

Can you really eat for healthy eyes?

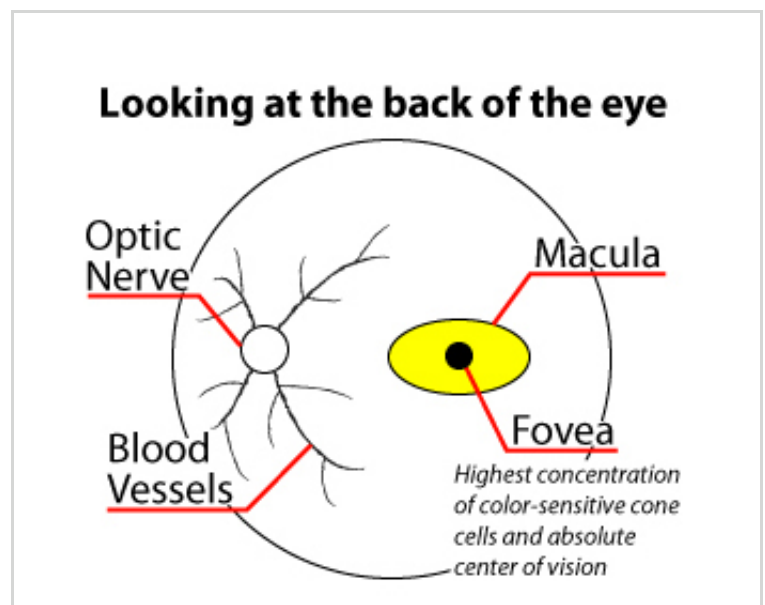


By Jo Seltzer, special to the Beacon

During your next eye exam, your doctor may show you a small viewing box connected to a computer and ask if you want to take a test that might predict your risk for developing macular degeneration.

It's probably a good idea given that age-related macular degeneration (AMD) is the leading cause of blindness in the elderly. Even if you don't yet count yourself among that group, you should know that the disease can get started much sooner.

Many scientists now believe that macular degeneration is associated with the pigment layer on your retina which can begin to deteriorate at any time. An estimated 1.8 million Americans, 40 and older, have advanced AMD and another 7.3 million people with intermediate AMD are at substantial risk for vision loss, according to the American Health Assistance Foundation. That



number is expected to nearly double in the next 12 years.

The test your doctor may recommend is called "Heterochromatic Flicker Photometry." It measures the depth of a layer of yellow pigments that cover the macula – the area of the retina where most of your focused vision takes place.

The good news is that if your pigment layer is on the thin side, you can fatten it up by eating the pigments that concentrate in the retina. The pigments, zeaxanthin and lutein, are found in green leafy veggies and in red or orange peppers. You can also take these pigments in the form of pills.

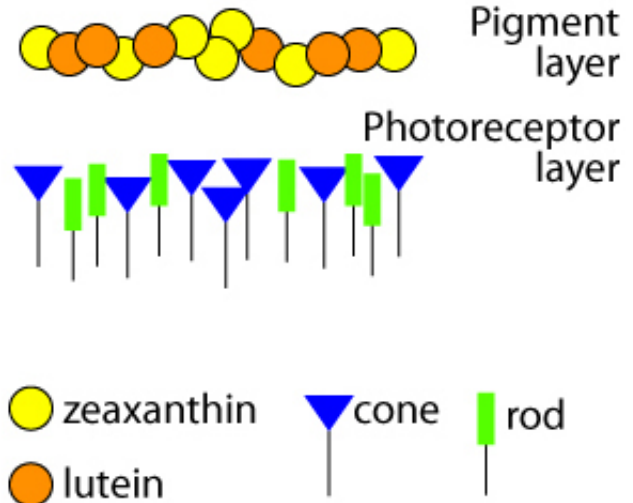
In doing so, you may not only be saving your vision, but perhaps also supporting a Chesterfield-based business and local research projects. ZeaVision markets zeaxanthin and lutein supplements and sponsors research around the world. The Optometry School at the University of Missouri-St. Louis and the Washington University School of Medicine are also engaged in research projects involving macular degeneration. More on that later.

HOW THESE PIGMENTS WORK

That popular cartoon character Popeye had the right idea. He ate his spinach and got stronger. By eating certain foods, many researchers now believe, you can strengthen the pigment layer in your retina and stave off macular degeneration.

Follow Popeye's example and you will eat a lot of lutein. You can add zexanthin by eating mangos, oranges and red and orange peppers. Egg yolks are a rich supply of these pigments, as well.

A diagram of the Retinal Macula



In the central fovea, cones are very dense. This cone-rich area is covered with more zeaxanthin than lutein. Away from the center of the macula, rods become more dense, and lutein is the more abundant pigment.

Scientists believe that pigments in the retina may serve several functions.

They absorb short wavelength blue light believed to be damaging to the retina's rods and cones.

They are antioxidants, scavenging destructive free radicals.

They may have anti-inflammatory activity.

They may sharpen visual acuity by correcting an optical phenomenon called chromatic aberration.

The average American consumes about 1 mg of zeaxanthin/lutein per day. Though there is no official recommended daily amount (RDA), studies have indicated that 4-6 mg per day is needed for eye protection. So those who skimp on fruits and veggies may want a dietary supplement.

ZEAVISION'S VISION

Chesterfield-based ZeaVision markets zeaxanthin/ lutein supplements as well as the pigment measuring instrument called the QuantifEye. It also sponsors research on the zeaxanthin pigment in St. Louis and around the world.

ZeaVision's founder, Dr. Dennis Gierhart, Ph.D., has been interested in zeaxanthin for a long time. As a chemist, Gierhart had been in the food industry, working on the pigment as an additive to chicken feed. (It seems we Americans like our chickens to have yellow skin.) But when he learned how extensively the pigment is concentrated in the center of the retina, he had a "Eureka" moment. It seemed clear to him that

HOW THE TEST WORKS

DESCRIPTION OF THE MACULA

A small oval area in the retina called the macula contains a double layer of photoreceptor cells. With its high density of receptors, predominantly cone cells, the macula is the source of visual acuity. The macula is often described as yellow, because a layer of yellow pigments, a mixture of the carotenoids lutein and zeaxanthin, cover it. In contrast, the parts of the retina responsible for peripheral vision lack the yellow pigment covering.

The heterochromatic flicker photometry test measures the

zeaxanthin and vision must be linked.

In December 2000 he founded ZeaVision with a commitment to investigating the role of zeaxanthin in visual health. The company owns several patents for producing and formulating zeaxanthin. At present, the zeaxanthin in its EyePromise supplements come from red peppers.

Gierhart takes pride in the fact that his supplements have undergone full FDA scrutiny, though that's not a requirement. In addition, since his zeaxanthin comes from a natural source, he has every production run tested in three independent labs both for composition and biological availability.

ZeaVision sponsors basic research in Spain, England, Holland, and about a dozen laboratories in the United States. Projects range from rodent models to double blind human studies. For example, in collaboration with researchers from Wayne State University in Detroit, Gierhart recently presented evidence that zeaxanthin can lessen retinal damage in diabetic rats. His company website has a section devoted to digests of contemporary zeaxanthin research

LOCAL UNIVERSITIES SEE PROMISE IN RESEARCH

yellow pigment layer.

The test is performed by having the patient respond to changes in light patterns. The instrument projects alternating flashes of equally bright yellow and blue light onto the retina. When the interval between bursts is very short, the eye perceives a steady light. As the interval between flashes becomes longer, the eye perceives flickering light. In the test patient indicates the point of transition from a perceived steady light to a flicker.

Basically, the heterochromatic flicker test works on the simple physical principle that yellow absorbs blue light.

Peripherally, all colors reach the retina. The test-giver first concentrates on the peripheral vision area, and increases the interval between bursts until the test-taker sees a flicker. Since these peripheral areas have no yellow pigment covering them, both colors are perceived equally well.

In the macula, the yellow pigment blocks some blue light from reaching the retina. The test-giver then concentrates on the macular area, where the yellow pigment absorbs some of the blue

Dr. Carl Bassi, Ph.D., at the UMSL Optometry School is involved in several basic research projects investigating the effects of zeaxanthin on normal vision. At Washington U. Medical School, Dr. Rajendra Apte, M.D., does clinical research to see if these pigments and other supplements slow the progress of the disease in patients who already are diagnosed with macular degeneration.

Bassi is studying the relationship between zeaxanthin and some aspects of vision in the healthy eye. He was a consultant in developing an instrument called QuantifEye and now uses it to measure retinal pigment density in volunteers.

People in the lower quartile of pigment density can participate in a six month double blind study. After an eye exam, participants are tested to see how quickly they recover from having a bright light shined in their eye – a "macular stress test." They are also tested for contrast perception with and without glare. Then they take either a zeaxanthin supplement or a placebo for six months. During that period, researchers measure macular pigment density, recovery from glare, and contrast perception three more times. Bassi is just beginning to evaluate some of the data to see if zeaxanthin has an effect.

In another study, people who complain of excessive light sensitivity take zeaxanthin or a supplement for 6 months to see if the supplement improves this condition. Bassi has a patent pending on an instrument that can measure light sensitivity.

WASHINGTON UNIVERSITY INVESTIGATES TREATMENTS FOR EARLY MACULAR DEGENERATION

Patients in the early stages of macular degeneration are usually advised to take the so-called AREDS supplements which contain vitamins A and C, beta-

pigment absorbs some of the blue light. As a result the test-taker perceives the input light as a flicker sooner (shorter intervals between flashes.) The denser the layer of pigment, the more incoming blue light is absorbed, and the earlier the patient sees a flicker.

Software in the QuantifEye instrument then takes the difference between flicker perception centrally and peripherally, feeds the numbers into a mathematical formula and arrives at a value for pigment density.

carotene, zinc and copper. A ten year study sponsored by the National Institutes of Health found that this formulation reduced the risk of progression from early to late disease by 25%.

During the course of the AREDS (Age Related Eye Disease Study), other investigators began to publish reports that zeaxanthin/lutein also slowed macular degeneration. So the participants in that study were asked about their dietary habits. The patients who did well on average also had diets higher in zeaxanthin, lutein, and omega-3-fatty acids.

Now a second AREDS study is beginning, which will evaluate the risk reduction of zeaxanthin, lutein, and omega-3 -fatty acids. Apte from Washington University's Department of Ophthalmology, explains that this study will be more complex than the first.

"It would be unethical not to offer all patients the option of taking the AREDS1 supplements, since they have been shown to work." The new study, which aims to enroll 5000 patients and study the progress of their disease over another ten years, will look at the three new supplements, with and without the AREDS1 supplements.

Apte points out that sufficiently slowing down the progress of macular degeneration in older patients is almost equivalent to a cure.

WHAT DOES ALL THE RESEARCH SHOW?

In general, retinal pigment density declines with age. However, the question of whether thinning of the pigment layer actually causes age-related macular degeneration in people unlikely to be answered by direct experimentation. After all, ethicists would not look with favor on protocols that might lead to blindness.

Nonetheless, a number of recent studies have established strong connections. Many of these studies have had large patient populations, and several have followed their human subjects for five to ten years.

Here are the correlations:

High plasma levels of zeaxanthin/lutein are associated with dense retinal pigment.

People whose diets include high levels of foods containing zeaxanthin/lutein have a lower rate of developing macular degeneration.

Increased pigment density is associated with a decreased risk of macular degeneration.

So, if you can spare about \$20 and five minutes, you might consider taking that heterochromatic flicker test. If you come out on the low end, eating lots more fruits and veggies, or taking the supplement your eye doctor recommends may mean you can keep your sight for the rest of your life.

Contact Beacon health editor [Sally J. Altman](#).

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