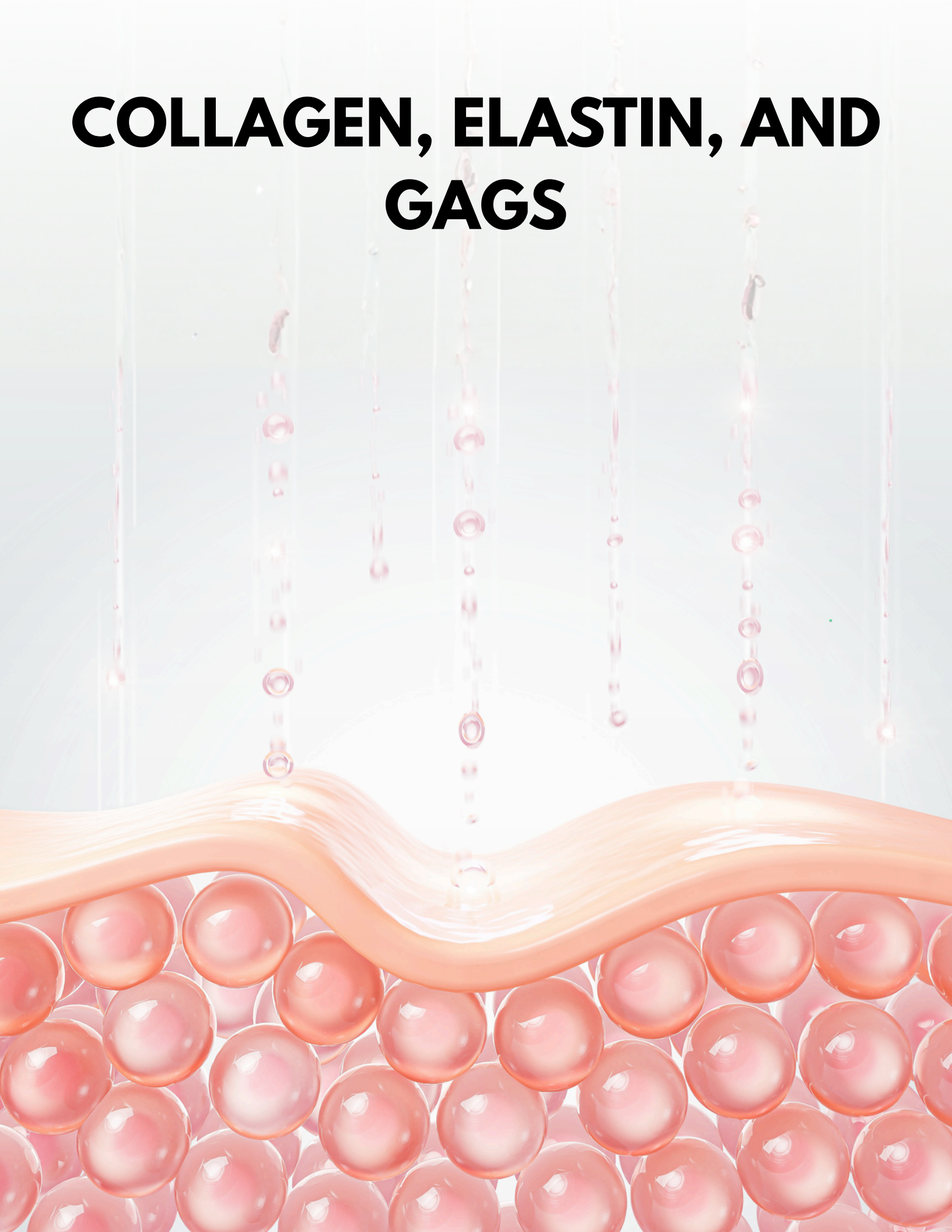
COLLAGEN, ELASTIN, AND GAGS



Collagen

Collagen is the main structural protein in the skin that gives it strength and firmness. It acts like a support network that keeps the skin lifted and stable. I like to think of it like the stuffing inside a teddy bear. With plenty, it stays plump and holds its shape. With less, it begins to lose its shape and firmness.

As collagen naturally declines over time, the skin loses its structural support. This leads to a gradual softening of firmness, where fine lines start to deepen and the skin no longer feels as tight or resilient as it once did.

Collagen production declines naturally starting in the mid-20s, dropping by about 1%–1.5% per year, with an acceleration in loss after age 40 and a significant, rapid drop during menopause. Women lose up to 30% of their skin collagen within the first five years of menopause, with a further 2% decline each year after.

What you can do

Supporting collagen production is less about finding a single solution and more about consistently protecting existing collagen while encouraging the body to produce new fibers. One of the most important steps is sun protection, since UV radiation is the number one driver of collagen breakdown. Daily use of a broad-spectrum SPF helps preserve the collagen you already have by preventing this damage before it starts. Certain topical ingredients can also help stimulate collagen synthesis. Retinoids like retinol or tretinoin are well-studied for increasing collagen production and improving skin structure over time. Vitamin C is also essential because it acts as a cofactor in collagen formation and helps stabilize existing collagen, while peptides may support repair signaling pathways in the skin that encourage remodeling and strengthening of the dermal matrix.

At the same time, it’s important to reduce factors that accelerate collagen breakdown. Chronic inflammation speeds up aging processes in the skin, and lifestyle factors play a major role here. High sugar diets can contribute to glycation, a process that stiffens and damages collagen fibers. Smoking significantly accelerates collagen degradation, and unmanaged stress may also contribute indirectly through inflammatory pathways and hormone fluctuations that affect skin repair. On the supportive side, the body also needs adequate building blocks to create collagen in the first place, including enough dietary protein for amino acids like glycine, proline, and lysine, as well as nutrients like vitamin C, zinc, and copper that act as essential cofactors in collagen synthesis and cross-linking.

Collagen Supplements

Collagen supplements are often marketed as a direct way to “rebuild” skin collagen, but the reality is more complex. When you consume collagen in powder or gummy form, your digestive system breaks it down into amino acids and smaller peptides, just like any other protein source. These components are then distributed throughout the body and are not specifically directed to the skin. While those amino acids can technically be used to build new collagen, they are also used for many other essential functions in the body, such as muscle repair and organ maintenance. Some research does show modest improvements in skin hydration and elasticity with hydrolyzed collagen peptides, but these effects tend to be subtle and vary depending on the individual, overall diet, and skincare routine. Because of this, collagen supplements are best thought of as a general protein support rather than a targeted or guaranteed way to rebuild skin collagen.

Topical Collagen Products

Topical collagen is another heavily marketed ingredient, but it’s important to understand its limitations in a realistic way. Collagen molecules are too large to penetrate the skin barrier, which means when you apply collagen directly in creams or serums, it does not actually reach the dermis where your body produces and stores collagen. Because of this, topical collagen cannot directly “replace” or rebuild lost collagen in the skin.

Because of this, topical collagen is best viewed as a hydrating, skin-conditioning ingredient rather than a collagen-boosting treatment. If the goal is to actually stimulate collagen production and remodel the skin long-term, ingredients like retinoids, vitamin C, peptides (specific signaling peptides, not just collagen itself), and consistent sun protection are far more effective.

Elastin

Elastin is one of the key proteins in your skin that helps it stay flexible and “bounce back” after movement. Collagen is what gives skin firmness and structure, and elastin is what allows it to stretch and return to place. Think of it like the air in a basketball. It helps the ball to bounce back, but over time it loses air, thus losing its ability to bounce back.

Over time, just like collagen, elastin naturally declines.;however, the important difference is that elastin is not easily replaced once it is damaged, which is why changes in skin elasticity can become more noticeable with age.

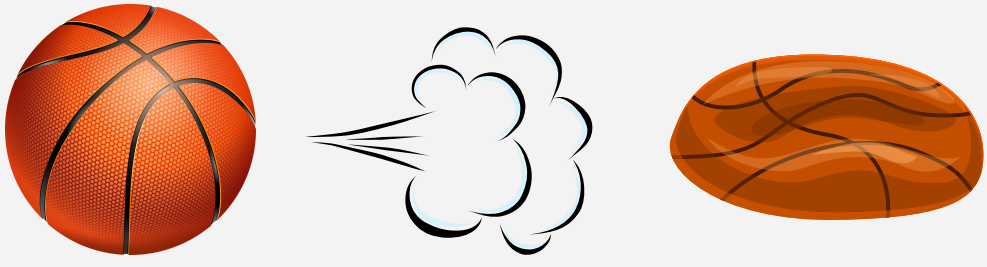
The biggest factor that breaks down elastin over time is sun exposure. UV rays slowly damage the skin’s deeper structure and can lead to disorganized, weakened elastin fibers. This is what contributes to that leathery texture or “loss of bounce” that can develop in chronically sun-exposed skin. Other lifestyle factors like smoking, chronic inflammation, oxidative stress, and high sugar intake can also speed up this breakdown process by weakening the skin’s support system over time.

What you can do

When it comes to supporting elastin, the focus is much more on *protecting* what you already have rather than trying to *rebuild* what’s been lost. Daily sunscreen use is one of the most important steps because it helps prevent UV damage before it impacts the skin’s structure. Antioxidants like vitamin C can help defend the skin against oxidative stress, and ingredients like retinoids can support overall skin renewal and collagen health, which indirectly helps maintain a stronger, more supported dermal structure. Healthy lifestyle habits: like not smoking, managing inflammation, and supporting stable blood sugar also play a big role in slowing down elastin breakdown over time.

Topical Elastin Products

It’s also important to understand that topical “elastin” in skincare products does not rebuild elastic fibers in the skin. Elastin molecules are too large to penetrate deeply enough to actually replace or repair the structural network in the dermis. Instead, these ingredients mainly provide surface hydration and skin-conditioning benefits, which can temporarily make skin feel smoother or more hydrated, but they don’t change the underlying elasticity.



Glycosaminoglycans

Glycosaminoglycans (often shortened to GAGs) are a group of naturally occurring molecules in the skin that play a major role in hydration, plumpness, and overall skin resilience. They are found in the dermis and work like “water magnets,” drawing and holding moisture within the skin.

One of the most well-known GAGs is hyaluronic acid, which is responsible for that hydrated, supple, bouncy look in healthy skin. While collagen provides structure and elastin provides elasticity, GAGs are what help keep the skin hydrated and cushioned so those structures function properly.

As we age, the *levels* and *quality* of GAGs in the skin naturally decline. This leads to a gradual loss of hydration and volume within the dermis, which can make fine lines more noticeable and contribute to a thinner, less plump appearance. Environmental factors like UV exposure, chronic inflammation, and oxidative stress can also accelerate the breakdown of these molecules. When GAG levels are reduced, the skin not only becomes drier but also less supported overall, since water content plays a key role in how “full” and resilient the skin looks and feels.

Supporting GAGs is very achievable through both skincare and lifestyle. One of the most effective topical ingredients is hyaluronic acid, which helps bind water to the skin and temporarily restore hydration and plumpness. Other humectants like glycerin and panthenol also support moisture retention and barrier health. Ingredients that reduce inflammation and strengthen the skin barrier, such as ceramides and antioxidants, indirectly help preserve GAG function by creating a healthier environment for hydration to be maintained. Internally, adequate water intake and a nutrient-rich diet also support the skin’s ability to maintain balanced hydration levels.

Unlike collagen and elastin, GAGs are much more responsive to topical support, meaning their effects can be seen more quickly in terms of hydration and plumpness. However, it’s important to understand that most topical GAG-supporting ingredients, like hyaluronic acid, work within the upper layers of the skin and do not permanently increase the skin’s natural production of these molecules. Instead, they help temporarily restore moisture balance and improve the appearance and feel of the skin while they are present.

Overall, glycosaminoglycans are essential for maintaining a hydrated, youthful complexion because they directly influence the skin’s moisture levels and softness. While they naturally decline with age, they are one of the most responsive components of the skin when it comes to topical support, making consistent hydration-focused skincare a key part of maintaining healthy skin function over time.