

Astaxanthin with AstaPure®



INGREDIENTS

Doctor's Best Astaxanthin supplies astaxanthin, a xanthophyll carotenoid nutrient with unique molecular properties, along with other naturally occurring carotenoids. Astaxanthin has a diverse range of health benefits related to its powerful antioxidant effects and other actions on cell membranes and on energy production.

The body cannot make astaxanthin. It is made by algae, and moves up the food chain when the algae are consumed as food. It gives the red color to seafoods such as salmon, trout, crab, shrimp, lobster, and krill, but these astaxanthin foods are not common in most diets. Doctor's Best is pleased to offer this nutrient in its natural form, as a solvent-free concentrate from the microalga *Haematococcus pluvialis*, and at full clinical potency.

BENEFITS

Versatile Cell Membrane and Whole-Body Protection*

The molecular character of this natural astaxanthin especially equips it to become incorporated into working cell membranes. The molecule is long and thin, with both ends having "polar" groups that are compatible with water but the middle segment being "nonpolar" and not water-compatible.¹ This specific molecular layout allows astaxanthin to insert into cell membranes without substantially changing the membrane structure.² In this way astaxanthin differs from other carotenoids which distort the membrane's structure and thereby make it more vulnerable to damage from "free radical" or other toxic influences. Within the membrane astaxanthin provides potent protection against free radical or other toxic attack.²⁻⁵

All cells have membranes, and membranes manage most of the processes important for life.⁶ Every cell membrane is an ultrathin, extended, double molecular sheet of lipids, into which are inserted enzymes and other catalytic proteins.^{6,7} The generally intense metabolic activities within membranes typically generate highly reactive "free radical" substances that can require control by antioxidant defenses.^{7,8} Astaxanthin provides cell membranes with potent antioxidant defense against a variety of free radical byproducts.³⁻⁵

The double lipid layers of cell membranes can resemble micro-railroad

tracks as seen under a microscope.⁶ Each astaxanthin molecule likely spans the membrane's two layers, rather like ties span a railroad track.¹ This positions them to intercept and neutralize free radicals, whether these are at the membrane's edge or within its core.^{2,5}

Astaxanthin's ability to protect cell membranes against free radical attack was clearly illustrated in an experiment with rofecoxib. This pharmaceutical is known to cause the generation of oxygen free radicals that can destroy membranes (via a process called "peroxidation"). In experiments with membranes created in the laboratory, astaxanthin totally blocked rofecoxib's damage and actually switched the membrane into anti-peroxidation balance.⁹

Astaxanthin also fights free radicals differently from most other antioxidants. Rather than donate electrons, as most antioxidants do, astaxanthin has a very high capacity to neutralize free radicals by taking electrons from them.¹⁰ This property gives the astaxanthin molecule better stability than other antioxidants, and therefore it can remain active longer in the membrane.

As a powerful membrane protectant, astaxanthin also has specific protective effects for mitochondria, the microscopic energy powerhouses of all our cells. The mitochondria are built on a double membrane system that is crammed with enzymes and other proteins that specialize in making energy (ATP)⁶ Mitochondria make over 90% of the body's energy, using over 85% of the body's oxygen supply.^{7,8} But these oxygen molecules are highly reactive and a small percentage become oxyradicals.⁹ Some are neutralized by antioxidant enzymes, but others escape to directly attack the mitochondrial membranes or to propagate other reactive molecules that do damage.⁴

Astaxanthin 6 mg, 30 & 90 Veggie Softgel

Supplement Facts

Serving Size 1 Veggie Softgel
Servings Per Container 30 & 90 Servings

	Amount Per Serving	% Daily Value
Astaxanthin (from AstaPure®)	6 mg	†
(extract from <i>Haematococcus pluvialis</i> microalgae)		

† Daily Value not established.

Other Ingredients: Extra virgin olive oil, vegetarian softgel (modified food starch, glycerin, carrageenan, purified water).

Suggested Adult Use: Take 1 softgel daily after meals, or as recommended by a nutritionally-informed physician.

Non-GMO / Gluten Free / Soy Free / Vegan
Store in a cool dry place.

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Experimental studies indicate astaxanthin conserves and promotes the critical bioenergy function of mitochondria. In a study with dogs and cats, astaxanthin given by mouth became more concentrated in the membranes of the mitochondria than in other cell membranes.¹¹ In experiments with cultured cells, astaxanthin lowered the mitochondria's production of oxygen free radicals¹² and at concentrations achievable in the body by dietary supplementation.¹³ Astaxanthin also increased the mitochondria's resistance to toxic challenge and even increased their ATP energy output.¹²

Astaxanthin may promote healthy antioxidant balance in overweight individuals. In a 2011 double blind trial,¹⁴ one group of overweight subjects received astaxanthin (20 mg per day) for twelve weeks, while a matched control group received a placebo. The astaxanthin group experienced significant improvement in three measures related to antioxidant balance: blood levels of the free radical markers malondialdehyde and isoprostanes were significantly lowered, and blood total antioxidant capacity was significantly increased. Astaxanthin also significantly lowered blood LDL cholesterol (low-density lipoprotein cholesterol) levels.

Astaxanthin therefore has a universally protective effect on cell membranes in general and the membranes of mitochondria in particular, with potential to improve mitochondria's energy production efficiency. These potent membrane benefits of astaxanthin underlie its capacity to improve antioxidant protection at the whole-body level.

Supports Memory and Other Higher Brain Functions*

In a small clinical trial, astaxanthin was shown to enhance memory and other higher brain functions ("cognition").¹⁵ Ten healthy men aged 50-69 who had been complaining of forgetfulness received astaxanthin at 12 mg per day for 12 weeks. On computerized cognition tests their attention, memory and other cognitive functions improved significantly, as did their stimulus response time. Various other experimental studies support these findings of brain benefits from astaxanthin.¹⁶⁻²⁰

Astaxanthin at human physiological levels improved the memory and learning performance of mice in water maze tests.¹⁶ In cultured nerve cells it protected the mitochondria against oxygen free radical attack¹⁷ and the cell as a whole against attack from outside toxins.^{18,19} Astaxanthin also stimulated cultured stem cells to mature into functioning nerve cells.²⁰

Enhances Vision and Relieves Eye Fatigue*

Astaxanthin has been extensively researched in Japan for its support of vision. In several double blind and other clinical trials, published in Japanese, astaxanthin at 6 mg per day significantly improved visual sharpness in healthy volunteers (reviewed in Yuan, 2011²¹ and Kajita, 2009²²). Other trials published in English show astaxanthin also can relieve eye fatigue and provide support for vision during aging.^{22,23}

Extended work at computer monitors is known to cause eyestrain, blurring and other vision problems. One double blind trial compared astaxanthin (5 mg per day) versus a placebo, against eyestrain in young Japanese VDT (visual display terminal) workers.²³ Astaxanthin significantly improved eye muscle accommodation, which closely equated to relief from eyestrain. In another clinical trial astaxanthin (6 mg per day, for 4 weeks) significantly improved eye muscle functions in middle-aged subjects.²² Their eyestrain improved, as did their ease of seeing near objects.

Supports Healthy Blood Flow and Vessel Integrity*

Astaxanthin offers support for maintaining healthy blood lipids. In addition to its benefit for LDL cholesterol in overweight individuals,¹⁴ another double blind, placebo-controlled trial demonstrated that astaxanthin (at 6 mg or 12 mg per day for 12 weeks) significantly elevated HDL cholesterol, an effect consistent with maintenance of cardiovascular health.²⁴ Astaxanthin taken at 12 mg per day also significantly lowered triglycerides.²⁵

Astaxanthin also may promote optimal body fat metabolism. In a double blind trial, overweight subjects aged 20-65 years received a beverage providing either 6 mg astaxanthin per day, or no astaxanthin, for 12 weeks.²⁶ Computer tomographic (CT) scanning reported a significant reduction in



abdominal subcutaneous and total fat. Astaxanthin taken at 16 mg per day for 3 months also supported healthy blood glucose metabolism, in a small clinical trial.²⁷

The red blood cells that typically circulate with the blood have antioxidant defenses that help protect other blood cells and the blood vessel lining against free radical attack. In the process the red cells themselves may sustain free radical damage, and this could negatively affect their delivery of oxygen to the tissues.²⁸ In a 2011 double blind trial, healthy subjects aged 50-69 years received either astaxanthin (at 6 or 12 mg per day), or a placebo, for 12 weeks.²⁹ At the end of the trial, when compared to the placebo group the astaxanthin group had significantly lower hydroperoxides (free radical byproducts) in their red blood cells and their plasma samples.

In another human study astaxanthin enhanced a measure of blood flow.³⁰ Healthy middle-aged men were randomly chosen to receive either astaxanthin (6 mg per day) or a placebo, for ten days. Blood was collected from a vein in the elbow area, then a precisely measured amount was forced under pressure through a set of very fine tubes about the width of capillaries. The time required to traverse these capillary-type tubes was measured (blood transit time). The astaxanthin group showed significantly lower transit time at the end of the trial, indicating their blood was flowing more freely. The researchers concluded astaxanthin could enhance the capillary circulation.

Promotes Healthy, Integrated Immune Response*

Astaxanthin promotes healthy immune competence. In a 2010 double blind trial, young healthy women received astaxanthin at a 2 mg or 8 mg per day dose, for 8 weeks.³¹ Astaxanthin at 2 mg per day significantly increased the total T cell numbers, while the 8 mg per day dose significantly increased natural killer cell activity, enhanced lymphocyte proliferation in response to stimulation, and enhanced the skin delayed type hypersensitivity (DTH) response to injected tuberculin. From these findings the researchers concluded astaxanthin promoted both cell mediated and antibody mediated immunity, and promoted immune competence overall.

In this trial, astaxanthin also significantly lowered plasma 8-OHdG (8-hydroxy-2'-deoxyguanosine), indicating it may help reduce ongoing DNA damage in the body.³¹ DNA damage (measured as urine 8-OHdG) also was significantly reduced in another double-blind trial, one in which astaxanthin enhanced immune balance in the skin. In this trial subjects received astaxanthin (12 mg per day) or a placebo, for 4 weeks.²⁶ Astaxanthin proved significantly more effective than placebo at promoting overall quality of life, and helping with associated feelings of uneasiness.

Counters Oxidative Stress Related to Aging*

A 2009 trial recruited postmenopausal women aged 65 years or younger, and selected 20 of them with above-average oxidative stress—a relative excess of free radical activity over antioxidant capacity, as measured in their blood.³² These women then received astaxanthin (12 mg per day) for 12 weeks. Astaxanthin significantly enhanced their blood antioxidant capacity, and supported maintenance of blood pressure already in the normal range. The group reported significant support for "tired eyes," occasional constipation, "cold skin," and occasional difficulty in falling asleep.

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Taken together, astaxanthin's capacity to counter free radicals, and its plethora of benefits for memory and other brain functions, vision, cardiovascular health, and immune function strongly recommend it as a premier nutrient for support of healthy aging. Astaxanthin's plethora of beneficial actions, from the fundamental levels of cell membrane integrity and mitochondrial energy production through to the plethora of clinical benefits, strongly suggest this nutrient can promote health and wellbeing at every stage of life.^{33,34}

SCIENTIFIC REFERENCES



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