



## Vision Alert

---

### September 2007

#### Dietary Lutein and Zeaxanthin Protect Eyes from Wet-Type Macular Degeneration

ROCKVILLE, Md., Sept. 12 -- Risk of developing the neovascular or "wet" type of age-related macular degeneration is significantly reduced in patients with diets rich in lutein and zeaxanthin, investigators found.

Among more than 4,500 adults ages 60 to 80, those with diets highest in the carotenoids lutein and zeaxanthin had a 35% lower risk compared with patients who consumed little of the nutrients, reported Traci E. Clemons, Ph.D., of the Emmes Corporation here, and colleagues, in the September issue of the *Archives of Ophthalmology*.

Their multi-center Age-Related Eye Disease Study research group also found that diets high in lutein and zeaxanthin -- found in eggs, leafy greens, and cruciferous vegetables such as broccoli -- were associated with a 55% reduction in risk of geographic atrophy.

The group also saw an association for a 27% drop in risk for large or extensive intermediate drusen, the lesions seen with age-related macular degeneration.

There were no clear associations, however, between risk of macular degeneration and the other nutrients studied, including retinol, alpha tocopherol (vitamin E), or vitamin C.

"If these cross-sectional results can be confirmed in prospective samples and experimental studies, lutein and zeaxanthin may be considered as useful agents in food or supplement-based interventions designed to reduce the risk of [age-related macular degeneration]," they wrote.

The report, the group's 22<sup>nd</sup>, focused on the relationship between the various nutrients and neovascular age-related macular degeneration risk in the study cohort, which consisted of 4,519 adults who ranged in age from 60 to 80 at enrollment.

The researchers used color fundus photographs to categorize the participants according to severity of macular degeneration, as follows:

- Group 1 (1,115 patients) had fewer than 15 small drusen and served as referent controls.
- Group 2 (1,060 patients) had at least one eye with one or more intermediate drusen (63 ?m-124 ?m), extensive small drusen (cumulative area at least 1/12 diameter of AREDS standard disc area), or pigment abnormalities associated with age-related macular degeneration.



## Vision Alert

---

### September 2007

#### Dietary Lutein and Zeaxanthin Protect Eyes from Wet-Type Macular Degeneration

- Group 3 (1,568 patients) had at least one eye with one or more large drusen (125  $\mu$ m or larger) or extensive intermediate drusen (soft, indistinct drusen present in a cumulative area equivalent to that occupied by 20 drusen each having a diameter of 100  $\mu$ m or 65 distinct drusen each having a diameter of 100  $\mu$ m).
- Group 4 (118 patients) had at least one eye with definite geographic atrophy anywhere within 3000  $\mu$ m of the fovea.
- Group 5 (658 patients) had evidence suggesting choroidal neovascularization retinal pigment epithelial cell detachment in one eye (non-drusenoid retinal pigment epithelial detachment, serous sensory or hemorrhagic retinal detachment, subretinal hemorrhage, subretinal pigment epithelial hemorrhage, subretinal fibrosis) or scars of photocoagulation for macular degeneration.

The investigators estimated the patients' nutrient intake from their responses to a self-administered semi-quantitative food frequency questionnaire at enrollment. The intake values, including nutrients from vitamins and dietary supplements, were energy adjusted and classified by quintiles. The authors also created logistic regression models to explore the relationship between diet and macular degeneration.

They found that in an analysis adjusted for total energy intake and non-nutrient-based risk factors, there was an inverse association between dietary intake of lutein/zeaxanthin and neovascular age-related macular degeneration, with an odds ratio for patients in the highest versus lowest quintiles of 0.65 (95% confidence interval, 0.45 to 0.93).

The patients with the highest intake of the two carotenoids also had a lower risk for geographic atrophy (odds ratio 0.45, 95% CI, 0.24 to 0.86), and for large or extensive intermediate drusen (odds ratio 0.73; 95% CI, 0.56 to 0.96), again comparing the highest with the lowest quintiles of intake.

"There is biologic plausibility to our findings because lutein and zeaxanthin are the major diet-based macular carotenoids," the investigators wrote. "These compounds may affect processes modulating light or oxidant exposure. Lutein and zeaxanthin have the capacity to filter short-wavelength light associated both with photochemical damage and the generation of reactive oxygen species that attack cellular lipids, proteins, and nuclear material; these carotenoids also have the capacity to reduce the potency of nascent reactive oxygen species."

The authors noted that the results could have been confounded by the case-control sampling design of the study and by recall bias of food intake on the part of study participants.



## Vision Alert

---

### September 2007

#### Dietary Lutein and Zeaxanthin Protect Eyes from Wet-Type Macular Degeneration

##### Action Points

- Explain to patients that the antioxidant compounds lutein and zeaxanthin -- found in eggs, leafy greens, and cruciferous vegetables such as broccoli -- according to this study appear to be associated with protection against the neovascular or "wet" type of age-related macular degeneration.
- Note that other nutrients studied by the researchers -- retinol, alpha tocopherol (vitamin E) and vitamin C -- were not associated with protection.
- Explain that this study did not look at the association between diet and "dry" age-related macular degeneration.
- Point out that the study design is susceptible to uncontrolled confounding and cannot prove causality.

The study was supported by contracts from the National Eye Institute, with additional support from Bausch and Lomb. There were no reported author conflicts of interest.