

MCFIP - The epigenetic activities of collagen are included in this document.

<https://theconversation.com/collagen-in-your-coffee-a-scientist-says-forget-it-122766>

Collagen in your coffee? A scientist says forget it

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Collagen products are popping up everywhere. While collagen is probably most well known for its touted skin care benefits and as a major component of lip enhancers and injections, some celebrities, like [Kourtney Kardashian](#), are suggesting that people drink it. Products derived from collagen are not just in skin creams and dietary supplements but even in [pillow covers and clothing](#). Kardashian is [even selling](#) collagen supplements.

Collagen is the body's most abundant protein, made up of [amino acids](#), or peptides. It literally glues our bones, cartilage, skin and blood vessels together. It's what makes our tissues grow, mature and move. Its presence under your skin can keep it from sagging over time.

Because our bodies begin to lose collagen in our 20s, skin creams and treatments made from the connective tissues of animals seem like an effective way to combat age. And, it has few side effects.

But there's a catch – or two. As a female interested in aging gracefully and as a scientist who [studies collagen](#), I have found the plethora of collagen-based products to be interesting. I have been involved with studying collagen for over a decade as our lab is working to develop a collagen made solely in a laboratory instead of sourcing from animals. I have asked other collagen-knowledgeable colleagues what they think of everyone putting it in their coffee, and I get some smirks.

Collagen for arthritis and healing wounds

Starting in our 20s, our bodies produce less collagen, causing our skin to sag and wrinkle, our bones and joints to weaken and stiffen, and our hair to become thinner. A diet high in sugar, excessive sun exposure and smoking also diminish collagen levels.

Collagen's molecular structure is something called a complex triple helix, like three pieces of rope twisted together. Certain molecular interactions require a triple helix shape in order to function. There are about 30 different types. **The vast majority of the**

collagen in our bodies, however, is of three types: type 1, which gives skin its firmness; type II, which makes up our movable joints; and type III, which gives tissue its elasticity.

Note: Collagen diseases impact the entire body.

<https://my.clevelandclinic.org/health/diseases/14803-connective-tissue-diseases>

The document affixed to this article provides a verifiable explanation for the epigenetic differences between types 1 - 2 and 3 of collagen.

Most of the studies of collagen have focused on arthritis and wound healing, and collagen supplements have been found to be effective. While very little research has been done on other applications, it is likely that collagen taken orally diminishes the molecules that lead to inflammation and disease.

What you should know about that hot drink

The collagen molecule itself is too large to penetrate the surface of the skin when applied in a cream or lotion. It just sits there until it's washed off. Soluble or hydrolyzed collagen, which is broken down into smaller fragments, does penetrate the skin, but these fragments are likely too small to do any good. Likely, a skin improvement is due to additional ingredients in your topical cream or simply additional proline, an amino acid found in collagen.

In addition, collagen falls apart at temperatures above body temperature, turning it into plain gelatin – yes, the stuff in Jell-O. At these higher temperatures – when added to hot coffee, for example – collagen's molecular structure melts, diminishing or even negating the desired health benefits.

What to look for when buying collagen

The Food and Drug Administration does not evaluate collagen supplements, or any dietary supplement, so it's smart to do your own research before you buy.

First, it's best to get a collagen boost from your diet by eating lots of leafy green vegetables, citrus, eggs, berries, tomatoes, cabbage, pumpkin seeds, avocados and garlic, which can provide your body with nutrients to support collagen growth.

What about bone broth? Despite the hype, the notion that the collagen in bone broth will somehow become collagen in your body is just wishful thinking. In fact, the ingredients that are supposed to make bone broth superior are not that special, and likely during preparation the collagen has been melted.

Furthermore, the likelihood of a large amount of collagen from any source (e.g., supplement, bone broth or meat) making it all the way from your digestive tract to a joint or your skin is small, and if it occurs at all, the amount is likely to be just a small fraction of what you ingested. It is most likely to have an impact on gut immunity, which then may alleviate symptoms of arthritis.

Those who prefer a supplement should use a refrigerated, liquid collagen or collagen powder mixed into a cold beverage. Collagen peptides have already been melted and are therefore similar to other protein powders.

And remember that not all commercially available collagens are equal. Always find out where your collagen comes from. If you have a fish, egg or shellfish allergy, be sure your collagen comes from another source.

Given the lack of FDA oversight, it's also a good idea to buy collagen that has been tested by a credible group like the USP or UL.

Select a brand that provides your collagen of interest. If you're looking for joint health, collagen type II is your best bet. If you're looking for a skin or hair boost, collagen type I would likely work best.

And finally, make it part of your daily routine. The benefits wear off if you stop taking it.

Collagen Types

The following illustration can be used to identify how the three types of collagen differ in roles and in their epigenetic constituents.

Cell Alignment: For Discussion Purposes

TNF-Alpha: TGF-Alpha (Calnexin) Density

Calcium - threonine - magnesium (BRCA1)

Calcium - serine - magnesium (BRCA2)

Calcium - cysteine - magnesium (BRCA3)

For Discussion:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3436948/>

TNF-Beta: TGF-Beta (Calmodulin) Motility

Calcium - phenylalanine - magnesium (HRas)

Calcium - tyrosine - magnesium (KRas)

Calcium - tryptophan - magnesium (NRas)

TNF-Gamma: TGF-Gamma [VEGF] (Calcineurin) Modulatory Enzyme

Iron - serine - Manganese

Iron - cysteine - Manganese

Iron - threonine - Manganese

The following are examples of bioidentical "enzymes" that have evolved with various designations; e.g. AKT, mTOR, PTEN, NF-kB, and MYC.

The following explanations can be verified using computational biology and bioinformatic search.

Type I - Firmness

- It is an alternative designation for calnexin
- Both TNF-alpha and TGF-alpha are identified as being factors that increase collagen levels
- The amino acids correlate with those provided in the illustration.

Type II - Moveable Joints

- It is an alternative designation for calmodulin
- Both TNF-beta and TGF-beta are identified as being factors related to collagen II levels
- The amino acids correlate with those provided in the illustration

Type III - Elasticity

- It is an alternative designation for calcineurin
- The amino acids correlate with those provided in the illustration

Note: Other factors from calcineurin can be discussed with computational biologists including the spectrum of connective of connective tissue diseases.