increased circulation.
- ALA helps decrease ruddiness and large pores for reasons that aren't clearly understood. Dr. Perricone hypothesizes that it may be connected to ALA's ability to increase



energy metabolism, which may normalize the secretions of sebaceous glands, thus resulting in smaller pores.

- DMAE (dimethylaminoethanol)

DMAE is an antioxidant found in abundance in fish. When mixed with nutrients and other antioxidants and applied topically, it can improve the appearance of sagging skin, which results not just from free radical damage to collagen, but also to the nerves and muscles underneath the skin. Muscle tone and contraction are caused by the release of neurochemicals, specifically acetylcholine, at the neuromuscular junction—the microscopic space where the nerve acts on the underlying muscle. Once aging begins, the amount of acetylcholine produced and its effect on the muscle is diminished. The only way to get firmer skin and stronger muscles underneath is to enhance the levels of active acetylcholine in the body. You can do this by changing your eating habits and using DMAE both internally and externally. Salmon is a great source of DMAE.

Topically applied [DMAE](#) works within minutes of application, its firming effect lasting for nearly 24 hours. Continued use results in firmer skin virtually wherever it's applied. DMAE also boosts the effects of other antioxidants and results in increased smoothness and reduction of fine wrinkles. DMAE works, in part, by interspersing with and becoming part of the cell membrane, where its antioxidant properties allow the membrane to resist stress more effectively, protecting it from the free radical damage that results in the breakdown of the plasma cell membrane and the resulting production of eicosanoids that cause skin inflammation.

Those who use DMAE topically report a leaner look as their facial musculature improves. Some even notice that it lifts the tip of the nose. In one of Dr. Perricone's studies on DMAE, all study participants reported a tighter, more toned appearance in the skin around their eyes after just a few days. DMAE complex applied to the lip area helps with fine lines and wrinkles in that area. It gives a firmer appearance to skin on other areas of the body, as well. DMAE preparations are typically available at cosmetics counters in better department stores.

- [CoQ-10](#) creams have been shown to reduce wrinkles and, like alpha lipoic acid, appear to help digest old damaged collagen. (See Reference 5, below.)
- Use a product containing at least two of the following topical antioxidants.

Research has shown that applying antioxidant vitamins and herbs to the skin can help repair or prevent free radical skin damage. Look for a product that contains one or more of the following: [Vitamin C](#) in a fat soluble form, green tea extract, [DMAE](#), Vitamin E, Vitamin A, Coenzyme Q-10, Boron nitrite, [Tocotrienols](#), [Pentapeptides](#).

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