



WellnessOne Newsletter

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The Most Powerful Nutrient Ever Discovered for Eye Health

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Scientists long ago discovered that a class of naturally occurring pigments called held powerful antioxidant properties that are crucial for your health.

But only recently has one particular carotenoid jumped to the forefront in terms of its status as a "supernutrient," becoming the focus of a large and growing number of peer-reviewed scientific publications.

This carotenoid is called astaxanthin.

Astaxanthin is produced by the microalgae *Haematococcus pluvialis* when its water supply dries up, forcing it to protect itself from ultraviolet radiation.

Astaxanthin is leaps and bounds more powerful than beta-carotene, alpha-tocopherol, lycopene and lutein; other members of its chemical family. Astaxanthin exhibits VERY STRONG free radical scavenging activity, and protects your cells, organs and body tissues from oxidative damage.

What makes astaxanthin so different from other nutritional elements? And what can it do for your health?

The answers to these questions will form the basis of the remainder of this article, and I think you'll be quite impressed.

Astaxanthin is in a League of its Own

There are many properties that make this carotenoid special. Here are the main differences:

- Astaxanthin is by far the most powerful carotenoid antioxidant when it comes to free radical scavenging: it is 65 times more powerful than vitamin C, 54 times more powerful than beta-carotene, and 14 times more powerful than vitamin E.



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- Astaxanthin is far more effective than other carotenoids at "singlet oxygen quenching," which is a particular type of oxidation. The damaging effects of sunlight and various organic materials are caused by this less-stable form of oxygen. Astaxanthin is 550 times more powerful than vitamin E and 11 times more powerful than beta-carotene at neutralizing this singlet oxygen.
- Astaxanthin crosses the blood-brain barrier AND the blood-retinal barrier (beta carotene and lycopene do not), which has huge implications for the health of your eyes.
- It is soluble in lipids, so it incorporates into cell membranes.
- It is a potent UVB absorber.
- It reduces DNA damage.
- It is a very powerful natural anti-inflammatory.
- No adverse reactions have been found for people taking astaxanthin.
- It is virtually impossible to obtain the recommended daily amount of astaxanthin from diet alone because there are only two prime sources: microalgae and sea creatures that consume the algae (such as salmon, shellfish, and krill).



Carotenoids 101

Carotenoids are the compounds in your foods that give you that vibrant cornucopia of color -- from green grasses to red beets, to the spectacular yellows and oranges of your bell peppers -- as well as all of the beautiful flowers in your garden.

Almost all living things obtain their colors from natural pigments.

Beyond their visual splendor, these pigments have deeper value in that they carry out a variety of important biological functions. They are critical to the photosynthetic process and protect the plant or organism from damage by light and oxygen. Many animals incorporate carotenoids into their diets, which provide them with antioxidants and a source of vitamin A activity.

By consuming a plant or organism that contains these pigments, you gain a similar protective benefit.

There are more than 600 naturally occurring carotenoids, but most people are familiar with only a few.

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Carotenoids are classified into two groups:

1. Carotenes, which contain no oxygen atoms: lycopene (the red in tomatoes) and beta-carotene (the orange in carrots) are examples.
2. Xanthophylls, which contain oxygen atoms: lutein, canthaxanthin (the gold in chanterelle mushrooms), zeaxanthin, and astaxanthin are examples.

Zeaxanthin is the most common carotenoid found in nature (peppers, maize, kiwi, grapes, oranges and squash).

At this moment, about ten different carotenoids are likely circulating in your blood. None of the carotenes tested to date are able to cross your blood-brain barrier -- but astaxanthin does.

All Carotenoids are Not Created Equal

Some carotenoids (including beta-carotene, lycopene, and zeaxanthin) act not only as antioxidants, *but also as pro-oxidants* when present in your tissues in sufficient concentrations -- which is not a good thing.

Astaxanthin is unique in that it cannot function as a pro-oxidant, making it highly beneficial.

Zeaxanthin is already abundant in your diet, provided you eat enough fresh, raw, vegetables and some fruit. [Your best source of lutein is from the yolks of eggs](#) -- but make sure they are [organic eggs laid by free-range pastured hens](#).

Astaxanthin is different in that you are probably not consuming much of it, and certainly not enough to take advantage of all its benefits.

Astaxanthin is the most commonly occurring red carotenoid in marine and aquatic animals, especially salmon, giving it its characteristic pink color. Salmon and other sea creatures, like other animals, cannot synthesize astaxanthin themselves and must obtain it from their diets, which include zooplankton and krill. These smaller organisms feed on the microalgae, which are the original producers of the pigment.

Laboratory-made astaxanthin is now commonly used worldwide to supplement fish feeds in order to obtain the desired pinkish to orange-red color. However, [wild salmon are 400 percent higher in astaxanthin than farmed salmon](#), and 100 percent of theirs is *natural astaxanthin*, rather than synthetic.

Astaxanthin's Long List of Health Benefits is Growing by the Day



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There may be no other single natural substance that performs so many beneficial biochemical functions as this little-known carotenoid. Its scope is truly amazing.

Here are just some of the ways astaxanthin can positively impact your health, according to the latest research:

- Boosting immune function
- Improving cardiovascular health by reducing C-Reactive Proteins (CRP), reducing triglycerides, and increasing beneficial HDL
- GREATLY protecting your eyes from cataracts, macular degeneration, and blindness (which I will discuss at length below)
- Protecting your brain from dementia and Alzheimer's
- Reducing your risk for many types of cancer (including cancers of the breast, colon, bladder and mouth) by stimulating apoptosis (cancer cell death) and inhibiting lipid peroxidation
- Improving recovery from spinal cord and other central nervous system injuries
- Reducing inflammation from all causes, including arthritis and asthma
- Improving endurance, workout performance and recovery
- Helping to stabilize blood sugar, thereby protecting your kidneys
- Relieving indigestion and reflux
- Improving fertility by increasing sperm strength and sperm count
- Actually helping to prevent sunburn, and protecting you from the damaging effects of radiation (i.e., flying in airplanes, x-rays, CT scans, etc.)
- Reducing oxidative damage to your DNA
- Reducing symptoms from pancreatitis, multiple sclerosis, carpal tunnel syndrome, rheumatoid arthritis, Parkinson's disease, and Lou Gehrig's disease, and neurodegenerative diseases
- I personally use it to help protect me from radiation damage when I am flying during the day. The radiation is reduced by 99 percent when flying at night so this is not an issue



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for night flights. However, it does have to be taken for three weeks to build up levels to provide this level of protection.

This impressive list continues to grow as more studies are being published all the time about this incredible nutrient.

Carotenoids and Your Eyes

When you were a child, odds are you were told, "Eat carrots -- they'll give you good eyesight!"

There is some truth to that old adage, as carrots contain carotenoids -- many of which are important for your eyes. Vitamin A, or retinal, is vital to your retina -- without it, you would simply go blind. But vitamin A is readily available from your diet.

Of all the carotenoids, only zeaxanthin and lutein are found in your retina, which has the highest concentration of fatty acids of any tissue in your body. This is because your retina is a highly light and oxygen rich environment, and it needs a large force of free radical scavengers to prevent oxidative damage there.

It is theorized that your body concentrates zeaxanthin and lutein in your retina to perform this duty. The concentration of these two pigments in the macula of your retina are what give it its characteristic yellow color. (The macula is actually called the "macula lutea" which literally means "yellow spot.")



Zeaxanthin and lutein both cross the blood-brain-retina barriers, as astaxanthin does.

It is interesting that your eye preferentially concentrates zeaxanthin over lutein in the central macular retinal area (called the fovea), where the greatest amount of light impinges -- and zeaxanthin is a more effective singlet oxygen scavenger than lutein. Your body seems to naturally "know" this and accumulates it where it's most needed!

Leading Causes of Blindness: Macular Degeneration and Cataracts

Science is now revealing that astaxanthin may be the ULTIMATE carotenoid for eye health and prevention of blindness.

Blindness is an enormous problem worldwide. These [statistics](#) might disturb you:

- Age related macular degeneration (ARMD) is the leading cause of blindness for people over the age of 50.
- Sixty million people suffer from ARMD worldwide, and 10 million are blind.
- Severe, irreversible vision loss affects 30 percent of people over the age of 55.

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- Cataracts are another major cause of blindness, affecting more than 20 million people in the U.S. alone. Cataracts are caused by lipid peroxidation of the epithelial layer of the lens. Although they can have other causes, most are related to aging.
- Cataracts result in 3 million cataract surgeries every year.

Clinical studies tell us that photic injury from the cumulative effect of repeated "photic insults" and the resulting gradual loss of photoreceptor cells is a major cause of ARMD. Therefore, anything you can do to cut your losses from these photic insults will reduce your risk for developing macular degeneration as you age.

Protecting Your Retina with Astaxanthin

Vitamin C can help protect you from retinal injury from excessive light energy, and indeed, high levels of vitamin C are found in human retinal tissues. But this common nutrient cannot do the job alone.

Epidemiological studies have shown that diets high in carotenoids (especially lutein and zeaxanthin) are associated with a reduced risk of cataracts and ARMD. It has also been shown experimentally that regular consumption of lutein supplements can increase your macular pigment density, which may potentially reduce your risk for later development of ARMD.



Scientists have studied lutein, zeaxanthin, canthaxanthin, and astaxanthin for their respective abilities to protect the retina. But [none function to the degree that astaxanthin does](#), in terms of potency as a free radical scavenger and/or permeability across your blood-brain-retina barrier.

In studies, canthaxanthin was actually found to be potentially damaging to the eye as it caused eye inclusions, which can lead to retinopathy. So this carotenoid was ruled out as a supplement.

[Dr. Mark Tso](#) of the Wilmer Eye Institute at Johns Hopkins University (considered by most professionals to be the most prestigious ophthalmology training center in the world) has clearly demonstrated that astaxanthin is the clear winner when it comes to protecting your eyes. He discovered that astaxanthin easily crosses into the tissues of the eye and exerts its effects safely and with more potency than any of the other carotenoids, without adverse reactions.

Specifically, Tso determined astaxanthin could ameliorate or prevent light induced damage, photoreceptor cell damage, ganglion cell damage, and damage to the neurons of the inner retinal layers.

He concluded that astaxanthin supplementation could be effective in preventing or treating a whole host of eye diseases, including:

- Age-related macular degeneration (ARMD)
- Diabetic neuropathy
- Cystoid macular edema
- Central retinal arterial and venous occlusion
- Glaucoma
- Inflammatory eye diseases (i.e., retinitis, iritis, keratitis, scleritis, etc.)

Other researchers (Shimidzu et al, Bagchi, [Martin et al](#), and [Beutner](#)) have since confirmed Dr. Tso's finding that astaxanthin is the most powerful antioxidant ever discovered for eye health, giving your eyes an additional layer of long-term protection.

Prevention of Cancer and Support for Your Immune System

Besides being a huge discovery in the prevention of eye disease, astaxanthin is showing great promise in cancer prevention, at least in animal studies. Because astaxanthin is not commonly found in human serum, information on its epidemiology in human health is lacking.



[Several studies have shown the effectiveness of astaxanthin as a cancer preventative in rats and mice:](#)

- In 2002, Kurihara et al studied the protective effect of astaxanthin against cancer in mice. He found astaxanthin "improved antitumor responses by inhibiting the lipid peroxidation induced by stress."
- Tanaka et al (1994) showed that astaxanthin protected mice from urinary bladder cancer.
- A second study by Tanaka (1995) showed that astaxanthin prevented oral carcinogenesis in rats, and that the inhibitory effect on cancer was more pronounced than that of beta-carotene, which they had previously tested.
- A third study by the same research group (1995) found a significant decrease in the incidence of colon cancer in animals fed astaxanthin.

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As a side note, it is interesting that the principal dietary source of astaxanthin is salmon, which is a central to the diet of Eskimos and other coastal tribes of North America. These groups have demonstrated an unusually low prevalence of cancer, which has traditionally been attributed to the high levels of certain fatty acids in salmon.

But it is certainly worth exploring the possibility that the [astaxanthin in their fish diets may have played a cancer-protective role as well](#).

Astaxanthin was studied intensively by [Harumi Jyonouchi](#) of the University of Minnesota to determine if it has benefit to immune function. They found that astaxanthin enhanced antibody production and T-cell and T-helper-cell activity, and partly restored diminished humoral immune responses in old mice.

Astaxanthin also [reduced inflammatory symptoms in mice that had *H. pylori* infections](#).

For an extensive literature review, and much more about astaxanthin's biological effects and mechanisms of action, you can read "[Astaxanthin and Cancer Chemoprevention](#)" by [John E. Dore, Ph.D. of Cyanotech Corporation](#).

Boosting Your Endurance and Fat Loss

Astaxanthin may even improve your muscle endurance and enhance your ability to metabolize fat!



Is there anything this nutrient DOESN'T do?

Mice given astaxanthin were found to have accelerated body fat reduction (i.e., "fat burning") when combined with exercise, as compared to exercise alone in a [2007 study by Aoi et al.](#) Aoi reports the carotenoid seems to exert this effect by protecting the function of a lipid transport enzyme on the membrane of mitochondria that "fuels" energy production.

The end result?

Buff mice. Not that the world needs more physically fit rodents, but what works on mice often works on YOU.

Protection from Sunburn and Other Damaging Radiation

The ability of *Haematococcus pluvialis* to protect itself from the effects of intense ultraviolet radiation can actually help you avoid sunburn. This is a result of the "singlet oxygen quenching" I discussed earlier.

Current research is showing that, if you take 2 mg of astaxanthin daily for a month, it will be very difficult for you to get sunburned.

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The same powerful antioxidant properties that protect the algae from the sun's rays will protect your skin as well. It takes a few weeks for the pigment to build up in your tissues, so you can't just swallow a few pills just prior to your sun exposure and expect miracles.

Similarly, if you find yourself needing an x-ray or a [CT scan](#), you can gain some measure of protection from this radiation exposure by taking 2-4 mg astaxanthin for several weeks prior to the scan.

If you are planning to fly on an airplane, you are also exposed to massive amounts of ionizing radiation, [especially if you fly during the day](#). In this case, it would be wise to take a similar a dose of astaxanthin for the few weeks preceding your trip.

Final Suggestions

You may recognize the name astaxanthin because I have mentioned it in reference to krill oil, which has been my favorite source of animal based omega-3 fatty acids for many years now. One of the reasons for that is, *krill oil naturally contains astaxanthin*. And [our krill oil](#) has the highest concentration of astaxanthin of any krill oil supplement on the market today.

Because of the profound benefits this powerful antioxidant offers, I am excited to announce that we are in the process of developing several astaxanthin products that will be available in the near future.



If you are going to give astaxanthin a try, I recommend starting with 2 mg per day. If you are on a krill oil supplement, take that into consideration; different krill products have different concentrations of astaxanthin, so check your label.

Eating a variety of fresh organic foods -- and incorporating supernutrients like astaxanthin -- is the best approach to health, along with good sleep, exercise, and [earthing](#). You may want to consider incorporating more raw foods into your diet, which is an excellent starting point.

Sources:

- » [International Carotenoid Society](#)
- » ["Astaxanthin and Cancer Chemoprevention" John E. Dore, Ph.D.](#)