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## **NUTRITION AND VISION - PART 2: THE NUTRIENTS**

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### **Vitamin C**

Vitamin C is an antioxidant found in fruits and vegetables. It supports healthy capillaries, gums, teeth, and cartilage. Vitamin C can be found in virtually every cell in the body, and its concentration is significantly higher in the retina than in the blood. Since the human body does not make vitamin C, it must be consumed as part of the diet.

An observational study showed that women using vitamin C supplements over a 10 year period had a 64% decreased risk of developing cataracts. A second study had similar results and showed a 57% reduction in cataracts. They used a 364 mg/day dosage.

Vitamin C (along with zinc, beta-carotene, and vitamin E) was used in the Age-Related Eye Disease Study (AREDS) discussed in part 1. The study showed that this treatment slowed AMD by 25% and visual acuity loss by 19% in high risk individuals. These results have since been confirmed in several smaller studies.

### **Zinc**

Zinc is a trace mineral that is found in high concentrations in the eye. It plays a critical role in transporting vitamin A to the retina. Zinc deficiency has been linked to poor night vision and cloudy cataracts. Zinc was part of the same AREDS study as vitamin C that slowed AMD by 25% and visual acuity loss by 19% in high risk individuals. Several studies have also shown that it is linked to visual acuity.

### **Lutein & Zeaxanthin**

Lutein and zeaxanthin are carotenoids that have been shown to reduce the risk of AMD and the formation of cataracts.

The main cause of cataracts is clouding of the lens due to oxidation. Lutein and zeaxanthin both serve as antioxidants, which help to neutralize free radicals that would otherwise lead to oxidative stress and damage in the retina.

Many recent studies have shown lutein and zeaxanthin to reduce the risk of AMD and improve visual performance. Neither of these nutrients were included as part of the original AREDS. Because of the many promising results, the National Eye Institute is currently conducting a second study (AREDS2) to confirm if a supplement containing 10mg of lutein and 2mg of zeaxanthin reduces the risk of developing AMD.

### **Omega-3 Fatty Acids**

Fats are an essential part of the human diet. The two families of essential fatty acids are omega-3 fatty acids and omega-6 fatty acids. Most individuals get enough of the essential omega-6 fatty acids; however low intakes of omega-3 fatty acids is common, particularly Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA). These fatty acids are important in many aspects of health, including: membrane structure, neural development, regulating heart rate, blood pressure and inflammation.

DHA is found in high concentrations in the retina. It has been shown that dietary deprivation of DHA in animals can result in visual impairment and retinal degradation. In addition to lutein and zeaxanthin, DHA and EPA are also being studied in the AREDS2.

*American Optometric Association. [www.aoa.org/nutrition.xml](http://www.aoa.org/nutrition.xml). 26 Oct 2011.*

*National Eye Institute. [www.nei.nih.gov](http://www.nei.nih.gov). 26 Oct 2011.*