CarotenALL™

MIXED CAROTENOID COMPLEX

For Cardiovascular, Vision and Prostate Health

Carotenoids: Plant-derived Protective Pigments

Plants use them as attractive pigments for the bright yellows, oranges, and reds of fruits and flowers. The vibrant autumn foliage of deciduous trees is a result of these light-gathering pigments in photosynthesis. They produce some of the dramatic colors of bird plumage. And our ability to view these sights is due to their pivotal role in human vision.

There are over 600 carotenoids in nature, several of which display a diversity of health-promoting activities. They are synthesized exclusively by plants and a number of microorganisms. This means that all higher organisms must obtain them from the diet. There is little mystery which foods are the best sources of carotenoids. Inasmuch as they are colorful pigments, they are usually found concentrated in fruits and vegetables of yellow, orange, and red hues, as well as dark green leaf vegetables. Carotenoids are lipid-soluble and are best absorbed when ingested with fats. Although it seems almost counterintuitive, *carotenoids are more bioavailable from processed foods* than fresh sources – this has been demonstrated by substantial experimental evidence. Once absorbed, carotenoids are distributed throughout the body, albeit the different carotenoids tend to concentrate in specific tissues.

Pro-Vitamin A & Antioxidant Functions

Carotenoids have two intrinsic biological functions: *as vitamin A precursors* and as *lipid-soluble antioxidants*. Retinol (vitamin A), the light gathering pigment in mammalian vision, can be derived from most, but not all, of the dietary carotenoids. *Beta*-carotene is a particularly good source in that theoretically each of its molecules can form two retinol molecules. Vitamin A deficiency is a cause of numerous vision-related problems.

Free carotenoids can react quickly with singlet oxygen and peroxyl radicals to form stable reaction products. In the environment of the cell membrane, they are among the most effective natural oxygen scavengers and are particularly well suited for protecting against lipid peroxidation.

CarotenAll®: Strength in Numbers

Distinct carotenoids can exert their antioxidant activities synergistically with one another as well as with the tocopherols (vitamin E and its isomers). Carotenoids and tocopherols also can reduce the free radical forms of one another. These cooperative interactions suggest that combined supplementation of carotenoids and tocopherols may protect cells from oxidative damage while still maintaining physiologically necessary vitamin A and E levels. With this in mind, **Jarrow FORMULAS® CarotenAll®** provides a combination of six dietary carotenoids in an amount equivalent to that found in 5-6 average servings of fruits and vegetables as well as *gamma*-tocopherol, a natural form of vitamin E. The components of **CarotenAll®** have been selected from a host of well-studied carotenoids, each with unique tissue distribution and health-promoting activities:

Alpha/beta carotene. *Alpha*- and *beta*-carotene are the paradigm for carotenoid functions; they are distributed throughout the body and have been investigated in a wide range of biological roles, such as for improving lung function, serving as antioxidants, stimulating immune response and regulating cell death (apoptosis). **Jarrow FORMULAS®** contains *alpha*- and *beta*-carotene, here extracted from palm fruit, in ratios identical to that found in carrots.

Lycopene. Lycopene, the red pigment in tomato and watermelon, is the most prominent carotenoid in the prostate and in blood serum. It is found concentrated in the testis, adrenal gland and liver. It is an excellent choice as a dietary lipid-soluble antioxidant. Lycopene is a more effective radical scavenger than are most other carotenoids and, because it cannot form vitamin A, dietary lycopene cannot be diverted to the synthesis of retinol.

Lycopene's distinct tissue localization and potent radical-scavenging ability has led to its being studied in connection with reducing sun-induced skin damage, inhibiting LDL peroxidation, and maintaining prostrate function. Dietary lycopene gained attention following a 1995 study that reported a lower instance of prostate cancer in men who consumed larger amounts of tomato products. Subsequent epidemiological investigations have reported conflicting results. Nonetheless, the potential benefits of lycopene continue to motivate research.

Lutein & Zeaxanthin. These oxygenated carotenoids (*xanthophylls*) are concentrated in the yellow macular pigment (MP) of the macula lutea in the retina of the eye. They are also present in outer rod cells. Lutein and zeaxanthin (36% and 18% of the MP, respectively) are derived from the diet. Lutein may also be converted to the carotenoid *mesozeaxanthin* (18% of the MP) in the body. These three pigments absorb short-wave light (blue and UV), the wavelengths that cause the most retinal damage. As potential antioxidants, they may protect against oxidative damage in the retina, a tissue with large oxygen demands. Age-related macular degeneration (AMD), characterized by the buildup of nodules (*drusen*) under the retina, may be a result of cumulative photooxidation of retinal lipids. Carotenoid antioxidants are thought to slow this process. Clinical studies have demonstrated a reduced risk of AMD in diets rich in xanthophylls.

Astaxanthin. Astaxanthin, which gives salmon flesh its pink color, is a very powerful scavenger of singlet oxygen and of free radicals more generally. Laboratory studies have demonstrated that astaxanthin is 10 times more efficient as an antioxidant than are the other most potent carotenoids and nearly 100 times more effective than *alpha*-tocopherol (the most common form of vitamin E). This antioxidant action is believed to be central to astaxanthin's potential health benefits as a defense against lipid peroxidation. Like lycopene, astaxanthin lacks pro-vitamin A activity in mammals. Unlike *beta*-carotene, it has the ability to cross the blood-brain barrier and thus it even may wield its antioxidant properties within the brain itself.

Usage & Safety

Take 1 to 2 capsules per day with meals or as directed by your qualified health consultant.

References

Bendich, A. (2004). "From 1989 to 2001: what have we learned about the "biological actions of beta-carotene"?" *J Nutr* 134(1): 225S-230S.

Bendich, A. and J. A. Olson (1989). "Biological actions of carotenoids." *Faseb J* 3(8): 1927-32.

Giovannucci, E., E. B. Rimm, et al. (2002). "A prospective study of tomato products, lycopene, and prostate cancer risk." *J Natl Cancer Inst* 94(5): 391-8.

Kristal, A. R. (2004). "Vitamin A, retinoids and carotenoids as chemopreventive agents for prostate cancer." *J Urol* 171(2 Pt 2): S54-8; discussion S58.

Landrum, J. T. and R. A. Bone (2001). "Lutein, zeaxanthin, and the macular pigment." *Arch Biochem Biophys* 385(1): 28-40.

Patrick, L. (2000). "Beta-carotene: the controversy continues." *Altern Med Rev* 5(6): 530-45.

Russell, R. M. (2004). "The enigma of beta-carotene in carcinogenesis: what can be learned from animal studies." *J Nutr* 134(1): 262S-268S.

Sesso, H. D., J. E. Buring, et al. (2004). "Plasma lycopene, other carotenoids, and retinol and the risk of cardiovascular disease in women." *Am J Clin Nutr* 79(1): 47-53.

Stahl, W., A. Junghans, et al. (1998). "Carotenoid mixtures protect multilamellar liposomes against oxidative damage: synergistic effects of lycopene and lutein." *FEBS Lett* 427(2): 305-8.

Tanumihardjo, S. A. (2004). "Assessing vitamin A status: past, present and future." *J Nutr* 134(1): 290S-293S.

Supplement Facts

Serving Size 1 Softgel

Amount Per Softgel		% DV
Vitamin A (Beta Carotene 1.43 mg) (Alpha Carotene 0.7 mg)	2583 IU	52%
Lutein (as esters)(*Tagetes erecta*) (Marigold petal extract)	10 mg	*
Zeaxanthin	2 mg	*
Lycopene (from GMO-free Tomatoes)	10 mg	*
Phytoene	1 mg	*
Phytofluene	1 mg	*
Astaxanthin	500 mcg	*
Gamma Tocopherol	10 mg	*

* Daily Value not established

Superior Nutrition and Formulation℠ by

Jarrow FORMULAS®

Los Angeles, CA 90035-4317

www.Jarrow.com

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

© 2006 Jarrow FORMULAS®

www.Jarrow.com

- **A Formulation of Six Carotenoids with Diverse Biological Activities**
- **Alpha- and Beta Carotene are Excellent Sources of Vitamin A**
- **Lutein and Zeaxanthin Protect Against Ocular Damage**
- **Astaxanthin Protects Against Lipid Peroxidation**
- **Lycopene Supports Healthy Prostate Function**

Jarrow FORMULAS®

Superior Nutrition and Formulation℠

CarotenALL™

MIXED CAROTENOID COMPLEX

For Cardiovascular, Vision and Prostate Health