Meta description: How retinol and tretinoin work inside the skin. The science behind the most studied ingredient in skincare.

SEO keywords/phrases: r

retinoids, best retinol,
what does retinol do,
what is retinol,
retinol vs tretinoin,
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cell turnover,
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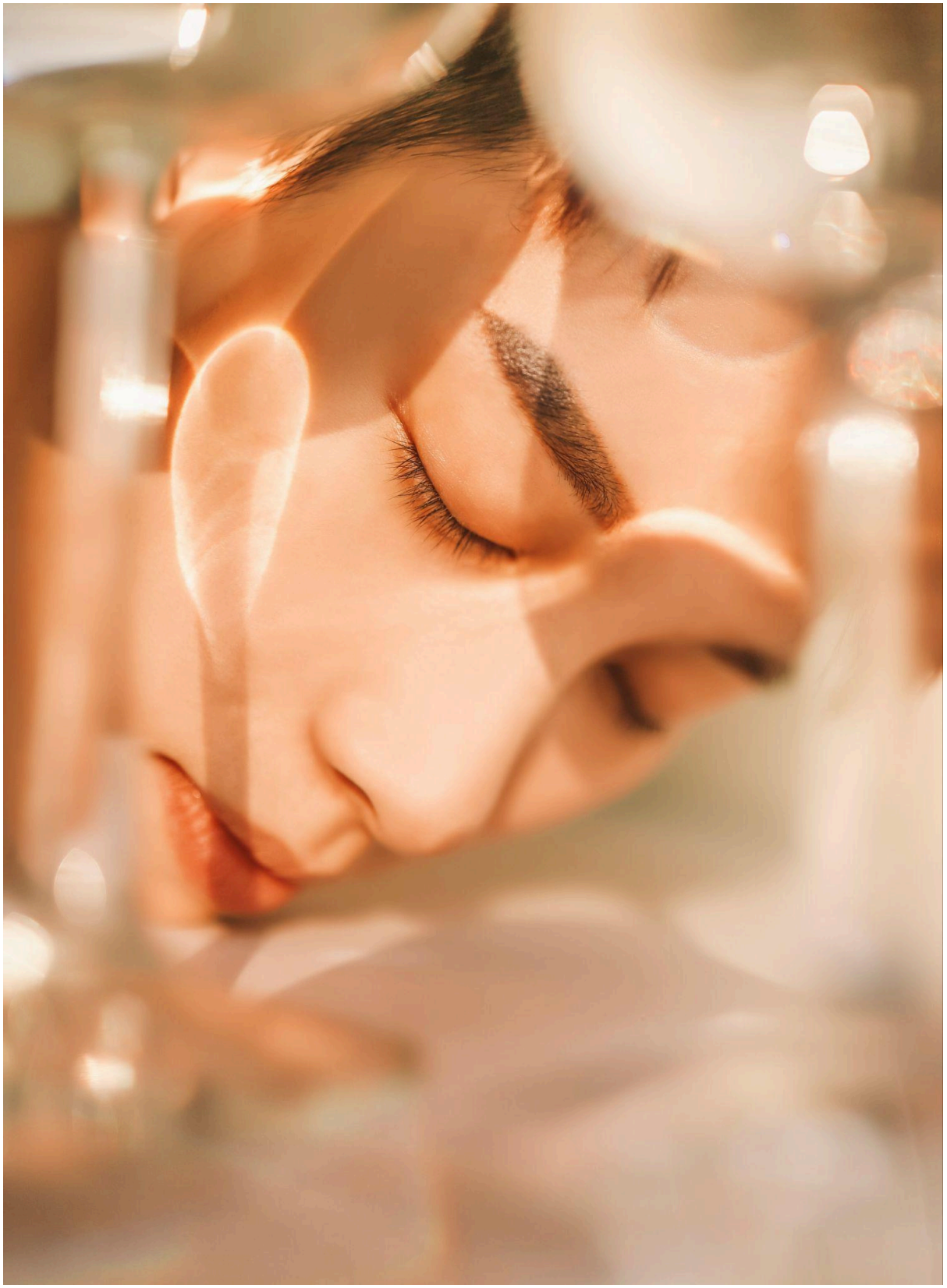
retinol side effects,
retinol purge,
retinol vs retinoid,
is retinoid the same as retinol

Word count: 1047

Goal: Drive organic traffic via search; position XXXXXX as a knowledgeable voice in skincare science

Audience: Skincare-engaged women in their late twenties to forties who already use or are considering retinol and want to understand it properly rather than just follow a recommendation. Beauty and skincare enthusiasts who follow the ingredient-led skincare conversation.



How do retinoids *actually* work?

The most talked-about ingredient in skincare, explained from the inside out. A look at what retinol actually does inside the skin.

Retinoids are vitamin A derivatives. Retinol is the most basic form of vitamin A. It is found naturally in animal products like dairy and eggs, the body also produces it by breaking down beta-carotene from plant foods like leafy greens and carrots. It contributes to the immune system, vision, and plays a crucial role in skin health. But we can't visibly reduce fine lines and uneven skin simply by eating lots of carrots. We would go orange before we notice any difference (the author can validate this claim via experience). Through diet alone, the body receives vitamin A concentrations too low to have a targeted effect on the skin. Applying it directly is far more effective.

Retinol vs tretinoin

When absorbed into the skin, retinol breaks down to create retinoic acid. The pharmaceutical name for this retinoic acid is **tretinoin.** This is the active ingredient, the molecule that does the work. Retinol is a cosmetic ingredient, whereas tretinoin is technically a drug because it triggers a direct biological response. Retinol needs to be broken down by the body first. Its potency is limited by enzymes in the skin becoming saturated. Tretinoin bypasses this regulatory system, and the cells receive it at concentrations that the conversion process could never achieve. The reaction may be both desirable and damaging, which is why tretinoin is not available over the counter.

How does it work?

Retinoic acid travels into the nucleus of the skin cells. In the nucleus, it binds to the receptors that directly regulate gene expression, switching particular genes on and off. The cell responds by producing more of the various proteins that benefit the skin.

What does it do?

Increases collagen and elastin production

Collagen and elastin are both secreted by skin cells. They self-assemble outside the cell to form collagen and elastin fibrils. These give the skin its strength, resistance, and stretchiness. Youthful skin is firmer and more bouncy than older skin due to having more collagen and elastin. Retinoic acid causes the skin cells to secrete more of these proteins.

Increases skin-cell turnover

The skin is like a conveyor belt of cells called keratinocytes. Within the basal layer, the deepest part of the epidermis, these cells divide to produce more cells. Keratinocytes contain structural proteins called keratins. Unlike collagen, these structural proteins remain within the cells. As skin cells rise through the epidermis, towards the surface of the skin, they change and produce different sorts of keratin, more rigid keratins. By the time keratinocytes get to the end of the conveyor belt, the surface of the skin, they are almost entirely keratin. Retinoic acid facilitates faster cell division in the basal layer. It also regulates the switch between different keratin types as the cells move upwards through the epidermis. This leads to an improved quality of the outer layer of the skin

Slows collagen from being broken down by the body

Matrix metalloproteinase enzymes break down collagen in the extracellular matrix. This process is important for healing, but these enzymes can get a bit out of control in aged and sun-damaged skin, causing the matrix to be dismantled faster than it's built. Retinoic acid leads to an increase in matrix metalloproteinase inhibitors, the proteins that keep these enzymes under control. So, retinoic acid not only leads to more collagen being created, but it also helps to maintain the collagen in the skin.

Maintains skin hydration and plumpness

Retinoic acid also stimulates hyaluronic acid production. Hyaluronic acid attracts water molecules. It keeps the skin hydrated and plump.

Regulates melanin production

Retinoic acid suppresses the enzyme that produces melanin, melanin is the pigment that gives skin its colour and protects it from UV damage. Faster cell turnover also means pigment-loaded cells are shed more quickly. So dark spots fade gradually over months, not because the pigment is bleached out, but because less is being made and what's already there clears faster.

The combined effects of all the above make retinoids the gold standard for skin longevity. Providing consistent use, skin texture smooths in four to six weeks, skin

tone evens in three to six months, and fine lines and acne scars improve after six to twelve months. There are, however, some caveats worth knowing about.

Cautions

There is an adjustment period (“purging”)

During this period, the skin may get spotty, red, and flaky. Microcomedones (pores filled with dead skin cells and sebum) that would take weeks to reveal themselves as spots come to the surface much more quickly and all at once, due to increased skin cell turnover.

It’s not suitable for everyone

People with sensitive skin may find even low concentrations of retinoids too troublesome to tolerate. Allergic reactions and contact dermatitis may occur, in which case retinoid use must stop at once to prevent further damage to the skin barrier. Purging may mask these adverse reactions and make it difficult to identify what’s actually happening. If the skin is still inflamed after four to six weeks, retinoid use must stop.

It’s not safe for pregnant women

Pregnant or breastfeeding women should not use retinoids due to the risk of vitamin A toxicity affecting the baby.

Sun-sensitivity increases with use

Faster skin cell turnover means newer skin cells lie on the surface of the skin; these cells are less tolerant to UV exposure and far more vulnerable to sun damage. When using retinol or tretinoin, SPF usage must be rigorous.

Final word

For those who can tolerate it, retinol remains one of the few skincare ingredients where the substance lives up to the hype. It has been in dermatology for more than fifty years and has held its place on skincare shelves for more than thirty, surviving trends that have come and gone around it. The evidence is plentiful, and the effects show up in skin in ways few other ingredients can match.