

Myth Busting Skin Health: Why is Astaxanthin Different?

Like the LinkedIn article I usually start by reminding people of the anatomy

Epidermis (outer layer)

- Its lipid rich – that is why you don't melt in the shower
- Only material that is soluble in lipids reaches the outermost layer
- Astaxanthin being lipidic (soluble in fats) and a potent free radical scavenger stops UV radiation from creating damage/inflammation in lower layers
- Astaxanthin is front line defense
- At the border of the epidermis and dermis lie melanocytes (pigment cells) that lead to tanning, if even, or age spots
- By contrast, Vitamin C is water soluble (does not penetrate) and is far weaker in scavenging free radicals.

Collagen Supplements (and other matrix elements and the baggage they have)

- Usually taken as the protein or peptides (pieces of protein)
- Assume that it will be ingested, digested, absorbed, delivered and reassembled to form the right type of collagen at the right place and time
- THAT IS A LOT OF ASSUMPTIONS
- First of all, there are 28 forms of collagen (at least) in humans – so which one do you need?
- Collagen in supplements are most commonly derived from fish scales or rooster combs. Does that match your needs? Is it the right form? How important are species differences?
- Plasma always has amino acids in it, so you can make proteins at any time, as long as the enzymes or processes are there and active. It is not a system that is waiting on substrate (amino acids) to work – it is regulated by whether the enzymes are present.

Let's Focus on Repair & Inflammation and how that Influences Collagen Health

- Inflammation can drive protein (collagen) breakdown.
- Firstly, during inflammation enzymes called MMPs (a family of proteases) are made by turning on the gene that codes for them.
- MMPs chop up collagen into pieces like a molecular machete. There are many forms of MMPs because there are many forms of collagen or matrix elements.
- The enzymes that make collagen are SWITCHED OFF at the gene level during inflammation. Why make it when you are actively breaking it into pieces with MMPs???
- In other words, during inflammation (sun exposure, photoaging etc.) there is no SYSTEM or ENZYMES or PROCESSES to make collagen.
- Making more collagen after removing damaged collagen, can ONLY OCCUR when the inflammation signals are terminated – all regulated by switches that turn on/off genes.

- Ingesting a collagen supplement during inflammation cannot make collagen as there are no enzymes active to reconstruct the amino acids into a protein.

PEARL NECKLACE

- Consider a protein is like a pearl necklace then the individual pearls are the amino acids
- If you ingest a protein supplement (collagen) then when you digest it the necklace is broken down into individual pearls that are absorbed and circulate in the blood.
- In tissues the pearls are reconstructed into a necklace (for collagen there are >28 forms).
- But during inflammation all you have is pearls you cannot make the necklace (no enzyme) and the necklaces that are there are being damaged and broken.
- During inflammation some of the pearls are burned for fuel by mitochondria instead of glucose.

DATA to CONFIRM

- Fibroblasts are the cells that make matrix proteins like collagen.
- When hit with free radicals they no longer make collagen (gene is switched OFF).
- But Astaxanthin PLUS free radicals, then the collagen production is maintained.
- WHY? Because the astaxanthin scavenges the free radical – eliminates the cause, but it also protects the gene switches. So, the enzyme that makes collagen is still active & present.
- Vitamin C cannot do that, it does not affect the switches and is weak on the free radical scavenging (6000x weaker than Astaxanthin).
- So, taking Vitamin C with collagen will not work if there is inflammation.
- Vitamin C is useful for assisting with proline (one of the pearls) that is rich in collagen, but still, no benefits when there is inflammation

Other Considerations

- Skin is made up of many matrix elements not just collagen.
- There is elastin, fibronectin, tenascin (a glycoprotein), hyaluronic acid (a polysaccharide like starch and found in snail mucus).
- Each has their own family of enzymes controlling production and these are dictated by gene switches.
- Each matrix element that is ingested has the same issues as collagen that can influence their ability to correct problems
- Topical collagen and amino acids does nothing to correct these issues and further they are too polar to be absorbed through the epidermis.
- Astaxanthin also protects mitochondrial function so it limits oxidative stress from that source and also limits the burning of amino acids for energy by inflamed tissue (which limits their availability for protein construction).

Conclusion

Not only does astaxanthin correct and balance gene switches that control tissue matrix repair and deposition:

- it also negates the damage in the first place (scavenges the free radical)
- allows any benefits seen with Vitamin C/proline to become evident.

If there is a problem like photoaging, chronic inflammation or sun exposure, ingesting matrix elements in a supplement will not work unless you negate the oxidative stress and inflammation and astaxanthin is the premier solution for that.