# 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 provides cell membranes with potent protection against free radical or other oxidative attack. The unique chemical structure of astaxanthin precisely position it within cell membranes and circulating lipoproteins, thereby preventing the degradation of lipid membranes and other molecules or tissues from being damaged. 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

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 to benefit many chronic inflammatory conditions such as Crohn’s disease and ulcer disease.

#### 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

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. Thus, astaxanthin could 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. This finding suggests astaxanthin could potentially improve microcirculation.

#### 5.

IMMUNE SYSTEM BENEFITS

It is believed that 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 increased mitochondrial activity in these cells by increasing oxygen consumption without increasing generation of reactive oxygen species.

#### 6.

CARDIOVASCULAR BENEFITS

Immune response cells are particularly sensitive to oxidative stress and membrane damage by free radicals. Astaxanthin is found can enhance in vitro antibody production and can also partially restore decreased humoral immune responses.

#### 7.

MEMORY AND BRAIN FUNCTIONS

There is substantial evidence that oxidative stress is a causative or at least ancillary factor in the pathogenesis of major neurodegenerative diseases (Alzheimer’s, Huntington’s, Parkinson’s and amyotrophic lateral scler- osis, 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. Preliminary experiments shown astaxanthin improves cognitive functions in terms of improvement on measures of reaction time, attention, and working memory.

#### 8.

MUSCLE PERFORMANCE AND ENDURANCE

Astaxanthin significantly improved performance in the assessment designed to measure muscle strength and endurance. Astaxanthin also provides protection against oxidative stress and for improving speed and endurance in athletes.

#### 9.

MALE FERTILITY& REPRODUCTION BENEFITS

Astaxanthin was evaluated for protecting sperm function and fertility. Clinical trial results shown sperm linear velocity was significantly increased and semen oxygen radical generation was markedly decreased. Moreover, the pregnancy rate, which was 54.5 percent for the astaxanthin group compared to 10.5 percent for the placebo group (p < 0.05).

#### 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. Hoffman-La Roche confirmed its safety with extensive tests, including acute toxicity, mutagenicity, teratogenicity, embryotoxicity, and reproductive toxicity.