



American Optometric Association

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FACT SHEET ON NUTRITIONAL SUPPLEMENTATION FOR AGE-RELATED MACULAR DEGENERATION

Age-Related Macular Degeneration (AMD) is an acquired ocular disorder and a leading cause of legal blindness in persons over sixty.¹ AMD affects the macula, the central part of the retina, which is responsible for providing clear, sharp vision needed for reading, writing, driving and other visually-demanding activities.

The nature and severity of this condition varies with individual patients, with many experiencing some degree of loss of central vision in one or both eyes. Approximately 90% of patients with AMD have a non-exudative (or dry) form of the disease, which results in the development of dry, atrophic scars in the macular area. Non-exudative AMD patients typically experience slower, more gradual loss of vision. Only 10% of patients develop an exudative (or wet) form, which results in the leaking of fluid beneath the retina, and a greater and more rapid loss of central vision. Effective laser photocoagulation treatment for the disease is limited to small numbers of patients with exudative AMD who are identified early in the disease process.² Other treatment modalities include photodynamic therapy and surgical transplantation of the macula.

Research has now suggested that the development of AMD is linked to a depleted level of macular pigment. This retinal layer efficiently filters out harmful blue wavelengths of light, and also reduces the amount of free radicals, which are compounds found in high concentrations in the macular area and can cause oxidation of cell membranes.³ It is theorized that certain antioxidant compounds reduce the effect that these free radicals have on the macular pigment, and consequently may have an impact on the development of AMD.^{4,5,6} These antioxidants have demonstrated their effectiveness in building and maintaining the thickness of the retinal pigment layer, and are known as carotenoids, a family of colored compounds found in fruits and vegetables. Beta-carotene is an example of a carotenoid; altogether we consume and utilize fourteen different carotenoids in our diet. Two other carotenoids were found to have effectivity in the retinal pigment layer. Lutein and zeaxanthin are carotenoids found in many vegetables and fruits; they are found in the highest concentration in dark, leafy green vegetables such as spinach, collard greens, and kale. Studies have shown that a diet high in these materials have some effect on delaying the advancement of AMD.^{7,8,9,10} The use of synthetic supplements that contain these carotenoids, along with the vitamins C, E, and zinc, have been proven to be an effective means of limiting the disease in patients with advanced signs and symptoms of AMD.¹¹

The use of antioxidants cannot reverse the damage caused by AMD; however, its use may prevent or slow the progression of AMD in certain patients. If dietary supplementation of antioxidants taken along with Vitamins C, E, and zinc is undertaken, this therapy may be most appropriate for individuals who:

- Show early evidence of AMD
- Are over 50 years of age
- Have family history of AMD
- Receive insufficient dietary intake of vitamins and minerals

Additional studies and data are needed to further define the nutritional and antioxidant therapies and their relative dosages for the prevention of AMD. Other risk factors, although not thoroughly understood, may include smoking, alcohol intake, excessive sunlight, and elevated total cholesterol levels. Until further study results are available, the American Optometric Association recommends patients reduce their risk of AMD by wearing appropriated sun protection to limit ultraviolet exposure, stopping smoking, moderating any alcohol consumption, maintaining a nutritionally balanced diet, increasing consumption of foods or supplements that contain antioxidants, and seeking periodic optometric retinal examinations.

¹Prevent Blindness America. Vision Problems in the U.S. Schaumburg, IL: Prevent Blindness America 1994

²Cavallerano AA, Cummings JP, Freeman PB, et al. Optometric Clinical Practice Guideline on Care of the Patient With Age-Related Macular Degeneration. St. Louis: American Optometric Association, 1994

³Van Der Hagen AM, Yolton DP, Karninski MS, Yolton RL. Free Radicals and Antioxidant Supplementation: A Review of Their Roles in Age-Related Macular Degeneration. J Am Optom Assoc 1993; 64:871-878

⁴Hayes KC. Retinal Degeneration in Monkeys Induced by Deficiencies of Vitamin E or A. Invest Ophthalmol 1974; 13:499-510

⁵Ham WT, Mueller Ha, Ruffolo JJ et al. Basic Mechanisms Underlying the Production of Photochemical Lesions in the Mammalian Retina. Curr Eye Res. 1984; 3:165-174

⁶Organisciak DT, Wang HM, Li Z, Tso MO. The Protective Effect of Ascorbate in Retinal Light Damage of Rats. Invest Ophthalmol 1985; 26:1580-1588

⁷Seddon JM, Ajani UA, Sperduto RD, et al. Dietary Carotenoids, Vitamins A, C, and E and Advanced Age-Related Macular Degeneration. JAMA 1994; 272:1413-1420

⁸Age-Related Macular Degeneration Study Group. Multicenter Ophthalmic and Nutritional Age-Related Macular Degeneration Study-part 1; design, subjects and procedures. J Am Optom Assoc 1996; 67:12-29

⁹Age-Related Macular Degeneration Study Group. Multicenter Ophthalmic and Nutritional Age-Related Macular Degeneration Study-part 2: antioxidant intervention and conclusions. J Am Optom Assoc 1996; 67:30-49

¹⁰The Eye Disease Case-Control Study Group, Antioxidant Status and Neovascular Age-Related Macular Degeneration. Arch Ophthalmol 1993; 111:104-109

¹¹A Randomized, Placebo-Controlled, Clinical Trial of High-Dose Supplementation With Vitamins C and E, Beta Carotene, and Zinc for Age-Related Macular Degeneration and Vision Loss. Arch Ophthalmol 2001; 119:1417-1436