

New Study Reveals a Fresh Antiaging Role for Vitamin C in Your Skin

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September 03, 2025

STORY AT-A-GLANCE

- › A study conducted by Tokyo Metropolitan Institute for Geriatrics and Gerontology shows vitamin C activates gene pathways that restore skin thickness and cell renewal. This helps reverse age-related thinning and loss of resilience
- › Researchers confirmed vitamin C works through TET enzymes to demethylate DNA, a process that removes chemical tags blocking gene activity. This process turns on “youth genes” that boost skin regeneration and structure
- › Vitamin C’s antiaging benefits extend beyond the skin, supporting collagen synthesis, antioxidant defense, immune modulation, cardiovascular health, and cognitive performance
- › Whole foods provide natural, bioavailable vitamin C. Best sources include citrus, kiwifruit, berries, broccoli, kale, and bell peppers
- › Combining these with healthy lifestyle habits, like safe sun exposure, restorative sleep, and minimizing toxin exposure, supports stronger, more resilient skin as you age

Your skin is more than just the surface you present to the world. It is a living, dynamic organ that shields you from environmental stressors, regulates temperature, and helps maintain your body’s delicate balance of fluids and nutrients. Beneath its visible layers lies a complex structure of cells, fibers, and biochemical processes working together to protect and renew themselves.

However, over time, natural aging, combined with everyday exposure to the elements, pollution, and other factors, gradually alters your skin's architecture. The layers thin, cell turnover slows, and the ability to maintain hydration and elasticity becomes less efficient. These changes build over decades, subtly reshaping the way your skin looks and feels.

Researchers have long recognized that certain nutrients play a vital role in supporting skin health throughout life. Vitamin C, in particular, has been widely studied for its contributions to skin renewal and protection. Now, a team from the Tokyo Metropolitan Institute for Geriatrics and Gerontology¹ has taken this understanding further, exploring how this essential nutrient influences the very processes that help skin preserve its youthful thickness and structure over time.

How Vitamin C Reactivates the Skin's Renewal Pathways

The featured study, published in the *Journal of Investigative Dermatology*, examined how vitamin C influences the genetic activity of skin cells. Using lab-made human epidermal models, researchers created conditions that resembled how skin receives nutrients in the body. These models were exposed to vitamin C at concentrations of 0.1 millimolar (mM) and 1.0 mM, which match what realistically reaches the skin from the bloodstream.²

- **Skin structure changes with vitamin C** – After seven days, the inner living layer of the epidermis, known as the epidermal cell layer, became significantly thicker in vitamin C-treated models, while the outermost layer of dead cells, the stratum corneum, showed no notable change in thickness.

By day 14, the stratum corneum became thinner in models treated with 1.0 mM vitamin C, and the epidermal cell layer continued to thicken. This pattern suggests that vitamin C actively promotes skin cell turnover and renewal, rebuilding the living tissue beneath the surface while refining the outer layer.

- **Boost in cell proliferation** – The treated skin samples also showed a marked increase in cell proliferation, which was confirmed through the presence of more Ki-67-positive cells, a protein marker found in the nuclei of actively dividing cells.

The increase indicated that vitamin C was not only maintaining existing cells but encouraging the creation of new ones, an important process for maintaining skin thickness, strength, and resilience over time.

- **Activation of "youth genes"** – On a genetic level, the researchers identified over 10,000 hypomethylated regions in the DNA of vitamin C-treated cells. Hypomethylation is the removal of methyl groups from DNA, which allows certain genes to become more active. In this case, the researchers identified 12 key genes involved in cell proliferation whose expression jumped dramatically, by amounts ranging from 1.6-fold to 75.2-fold.

These genes are important for driving the growth, renewal, and differentiation of skin cells, and the pattern of their activation led the team to describe them as "youth genes." This reflects their role in maintaining the epidermis in a state that is more typical of younger skin, when regeneration is faster and structural integrity is higher.

- **Epigenetic pathway through TET enzymes** – The mechanism came into sharper focus when researchers blocked TET enzymes – specialized proteins that remove methyl groups from DNA. Once TET activity was inhibited, vitamin C's effects on skin thickness, proliferation, and gene expression disappeared. This confirmed that the nutrient's impact was working through a TET-mediated DNA demethylation pathway, directly switching on genes needed for skin cell renewal.
- **A deeper dimension to skin support** – The ability of vitamin C to encourage keratinocyte proliferation through DNA demethylation makes it a promising approach for addressing thinning skin. According to lead researcher Dr. Akihito Ishigami:

"[Vitamin C] seems to influence the structure and function of epidermis, especially by controlling the growth of epidermal cells. In this study, we investigated whether it promotes cell proliferation and differentiation via epigenetic changes."³

For those aiming to maintain skin health, this research adds a new layer to what's known about vitamin C. The same renewal processes that keep skin youthful operate throughout the body, making vitamin C's antiaging benefits far more than skin deep and a cornerstone of whole-body vitality as the years pass.

Beyond the Skin – Vitamin C's Broader Antiaging and Health Benefits

While vitamin C's ability to support skin structure is drawing renewed attention, its influence on health extends far beyond the surface. This nutrient operates in nearly every tissue of the body, acting as both a biochemical catalyst and a protective agent, shaping the way your body adapts to daily stressors and the aging process. Some of its other benefits include:

- **Antioxidant defense against oxidative stress** – By neutralizing reactive oxygen species (ROS) and reactive nitrogen species (RNS), vitamin C helps protect lipids from peroxidation, proteins from structural changes, and DNA from mutations that accumulate with age. This protection is particularly important because oxidative damage is a central driver of cellular aging, contributing to functional decline in organs and tissues.⁴

Vitamin C also works synergistically with other antioxidants. It regenerates vitamin E from its oxidized form, sustaining lipid protection in cell membranes. This cooperative defense supports overall redox balance and is especially important in tissues with high metabolic activity, where ROS production is greater.⁵

- **Collagen synthesis and tissue repair** – Collagen is the body’s most abundant protein, creating the framework that gives skin, bones, cartilage, tendons, and blood vessels their strength and flexibility. Vitamin C is essential for enzymes that help collagen form its strong, stable triple-helix shape. Without adequate vitamin C, collagen fibers are weaker and less stable, leading to impaired wound healing, loss of tissue integrity, and increased fragility as you age.⁶
- **Immune system modulation** – As the immune system ages, its defenses become slower and less coordinated, making infections more common and recovery slower. Vitamin C supports immunity on multiple fronts, helping to counter some of these age-related changes. It boosts the production and activity of key white blood cells, such as neutrophils, lymphocytes, and phagocytes, which track and destroy harmful microbes.

When infections do take hold, vitamin C helps shorten their duration and lessen their severity. It helps regulate inflammation so the immune system can clear pathogens effectively without damaging healthy tissue, a balance that becomes increasingly important as the immune system’s precision declines over time.⁷

- **Neuroprotection and cognitive health** – Vitamin C is concentrated in the brain at levels far higher than in most other tissues, reflecting its importance in neural function. Research suggests that adequate vitamin C status may help slow age-related cognitive decline by preserving synaptic plasticity, reducing oxidative injury, and modulating inflammation in neural tissue. This combination supports memory, attention, and overall mental clarity well into older age.^{8,9}
- **Cardiovascular support** – As blood vessels age, their inner lining (the endothelium) loses some of its ability to respond to signals that tell the vessels to relax or constrict, making it harder to regulate blood flow and pressure effectively.¹⁰ Vitamin C helps offset these changes by boosting levels of nitric oxide, the key molecule that prompts vessels to relax, and by reducing oxidative stress that injures the delicate vascular lining.¹¹

By protecting and restoring endothelial function, vitamin C supports smoother blood flow and healthier blood pressure. Research links higher vitamin C intake to modest reductions in both systolic and diastolic pressure, as well as improved arterial compliance, meaning the vessels remain more flexible and adaptive. Over time, these effects reduce the risk of cardiovascular disease.¹²

To learn more about vitamin C's heart-protective properties, read "[Can Vitamin C from Fresh Foods Help Lower Heart Disease Risk in Type 2 Diabetes?](#)"

How to Boost Your Vitamin C Levels Naturally

Your body doesn't make or store vitamin C, so it depends entirely on your daily intake to meet its needs. While requirements vary, most adults do well with at least 200 to 400 milligrams per day.¹³ Supplements may be helpful in certain situations, but for long-term health and resilience, whole foods remain the most effective, balanced, and reliable source.

- **Center your diet on vitamin C-rich whole foods** — Whole foods not only provide vitamin C in its natural, bioavailable form but also deliver a wide array of companion nutrients that enhance its function and absorption. These include flavonoids, carotenoids, and other antioxidants that work together to create a more stable and sustained impact on the body. Excellent sources include:¹⁴
 - Oranges
 - Strawberries
 - Guava
 - Brussels sprouts
 - Lemons
 - Kiwifruit

- Bell peppers
- Kale
- Grapefruits
- Papaya
- Broccoli
- Spinach
- **Choose fresh fruits** – Vitamin C breaks down quickly when exposed to heat, light, and air, so opt for fresh or frozen produce over canned versions, which often lose nutrient potency during processing. For example, frozen strawberries retain more vitamin C than canned ones, as freezing preserves the nutrient better.¹⁵
- **Prepare vegetables thoughtfully based on gut health** – If your gut is compromised, whether from poor diet, microbiome imbalance, or digestive irritation, raw, vitamin C-rich veggies are hard to digest. In this state, their antinutrients and plant compounds may feed harmful microbes and aggravate symptoms.

Light steaming or gentle sautéing lowers these compounds and makes the vegetables easier to digest while preserving much of their vitamin C. As your gut function improves, introduce more raw vegetables into your diet to take advantage of their full nutrient content.

By prioritizing these strategies, a consistent intake of vitamin C from whole foods supports your skin health and helps slow the aging process effectively.

6 Additional Ways to Keep Your Skin Healthy as You Age

Aging skin reflects more than just the passage of time – it's a visible sign of cellular changes driven by oxidative stress, declining collagen production, and impaired mitochondrial function. While vitamin C plays a pivotal role in supporting skin renewal

and structure, maintaining youthful skin as you age requires a holistic approach that addresses both external and internal influences. Below are six practical tips to help you protect your skin from age-related decline:

1. Practice safe sun exposure – Sunlight is essential for skin health, as it stimulates vitamin D production, which supports skin cell growth and repair,¹⁶ and boosts mitochondrial melatonin, a powerful antioxidant.¹⁷ But your skin's tolerance to sunlight depends on your internal state, especially the types of fats stored in your tissues. If your body is still working to clear excess **linoleic acid** (LA), sun exposure requires more caution.

LA tends to accumulate in skin tissue and is highly prone to oxidation. When exposed to sunlight, it triggers inflammation and DNA damage, putting you at risk of sunburn. Hence, if your diet is rich in LA, avoid direct sunlight during peak hours (10 a.m. to 4 p.m.) until you've reduced LA intake for at least six months. This gives your body time to flush out some of the stored LA, lowering your risk of sun-induced skin damage.

To speed up this process, consider boosting your intake of C15:0 (pentadecanoic acid), a stable odd-chain saturated fat in full-fat dairy and butter.¹⁸ Most people get only about 10 to 200 milligrams of C15:0 per day. I personally take 2 grams daily. Learn more about this nutrient in "[The Fast-Track Path to Clearing Vegetable Oils from Your Skin](#)." For more tips on how to get safe sun exposure, read "[Beyond Vitamin D Production – How Sensible Sun Exposure Supports Overall Health](#)."

2. Prioritize collagen-rich foods and avoid seed oils – Incorporate bone broth, gelatin, or collagen supplements to boost glycine intake, a key amino acid in collagen's structure. At the same time, eliminate vegetable oils like canola or sunflower oil from your diet – these promote inflammation and oxidative stress that accelerate skin aging. Opt for healthy fats like grass fed butter or coconut oil instead.

3. Incorporate regular movement to support detoxification – Exercise enhances blood flow, delivering oxygen and nutrients to skin cells while promoting lymphatic drainage to remove toxins that contribute to aging. Research has shown that regular exercise increases blood flow to the skin, improves skin moisture, and elevates skin temperature. It's also been shown to improve skin structure and appearance by promoting mitochondrial biosynthesis and hormone secretion.¹⁹

Aim for moderate activities like walking or strength training for 30 to 60 minutes daily, avoiding excessive high-intensity workouts that cause oxidative stress. This not only supports mitochondrial energy production but also helps maintain skin elasticity and tone.

4. Minimize exposure to toxins – Everyday chemicals like bisphenols (from plastics) and phthalates (found in many cosmetics and fragrances) mimic hormones and interfere with the skin's natural renewal cycles, contributing to dryness, irritation, and premature aging.

Replacing plastic containers with glass and choosing personal care products made without synthetic additives helps reduce this burden. Simple changes like these create a cleaner environment for your cells to thrive.

5. Improve sleep and circadian rhythm to boost skin repair – Skin regeneration peaks during sleep, when cell turnover and collagen synthesis are most active. Disrupted sleep or irregular circadian rhythms weaken the skin barrier, slow healing, and increase inflammation, accelerating wrinkles and sagging.²⁰

Aim to get adequate, high-quality sleep nightly by maintaining a consistent bedtime routine, limiting blue light exposure from screens in the evening, and getting morning sunlight to reset your circadian rhythm. Keep your bedroom cool, dark, and quiet to enhance deep sleep, allowing skin cells to repair oxidative damage and maintain a youthful, radiant appearance.

6. Stay hydrated to support barrier function and detoxification – Proper hydration is important for maintaining skin elasticity and preventing trans-epidermal water loss, which contributes to dryness and fine lines as you age. Dehydration also impairs detoxification, allowing toxins to accumulate and stress skin cells.²¹

Drink pure filtered water throughout the day, and consider adding mineral-rich options like coconut water or a pinch of sea salt and lemon to support hydration at the cellular level.

Adopting these strategies directly addresses the cellular and environmental factors driving skin aging. Combined with a vitamin C-rich diet, these practices foster a vibrant, youthful complexion well into later years.

Frequently Asked Questions (FAQs) About the Antiaging Benefits of Vitamin C

Q: How does vitamin C help keep my skin looking younger as I age?

A: Vitamin C supports your skin's structure by promoting collagen production, enhancing cell renewal, and reducing oxidative stress. It helps maintain the thickness and elasticity of your skin, which tend to decline over time. The latest research also shows that vitamin C activates genes involved in skin regeneration, reinforcing its role in keeping your skin resilient and youthful.

Q: Can vitamin C really change how my skin cells behave?

A: Yes. The study from the Tokyo Metropolitan Institute for Geriatrics and Gerontology found that vitamin C triggers epigenetic changes in skin cells, specifically DNA demethylation, which reactivates genes responsible for cell growth and repair. These changes boost skin cell proliferation and help rebuild the deeper layers of the skin.

Q: What's the connection between vitamin C and collagen in my skin?

A: Vitamin C is essential for the enzymes that stabilize collagen's structure. Without it, collagen fibers become weak and disorganized, leading to skin thinning and loss of elasticity. By supporting collagen synthesis, vitamin C helps maintain firm, resilient skin.

Q: What are the other antiaging benefits of vitamin C beyond skin health?

A: Vitamin C supports multiple systems that decline with age. It protects cells from oxidative damage, modulates the immune system to improve infection control, helps maintain flexible blood vessels and stable blood pressure, and supports cognitive health by protecting brain cells from inflammation and oxidative stress. These actions make it a key nutrient for whole-body resilience as you age.

Q: What are the best natural sources of vitamin C I can include in my diet?

A: Top food sources include fresh fruits, such as oranges, lemons, grapefruits, strawberries, kiwifruit, and papaya, as well as lightly cooked veggies, such as bell peppers, broccoli, Brussels sprouts, kale, and spinach.

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