



NUTRITION'S ROLE IN EYE HEALTH



What optometrists should know
and how to share this information with patients.

BY JENNIFER WADEMAN, OD

How much do eye care providers really know about the role of nutrition in eye health? Do we talk with our patients about the influence of diet on eye disease? Do we offer nutritional recommendations to our patients? We understand the importance of UV protection in delaying the onset of cataracts, of the Amsler grid in detecting changes in vision, and of blue light-blocking lenses for potentially protecting the macula, but

what about the importance of nutrition for preventing eye disease and protecting vision?

MAKE A DIFFERENCE

We see diabetic patients in our exam chairs every year for both comprehensive eye examinations and diabetic examinations. We are often the first to detect changes in a patient's blood sugar by evaluating the blood vessels in the back of the eye. Counseling patients with diabetes

on proper blood sugar control and providing nutritional recommendations can help prevent these patients from developing diabetic eye disease.

The Age-Related Eye Disease Study (AREDS) and AREDS2^{1,2} evaluated the ability of pharmacologic doses of nutrients and supplements such as vitamins, minerals, and essential fatty acids to prevent or delay the onset of eye disease. These studies spurred further research on the use of such complementary and alternative medical treatment. AREDS evaluated the risk factors, clinical course, and progression of age-related macular degeneration (AMD) associated with high-dose antioxidant supplementation.

The AREDS formulation is based on these study data, with dose-specific recommendations for nutritional supplementation to reduce the risk of progression of AMD.² The AREDS2 formulation offers a safer alternative for patients with AMD by substituting lutein and zeaxanthin for beta-carotene, which was a component of the original formulation that was found to be associated with an increased risk of lung cancer in former smokers.^{1,3}

KEY NUTRIENTS THAT MAY PROTECT OCULAR HEALTH



Vitamin A (eg, eggs, carrots, spinach)



Vitamin C (eg, broccoli, oranges, berries)



Vitamin E (eg, nuts, seeds, kale)



Lutein and Zeaxanthin (eg, egg yolks, kale)



Zinc (eg, beef, beans, nuts, cereals, oysters)



Essential Fatty Acids (eg, salmon, tuna)

A CLOSER LOOK AT COMMON NUTRITIONAL SUPPLEMENTS

Let's take a look at the role of vitamins, minerals, and fatty acids in the prevention of eye diseases, particularly cataract, diabetes, and dry eye disease (DED).

Vitamin A

Vitamin A can be found in green leafy vegetables, orange vegetables, eggs, and cantaloupe. This vitamin plays an important role in corneal

lubrication and ocular moisture,^{4,5} and it has been studied in relation to DED. In a 2019 study by Alanazi et al, short-term oral vitamin A supplementation improved the quality of tears in patients with DED.⁶ Limitations of this study include its small sample of participants and short duration.

Vitamin C

Vitamin C is an antioxidant that aids the formation of collagen in the cornea, helps to maintain

the integrity of blood vessels in the retina,⁷ and may play a role in cataract prevention.¹ Good sources of vitamin C include citrus fruits, broccoli, brussels sprouts, bell peppers, and berries. The recommended daily intake (RDI) of vitamin C is 75 to 90 mg. The AREDS2 formula contains 500 mg.^{1,7}

Vitamin E

The primary function of vitamin E in the eye is to keep cells healthy. This antioxidant may fight off infection, decrease the risk of AMD, and guard against night vision problems.¹ Specifically, vitamin E enhances lutein's ability to protect retinal pigment epithelial cells.¹ Good sources of vitamin E include nuts, seeds, and dark leafy vegetables. The RDI of vitamin E is 22.4 IU. The AREDS2 formula contains 400 IU.^{1,7}

Lutein and Zeaxanthin

Lutein and zeaxanthin are the two main carotenoids with which we should all be familiar. They enrich the macula⁵ and are thought to protect the retina by absorbing short-wave blue light and UV radiation, reducing oxidative stress.⁸ Egg yolks are the best source of lutein and zeaxanthin, but green leafy vegetables are also good sources. The typical daily intake for most individuals is only 1 to 3 mg, whereas the AREDS2 formula contains 10 mg of lutein and 2 mg of zeaxanthin.^{1,7}

Zinc

The retina contains a higher concentration of zinc than any other body organ. This mineral can be found in beef, poultry, pork, beans, cereals, and nuts. Zinc is thought to maintain retinal health by protecting against the damaging effects of light. Oysters are the best source of zinc.¹ The RDI of zinc is 11 mg for men and 8 mg women. The AREDS2 formula contains 25 mg of the mineral.^{1,7}

AT A GLANCE

- Proper nutrition can have preventive and protective mechanisms for people's overall health, including ocular health.
- Pharmacologic doses of nutrients and supplements such as vitamins, minerals, and essential fatty acids can prevent or delay the onset of certain eye diseases.
- Eye care providers are perfectly positioned to identify, diagnose, and help prevent a multitude of health issues. They have the expertise to identify nutrition-related health issues and can consistently promote good nutrition.

Essential Fatty Acids

Essential fatty acids—including the omega-3s docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA)—help to prevent AMD, owing to their neuroprotective effects. Sources of these nutrients include cold-water fish such as salmon, trout, tuna, and sardines. Essential fatty acids may reduce inflammation in the eye, and some studies have suggested an association between this form of nutritional supplementation and improvement of dry eye symptoms.^{1,7,9}

MAKING SENSE OF AVAILABLE INFORMATION

We can use the information on some of these nutrients and their protective roles in the eye to offer guidance to our patients on nutritional choices for disease prevention, but it is important that we not make definitive recommendations. Current data can be convoluted and sometimes limited.

Specifically, most studies acknowledge the limitations of multivitamin supplementation for the prevention of cataract due to the barriers against the delivery of those specific antioxidants to regions of the lens.¹⁰ Although several studies have shown

a reduced risk of nuclear cataract development, others show a nonsignificant reduction of cortical cataract and, conversely, an increased risk of posterior subcapsular cataract development with vitamin supplementation.¹¹⁻¹³

As for a connection between DED and supplementation with omega-3 fatty acids such as DHA and EPA, multiple studies report a reduction in symptoms associated with DED and a reduction in the inflammatory mediators involved in DED pathology.^{14,15} However, in the recent Dry Eye Assessment and Management (DREAM) study, omega-3 supplements were no better than placebo for typical patients with DED.¹⁶ The DREAM study compared the improvement in symptoms associated with DED in patients who received omega-3 from fish oil supplements or a placebo. Both the omega-3 and placebo groups reported improvements in symptoms, but there was no statistically significant difference in symptoms between the groups.¹⁶

OCULAR NUTRITION: SPREAD THE WORD

Eye care providers are perfectly positioned to identify, diagnose,

and help prevent a multitude of health issues. We have the expertise to identify nutrition-related health issues and can consistently promote good nutrition. If we are able to identify and diagnose dietary issues, we can gently encourage our patients to make dietary choices that may help to optimize their health and well-being. ■

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