

Collagen Supplement Fad

by Ann Gerhardt, MD November 10, 2019

Bottom Line at the Top: There are many health claims for collagen supplements, but the most they likely do is add protein to the diet.

Collagen supplement sales have doubled since 2016, generating billions of dollars for their manufacturers every year. And why not? It's a natural protein, made by our bodies in large amount. There are at least 16 types of collagen. As a group they are the most abundant proteins in the animal kingdom.

Collagen is largely responsible for the body's structural support in skin, bones and joints. We make less of it with age, contributing to saggy skin, weak bones and degenerated joints.



Some people lose more collagen than others. Sun-damaged skin cells have much less capacity to make collagen, making skin loose and papery thin. Smoking and air pollution exposure prematurely age skin also, likely due to excess collagen break-down caused by inflammation.

Hoping to fend off aging, people gravitate to supplements to undo the effects of too many birthdays. Americans like supplements and Boomers will pay to mitigate the appearance of aging.

Commercial interests have obliged with a slew of collagen supplements. Their marketing promotes it for

athletic success, joint health, shiny hair, strong nails and firm skin with fewer wrinkles.

Science so far doesn't justify these claims. Most studies have been small, uncontrolled and funded by collagen supplement manufacturers, likely introducing bias. Some tested products are mixtures, making it impossible to know which ingredient was responsible for any observed effects.

Supplement users assume that a product is absorbed into the body unchanged, tracks to body parts where it is needed and corrects the problem. **None of this is true for collagen.**

Collagen is a large protein that doesn't dissolve in water. That's why it doesn't leach out of our skin and bones over time. Our intestine cannot absorb any large intact protein, let alone one that is insoluble in digestive fluids and blood.

Supplements consist of collagen chemically reduced to smaller pieces. The label will say 'hydrolyzed.' Even these partial protein pieces require digestion into even shorter pieces called peptides that the intestine is capable of absorbing.

What eventually makes it into our bloodstream are tiny sections of the collagen protein. There is no guarantee that they will magically find each other and re-bond into intact collagen and home in on degenerated skin and joints, making them young again. **Ingesting collagen doesn't lead to depositing collagen where it is needed.**

Perhaps there is an alternative – something special about collagen peptides that boosts the body's own collagen production. Collagen consists of most of the usual amino acids, minus cysteine and tryptophan. What makes it special is its hydroxy-proline content. This amino acid is absent from almost every other protein in the body. It is crucial for collagen function in that it enables the twists that make collagen a stiff fibril (a sort of stringy piece).

So, might collagen supplements be effective by boosting our readily available supply of hydroxyproline? The answer is No. There is no circulating supply of

hydroxyproline, even after eating meat or taking a supplement, because it is very quickly degraded in the body.

There is also no way for skin, bone or cartilage cells to incorporate preformed hydroxyproline into collagen. Here's how it is normally accomplished: Cells make immature collagen protein containing a lot of amino acids called proline. While still inside the cell, enzymes convert those prolines into hydroxyproline. The collagen proteins then twist together into a helix and are extruded out of the cell, where further modifications make the collagen solid.

Hydroxyproline from meat or a collagen supplement can't boost collagen synthesis.

There ARE ways to optimize your cells' capacity to make collagen. Avoid sun, tobacco, pollution and oxidant damage. Optimize the diet with the nutrients necessary to make mature collagen. These are vitamins C, A and K, amino acids from protein foods, adequate calories and basic nutrients to fuel the process and enable protein synthesis, oxygen and iron. These are all necessary but, by themselves, will not boost collagen production unless their deficiency was causing the collagen deficiency.

Are collagen supplements safe? Most supplements contain collagen from cows and fish. Plants don't make collagen. So far, reported side effects from these supplements include stomach upset and rash. If the product comes from fish it may contain excess calcium, a potential risk for some.

Some dermatologists and consumer groups worry that ground up hooves, hides and body parts may contain heavy metals, toxic contaminants or viruses like the one that causes mad cow disease. The Food and Drug Administration has restricted collagen production from certain high-risk body parts, but, as with all "natural" supplements, there is no mandated testing or guaranteed safety.

I usually suggest that people eat the foods that we need to make collagen, like meat, fish, eggs, gelatin, poultry, fruits and vegetables. These, rather than spending extra money on supplements, also provide additional nutrients necessary for a healthy body. Avoiding exposure to inflammation triggers, like sun, tobacco products and air pollution will also help.¶