Vitamin C: Part of the Antioxidant Network

Studies report Vitamin C can slow the progression from moderate to advanced AMD and also prevent age-related cataracts.

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Editor's Note: This article is part of a year-long series focusing on vitamins and ocular health and is supported by Bausch & Lomb. To view all the articles in this series, go to www.revoptom.com and click on "Ocular Nutrition from A to Z."

General Summary: Vitamin C, Ascorbic Acid (AA), was first discovered by the Romanian scientist Svent-Gyorgi in the 1930s and is the major water soluble extra-cellular antioxidant found in abundance in fruits and vegetables. However, most animals, except modern humans, guinea pigs and bats, synthesize even larger amounts in their liver (up to 13,000 mg per day) without any evidence of DNA mutations or cancer. AA is involved in collagen synthesis (i.e., connective tissue), promoting healthy capillaries, gums and teeth and helps to heal wounds and stimulate strong bones. It promotes the absorption of iron and contributes to hemoglobin and RBC production in bone marrow. Iron intake is important for youth, menstruating females and in the prevention of iron-deficient anemia.

High dose AA intake has many speculated benefits. Optometrists should keep in mind that AA is taken from the blood stream and is actively concentrated by all tissues of the eye (cornea, aqueous, lens, vitreous and the retina). It is also highly concentrated by the brain and adrenal cortex. There is little scientifically documented risk in taking higher doses except for diarrhea. Bowel tolerance, or the laxative effect, is actually used clinically to determine optimal dose by integrative medicine practitioners. Keep in mind that high dose AA is less irritating when taken as sodium ascorbate.

Results from multiple retrospective and prospective studies have provided impressive scientific evidence that AA, taken alone, can prevent age related cataracts.

* The views expressed by this article are those of the authors and not Bausch & Lomb.

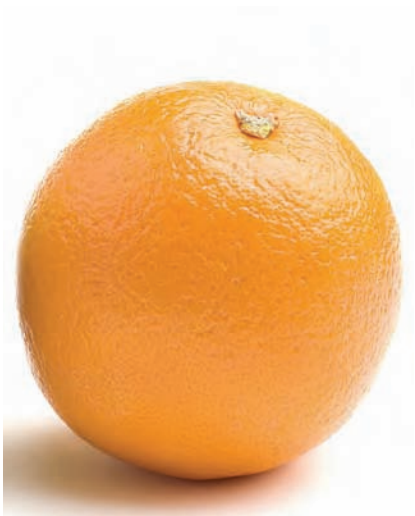
Vitamin C (ascorbic acid)	
water=soluble anti-oxidant	
RDI *	75-120 mg
consequences of deficiency	Scurvy (rare in developed countries)
side effect(s) with over dosage	Stomach aches and diarrhea; may reduce body levels of copper; caution in people with iron overload diseases as it increases iron absorption
dietary source(s)	Citrus fruits, potatoes, tomatoes, strawberries, cabbage
supplement form(s)	Alone or in multivitamin formulations

*Recommended Daily Intake

There is no question that for most people, serial dosing at regular intervals in most situations is preferable to a single large dose bolus. Bioflavanoids (Vitamin P) are supporting molecules found in fruits and vegetables alongside AA.

DEFICIENCY

In a sense, all cells of the body are AA dependent. AA is part of the "antioxidant network." For example, it regenerates both the major cellular membrane antioxidant (Vitamin E) and intracellular antioxidant (glutathione). In the most extreme state of deficiency (scurvy), symptoms such as muscle weakness, swollen and bleeding gums, loss of teeth, tiredness and depression, bleeding under the skin, anemia and frequent infections are all possible. Scientists, however, have recognized that stressed humans require more AA. These groups include smokers, alcoholics, diabetics, pregnant/breast feeding females, older patients, athletes, people in vigorous working occupations or patients with chronic diseases experiencing environmental stress from heat, cold or radiation.



VITAMIN C and CATARACT

Results from multiple retrospective and prospective studies have provided impressive scientific evidence that AA, taken alone, can prevent age related cataracts.[1]

VITAMIN C and CARDIOVASCULAR DISEASE

Historically, we know that AA protects us all against scurvy, but many other protective effects have also been identified. For example, a cardiologist has summarized 650 scientific citations concerning 17 ways in which AA specifically protects blood vessels.[2]

VITAMIN C and AMD (AREDS STUDY)

The specific amount of Vitamin C used in AREDS was 500 mg. Quite recently, a meta-analysis consisting of the AREDS Study and seven smaller studies revealed that antioxidants (beta-carotene, Vitamin C, and Vitamin E) and zinc supplementation slowed down the progression from moderate to advanced AMD and visual acuity loss in people with high-risk signs of macular degeneration (adjusted odds ratio=0.68, 95% CI, 0.53-0.87 and 0.77, 95% CI, 0.62-0.96, respectively).[3] People who should consider taking the supplements include those who are at high risk for developing advanced AMD. These people are defined as having either intermediate AMD in one or both eyes which includes the presence of either many medium-sized drusen or one or more large drusen. Advanced AMD in one eye, but not the other eye, is also an indication to take the AREDS formula. Advanced AMD is defined as either a breakdown of light-sensitive cells and supporting tissue in the central retinal area (advanced dry form), or the development of abnormal and fragile blood vessels under the retina (wet form) that can leak fluid or bleed. Vitamin C is an integral nutrient for preventing vision loss in advanced AMD.

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