# Astaxanthin

The most powerful antioxidant

## HEALTH BENEFITS

#### 1.

ANTIOXIDANT EFFECTS

Free radicals and highly reactive forms of oxygen are produced in the body during normal metabolism and can be induced by Physiological stress, air pollution, tobacco smoke, exposure to chemicals or exposure to ultraviolet (UV) light. Free radicals can damage DNA, proteins and lipid membranes. Oxidative damage has been linked to aging, atherogenesis, ischemia-reperfusion injury, infant retinopathy, age-related macular degeneration, and carcinogenesis. Astaxanthin is considered as “super anti-oxidant” which possesses one of the strongest known antioxidant effects. Its unique structure allows it to span biological membranes and act as an antioxidant by reducing and stabilizing free radicals. Astaxanthin’s antioxidant activity has been demonstrated in several experimental studies to confirm that this nutrient has a large capacity to neutralize free radical or other oxidant activity in the nonpolar (“hydrophobic”) zones of phospholipid aggregates, as well as along their polar (hydrophilic) boundary zones.

#### 2.

ANTI-AGING EFFECTS

The cumulative oxidative damage to mitochondria is the main culprit for the senescence of cells, which in turn is responsible for aging. Astaxanthin reduced the mitochondria’s endogenous production of oxygen radicals and protected the mitochondria against a decline of membrane function that typically occurs over time in cell cultures. Astaxanthin is found not only can preserve mitochondrial functions and its unique potential in the fight against aging, but also increase mitochondrial activity in these cells by increasing oxygen consumption without increasing generation of reactive oxygen species.

#### 3.

VISION AND EYE HEALTH

Astaxanthin has been extensively researched for its benefits for vision in terms of visual sharpness improvement, relieve eye fatigue and mitigate the age-related macular degeneration (AMD). Astaxanthin with strong antioxidant activity and UV-light protection effect reduced the risk for both nuclear cataracts and AMD. Research also shown deposition of astaxanthin in the eye could provide superior protection against UV light and oxidation of retinal tissues pointing to the potential of astaxanthin for eye health maintenance.

#### 4.

ANTI-INFLAMMATORY EFFECTS

Chronic inflammation is believed to be the silent disease at the heart of most degenerative conditions and lifestyle-related diseases. Astaxanthin has been reported to have anti-inflammatory effects as it can significantly lower the concentration of biomarkers of systemic inflammation. It also reported being a benefit for many chronic inflammatory conditions such as Crohn’s disease and ulcer disease.

#### 5.

IMMUNE SYSTEM BENEFITS

Immune cells are particularly sensitive to oxidative stress due to a high percentage of polyunsaturated fatty acids in their plasma membranes and generally produce more oxidative products. Astaxanthin offers protection against free radical damage to preserve immune-system defenses. The immunomodulating capacity of astaxanthin has been found to be superior to that of β-carotene and canthaxanthin. Astaxanthin has shown significant effects on immune function in a number of in vitro and in vivo assays using both animal models and humans.

#### 6.

CARDIOVASCULAR BENEFITS

High blood levels of low-density lipoprotein (LDL) - cholesterol (the ‘bad’ cholesterol) are associated with an increased risk of atherosclerosis. high-density lipoprotein (HDL) blood levels are inversely correlated with coronary heart disease and are indicative of protection against atherosclerosis. Research on human subjects has shown astaxanthin protects LDL-cholesterol against induced in vitro oxidation and in an animal model study, astaxanthin supplementation led to an increase in blood levels of HDL. Astaxanthin can benefit cardiovascular health by preventing LDL-cholesterol oxidation and modifying blood levels of LDL and HDL cholesterol. Astaxanthin intakes also reduce the risk of red blood cells (RBCs) being attack by oxidative stress which will cause peroxidative damage to the RBC membrane phospholipids, impairing its oxygen-carrying capacity. Astaxanthin also improved an experimental measure of “rheology” (blood flow capacity) in healthy men and could potentially improve microcirculation.

#### 7.

MEMORY AND BRAIN FUNCTIONS

The oxidative stress is a causative factor in the pathogenesis of major neurodegenerative diseases (Alzheimer’s, Huntington’s, Parkinson’s and amyotrophic lateral sclerosis, ALS) and that diets high in antioxidants offer the potential to lower the associated risks. Astaxanthin can cross the blood-brain barrier in mammals and can extend its antioxidant benefits beyond that barrier. Experiments showed astaxanthin improves cognitive functions in terms of improvement on measures of reaction time, attention, and working memory.

#### 8.

MUSCLE PERFORMANCE AND ENDURANCE

Astaxanthin can significantly lower serum lactic acid concentration in adults and improve muscle strength and endurance. It is effective for the improvement of muscle fatigue that might lead to sports performance benefits. Astaxanthin also provides protection against oxidative stress and for improving speed and endurance in athletes.

#### 9.

MALE FERTILITY& REPRODUCTION BENEFITS

Astaxanthin can improve semen quality, pregnancy rate and sperm velocity whereas idiopathic infertility can be decreased by astaxanthin. Clinical trial results showed sperm linear velocity and pregnancy rate was significantly increased and semen oxygen radical generation was markedly decreased.

#### 10.

SAFETY

Astaxanthin has demonstrated safety in numerous human clinical trials. Animal experiments have investigated astaxanthin at levels well over 120 mg/day in human equivalents, without causing apparent harm. It was confirmed its safety with extensive tests, including acute toxicity, mutagenicity, teratogenicity, embryotoxicity, and reproductive toxicity.