

Macular Pigment Imaging in AREDS II Participants: An Ancillary Study of AREDS II Subjects Enrolled at the Moran Eye Center

P. Bernstein¹, F. Ahmed¹, W. Gellermann², M. Sharifzadeh², I. Ermakov²

¹Moran Eye Center, ²Physics, University of Utah, Salt Lake City, Utah, USA

Purpose: The Age-Related Eye Disease Study II (AREDS II) is evaluating the potential protective role of the macular pigments lutein and zeaxanthin against age-related macular degeneration (AMD) in a randomized, placebo-controlled manner in over 4000 patients nationwide at nearly 100 sites. Only our site, however, is measuring tissue levels and distributions of the macular pigments at each visit. Here we provide baseline characteristics of our enrolled subjects prior to randomization.

Methods: Baseline levels and distributions of macular pigment carotenoids were determined via HPLC for serum, autofluorescence imaging (AFI) for retina, and resonance Raman spectroscopy (RRS) for skin. Genotyping of genetic variants strongly associated with carotenoid metabolic pathways or with risk of AMD was performed in comparison to 300 normal controls.

Results: 53 subjects (29 female and 24 male) out of a total of 55 Moran Eye Center AREDS II patients enrolled in this ancillary study. Total serum carotenoids and, to a lesser extent, zeaxanthin + lutein correlate with skin Raman values ($r=0.4131$, $p=0.0039$), but peak macular pigment optical density (MPOD) did not. Many of the participants have peak MPOD well above our age-adjusted normal range for unsupplemented individuals, consistent with the fact that >70% of our patients reported regular consumption of lutein and/or zeaxanthin supplements prior to enrollment.

Conclusions: Noninvasive skin measurements of total carotenoids are a good surrogate marker for blood values at the baseline visit, but not for peak MPOD in the retina. The high levels of peak MPOD at enrollment suggest that our site's subjects were already very aware of the potential benefits of lutein and zeaxanthin supplementation. Over the next five years, our ancillary AREDS II study will continue to provide unique information on the relationship of macular carotenoids and prospective risk of advanced AMD at a tissue level in a well defined cohort of high risk AMD patients with and without carotenoid supplementation.