

Fountain of youth?

ANTI-AGING SKINCARE THAT'S MORE THAN A MARKETING PLOY

BY MADDY BENNETT

Tired of expensive skincare products that don't work? To get the most for your money, pare down your routine to the fundamentals. From retinoids to collagen supplements, here's what dermatologists recommend to boost skin health, minimize wrinkles, and spare your wallet.

Retinoids

"Retinoids are compounds derived from vitamin A," explains Michelle Wong, a chemist and author of *"The Science of Beauty."* "There's abundant evidence that they work for common skin-aging concerns like wrinkles and dark spots."

How do retinoids work?

"They stimulate collagen production and increase cell turnover," says Debra Jaliman, a clinical assistant professor of dermatology at the Icahn School of Medicine at Mount Sinai. "That improves skin texture, softens lines, and fades discoloration."

Skin aging isn't a disease that needs to be treated, but if you want to try a retinoid, you have a wide array at your disposal. They fall into one of two main camps—prescription or cosmetic.

Prescription retinoids. "They are more regulated and reliable than cosmetic retinoids," says Wong. That's because randomized trials have to show that they actually work.

Tretinoin (Retin-A) and tazarotene are FDA-approved prescription drugs for wrinkles.

"Tretinoin is the most studied and generally the most potent retinoid because it's already in an active form," says Jaliman. (Unlike other retinoids, skin cells can use tretinoin without

first converting it to active vitamin A.)

"If you have significant sun damage or deeper wrinkles, prescription retinoids like tretinoin often provide more dramatic results," says Wong.

But "dramatic" doesn't mean "miraculous." While tretinoin is the best topical on the market for reducing signs of visible aging, it's no fountain of youth. (A "topical" is a product that you apply to your skin.)

In an analysis of eight randomized trials in 1,361 adults, those using tretinoin for up to two years saw only modest reductions in fine and coarse wrinkles compared to those using a placebo.¹ (Some of the trials were funded by pharmaceutical companies.)

What's the downside of retinoids?

They're notoriously irritating, though that lessens with time. To minimize irritation, "start by applying a retinoid just two to three nights per week, then increase the frequency as tolerated," says Jaliman. Going overboard risks peeling, redness, burning, itchiness, or dryness.

Got severe eczema, rosacea, or sensitive skin? Prescription retinoids may not be a fit for you, says Jaliman.



Retinoids, the "gold standard" among topical anti-aging ingredients, should be applied at night because most aren't stable in sunlight.

Cosmetic retinoids. If your skin is sensitive, consider gentler retinoids like retinol, retinaldehyde (aka retinal), and retinyl esters. They're regulated as cosmetics (not drugs), so you can find them in over-the-counter lotions, creams, and serums.

"Retinal and retinol are potentially the most effective, though they tend to be less stable and are the most irritating of the cosmetic bunch," says Wong.

If your skin is especially sensitive, or if you're already using other irritating skincare ingredients (like alpha hydroxy acids or vitamin C), consider an ester: Look for retinyl retinoate, retinyl palmitate, or retinyl acetate among the ingredients.

"There's a lot less evidence for them," says Wong, "but they seem to be a lot gentler."

One challenge with cosmetic retinoids: finding a stable, potent product. Some are carefully tested and some aren't, Wong notes. Her advice: "Go for a brand that invests a lot in research and development."

Neutrogena, RoC, L'Oréal, Olay, and other multinational brands are typically safe bets, she adds.

A few words of caution for cosmetic (or prescription) topical retinoids:

■ **Apply them at night.** Most retinoids break down in the sun.

■ **Wear sunscreen during the day.** Retinoids can make your skin burn more easily.

■ **Don't use during pregnancy.** Retinoid pills can cause birth defects like cleft lip and heart deformities. While it's not clear if topical retinoids can, too, it's safest to avoid both.

Alpha hydroxy acids

As we age, our skin cells turn over (i.e., replenish themselves) at a slower pace. Enter chemical exfoliants like alpha hydroxy acids.

"They help remove dead skin cells, which increases turnover," says Jaliman. "That can brighten dull skin, even out dark spots, smooth rough-

ness, and stimulate some collagen production."

If your skin could use that kind of pick-me-up, consider an alpha hydroxy acid. Look for a serum, cleanser, lotion, or at-home peel with ingredients like glycolic acid, lactic acid, or mandelic acid.

"Glycolic acid penetrates best because it has the smallest molecular size," says Jaliman. But that can make it more irritating.

"Lactic acid is often gentler and also hydrates skin," she adds. Both seem to work equally well.

In one trial (funded by a skincare company), researchers randomly assigned 67 middle-aged and older women to apply an 8% glycolic acid cream, an 8% lactic acid cream, or a cream without either acid twice a day to their faces and outer forearms.²

After 22 weeks, more than 70% of those using either acid-containing cream showed modest improvements (determined by the researchers) in signs of visible aging like skin yellowing and roughness, while just 41% of those using the placebo cream showed improvement.

Got acne-prone or sensitive skin? Mandelic acid could be easier to tolerate, Jaliman notes.

The downside of chemical exfoliants: with overuse, "they can cause irritation, redness, dryness, and increased sensitivity to sunlight," Jaliman cautions. And that can be a particular problem for people with darker skin.

"Too much irritation can trigger post-inflammatory hyperpigmentation—discoloration that's more visible in deeper shades of skin and that can take months to years to fade," she notes.

Most people can tolerate using a leave-on chemical exfoliant every day (as opposed to a more potent at-home peel that you wash off) if the concentration is 20% or lower. Just make sure to wear sunscreen outdoors, since



Serums are popular formulations for alpha-hydroxy acids and topical vitamin C.

sunlight can worsen irritation and hyperpigmentation.

If you have rosacea or sensitive skin, Jaliman suggests picking a product with a lower concentration or skipping exfoliants altogether.

Topical vitamin C

"Vitamin C is an antioxidant, so it can soak up free radicals that damage skin," says Wong.

Free radicals? They're compounds that, in high amounts, drive harmful inflammation and speed up aging. Our bodies make them every day, but that can kick into overdrive in response to ultraviolet light from the sun. Air pollution and cigarette smoke are other common sources.

"In the short term, a vitamin C product can reduce skin redness and burns caused by sunlight," says Wong. Long term, "it may lessen the damage that leads to signs of aging, like dark spots, fine lines, and wrinkles." It's also essential for building collagen and it helps even out skin tone, Jaliman adds.

Vitamin C comes in many forms. L-ascorbic acid is the most studied and may be the most potent, says Wong. (We'd need more research on the other forms to know for sure.)

In one small study, 19 middle-aged

Daily routine

"You don't need a complicated routine or expensive products to see results," says Jaliman. Here's what she recommends.

► IN THE MORNING

- Gently cleanse your face to remove sweat, oil, and dead skin cells that have accumulated overnight. Use a product intended for the face rather than a harsh soap (like one made for hand-washing). Got dry skin? Simply rinse your face with lukewarm water.
- Apply a vitamin C or alpha hydroxy acid serum.
- Apply a moisturizer with ingredients like ceramides, hyaluronic acid, glycerin, or niacinamide, which improve skin hydration and strengthen the skin's barrier.
- Slather on a broad-spectrum sunscreen with SPF 30 or higher (or use a moisturizer with SPF).

► IN THE EVENING

- Cleanse your face. (You can use the same cleanser you used in the morning.)
- Dry your skin, then apply a pea-sized amount of your preferred retinoid. (Retinoids penetrate deeper if your skin is wet, but that also increases the risk for irritation.) Use the retinoid every night (or less often if you don't tolerate it nightly).
- Moisturize again. You can use the same moisturizer for morning and nighttime, or a thicker cream at night if you have dry skin.

"Some studies suggest that topical estrogens—namely estriol and estradiol—may boost skin thickness and improve hydration, elasticity, and fine wrinkling," says Jaliman.

Estriol is a weaker form of estrogen than estradiol, but both worked equally well for skin aging when they were pitted head-to-head, says Marmon.

In the one randomized trial that

tested both, 58 middle-aged and older women applied either a 0.01% estradiol cream or a 0.3% estriol cream to their faces every day.⁴ After six months, those in both groups showed marked improvements in skin wrinkling, hydration, firmness, and collagen density. But the estrogens weren't tested against a placebo.

Estriol and estradiol also haven't been tested against the gold standard (retinoids), but one six-month trial pitting a 0.01% estradiol cream against a 15% glycolic acid alpha hydroxy acid cream in 30 postmenopausal women found similar anti-aging benefits.⁵

Evidence remains scarce for other estrogens, like estrone and the conjugated equine estrogen Premarin.

If your primary skin concern is dark marks, topical estrogens may not help. Loss of estrogen is mainly linked with skin dryness and thinness, not discoloration, says Marmon. Discoloration was even reported as a side effect in some topical estrogen trials.

And be wary of estrogen creams that you can get without a prescription. They often have even less data behind them, Marmon cautions.

Are topical estrogens safe?

Taking estrogen systemically for symptoms of menopause appears to be more beneficial than harmful for women under 60 or those who've been in menopause for less than 10 years.⁶

That said, too much estrogen can increase the risk of breast cancer, uterine cancer, and blood clots. (Age, years of use, health history, and other factors matter to your risk level.)

Topical estrogen creams applied vaginally appear to be safe because systemic absorption is minimal. Does that mean topical estrogens for skin aging are also safe?

"The studies we have are small and not designed to assess long-term safety," Marmon cautions. Safety likely boils down to the product, dose, size of the area you're treating, and how long you use it for, she adds.

women applied a 5% L-ascorbic acid cream to one side of their upper chest and a placebo cream to the other side every day.³ After six months, skin treated with L-ascorbic acid had improved in wrinkling and hydration compared to skin treated with the placebo. (One of the study's coauthors was employed by La Roche Posay, the maker of the L-ascorbic acid product used in the study.)

One drawback to L-ascorbic acid: it degrades easily. So look for products that contain stabilizers like vitamin E and ferulic acid, says Wong.

Those formulations can be more irritating, though. If that's a deal-breaker, opt for a gentler, more stable form of vitamin C like tetrahexyldecyl ascorbate, ascorbyl glucoside, or magnesium ascorbyl phosphate, says Jaliman. Just know that they haven't been as well studied.

Concentrations between 10% and 20% are optimal for any vitamin C formulation, says Jaliman. And whatever one you choose, "look for opaque, airtight packaging, because vitamin C degrades with exposure to light and air." Containers with pumps are more airtight than those with lids or droppers.

If your product is orange or brown, says Jaliman, "it's likely oxidized and may no longer be effective."

Topical estrogen

"Estrogen is thought to play a role in maintaining skin's collagen, thickness, hydration, and elasticity," says Shoshana Marmon, an assistant professor of dermatology at New York Medical College. That's why the sharp decline in estrogen during menopause can help drive facial aging.

Prescription estrogen gels are FDA approved for hot flashes, and estrogen creams are approved for vaginal symptoms like dryness. Though they haven't been approved for skin aging, both are sometimes prescribed "off label" to women for that purpose.

Can topical estrogen turn back the clock on our skin's appearance?

Though most studies haven't shown concerning changes in hormone levels in the blood, at least one study flagged an increase in blood estrogen levels in those using 0.2% topical estrogen for skin aging.⁷

Some participants in other studies have reported breast tenderness, a possible sign of too much estrogen

exposure, Jaliman adds.

Her take: If you have a history of estrogen-sensitive cancers (like most uterine and breast cancers) or blood clotting disorders, topical estrogen for skin aging isn't worth the risk.

The bottom line: Topical estrogens come with safety concerns and may not be more effective than mainstays

like retinoids, vitamin C, and alpha hydroxy acids.

¹ *Dermatol. Pract. Concept.* 15: 5172, 2025.

² *Arch. Dermatol.* 132: 631, 1996.

³ *Exp. Dermatol.* 12: 237, 2003.

⁴ *Int. J. Dermatol.* 35: 669, 1996.

⁵ *Cutis* 71: 481, 2003.

⁶ *JAMA Intern. Med.* 185: 1330, 2025.

⁷ *Arch. Dermatol.* 144: 1129, 2008.

Do collagen supplements improve wrinkles?

WHAT IS COLLAGEN?

It's one of the most abundant proteins in our bodies, and it "adds bulk and plumpness to skin," says Wong.

Collagen production declines with age, especially after menopause, says Jaliman. That leads to fine lines, wrinkles, and sagging.

Gone are the days of collagen injections (they're no longer en vogue due in part to allergy risks). Now, collagen supplements like powders and pills are all the rage. But can they firm aging skin?

Maybe.

Like all proteins, collagen is made up of amino acids, but it has one called hydroxyproline that most other proteins lack, says Wong.

In fact, more than 99% of the hydroxyproline in the body is in collagen.¹ And that may matter.

HOW MIGHT COLLAGEN SUPPLEMENTS WORK?

When you take a collagen supplement, small fragments (known as collagen peptides, hydrolyzed collagen, or collagen hydrolysate) pass into your bloodstream intact.²

While those fragments don't provide the building blocks for your body to make more collagen (a common misconception), they may act as a *signal* to build new collagen.

That's where hydroxyproline comes in. "Your body may detect the hydroxyproline-rich fragments



Don't expect an anti-aging miracle from collagen supplements.

from the supplement and think your own collagen is breaking down, prompting your body to build more," Wong explains.

So why not just eat your way to fewer wrinkles by consuming collagen-rich foods like brisket, skin-on fish, or tripe?

If only it were that easy.

Collagen supplements are typically hydrolyzed, which means that the collagen protein has been broken into fragments that are easy to absorb. That's not the case with the collagen in food.

SHOULD YOU TRY COLLAGEN?

The evidence for collagen's skin benefits is mixed, says Jaliman.

In an analysis of 14 randomized trials that included 967 adults (mostly women), participants who took 1 to 10 grams a day of hydrolyzed collagen saw moderate im-

provements in skin hydration and elasticity and slight improvements in wrinkles after 4 to 12 weeks compared to those who took a placebo.³

But overall, the benefits seen in collagen trials—many are low quality and/or industry funded—appear modest, at best (especially for something that's going to set you back a couple of dollars for each daily dose). What's more, there is no long-term safety data.

If you want to try a collagen supplement, though, look for brands with low-molecular-weight varieties like Verisol. That means the collagen fragments are smaller and may be more likely to work. And check for a quality assurance seal from NSF, ConsumerLab, or USP.

Just be alert for possible side effects like allergic reactions, bloating, or nausea. If you have a fish or shellfish allergy, avoid fish-based (marine) collagen. And people with alpha-gal syndrome should stay away from beef (bovine) or pork (porcine) sources of collagen.

Jaliman's bottom line: "Collagen supplements are not a miracle anti-aging treatment," but may offer subtle anti-aging benefits. 📌

¹ *J. Nutr.* 147: 2011, 2017.

² *J. Agric. Food Chem.* 53: 6531, 2005.

³ *Cureus* 15: e50231, 2023.