

# ***Nutritional Supplements in Eyecare: Understanding the Science – Part 1 - Carotenoids & The Macula***

**Ryan H. Powell, OD**

**Kansas City, MO**

**drpowell@vseyecare.com**

One-Hour CE

Category: Treatment & Management of Ocular Disease: Post. Seg. (PS)

Course Description:

The Macular Pigments: Lutein, Zeaxanthin and Meso-Zeaxanthin play a vital role in maintaining the health and performance of the macula throughout our lives. This course will introduce carotenoids as found in nature and diet and the specific deposition and distribution of these nutrients at the macula. The course will progress to discuss the evolution of research assessing the impact of macular carotenoids in patients with age-related macular degeneration and in healthy patients, by covering key clinical trials and case studies. In conclusion, the practical implementation of this information will be discussed. The speaker will share the clinical explanation he uses when educating his patients about macular carotenoids and how he summarizes the clinical research for his patients.

## Course Content:

### A. What are Carotenoids

- i) Sources in foods, review of US dietary intake and nutritional values
- ii) How to explain Carotenoids to patients
- iii) The Macular Pigments: Lutein, Zeaxanthin and Meso-Zeaxanthin
- iv) Placement of Macular Pigments in the retina layers

### B. Age-Related Macular Degeneration

- i) A review of the physiological changes occurring in the retina tissues in early versus late-stage Age Related Macular Degeneration
- ii) A review of modifiable risk factors in Age Related Macular Degeneration
- iii) A review of clinical data discussing the impact of new research on treatment plans:

### C. Age-Related Eye Disease Study (AREDS):

- i) AREDS 1- Benefits, Risk with Beta-carotene for smokers
- ii) AREDS 2 – Benefits & Safety of Lutein & Zeaxanthin
- iii) AREDS 2 established lutein and zeaxanthin, still has 80 mg zinc

### D. Meso-Zeaxanthin Ocular Supplementation Trial (MOST)

- i) Evidence-based recommendation for Early AMD patients
- ii) Review of preferential placement of Meso-Zeaxanthin
- iii) Impact of RPE65 enzyme on conversion of Lutein to Meso-Zeaxanthin

### E. Central Retinal Enrichment Supplementation Trial (CREST): European Research Council funded studies

- I) Crest AMD
  - a) Impact of adding Meso-Zeaxanthin
  - b) Review of Zinc recommendations
- II) Crest Normal
  - a) Implications for “healthy” patients

### F. Visual Performance: A review of Case Studies and Clinical Science Demonstrating Improved Visual Performance when macular carotenoids are taken and serum carotenoid levels and MPOD are increased.

- i. A Review of Visual Performance Measures:
  - a) Speed: Temporal Visual Processing
  - b) Decision Making: How Long it takes to act on an event
  - c) Contrast Sensitivity: A higher level of acuity measure

ii. Case Study Review of Athlete Results with Macular Carotenoid Supplementation (Georgia Athlete Case Study)

- a. Improved Coincident Anticipation Timing with increased Macular Pigment Optical Density
- b. Improvement in Glare Sensitivity with increase in MPOD
- c. Increased Visual Temporal Processing Speed with Increased MPOD
- d. Contrast Threshold reduction with increased MPOD
- e. Reduced Photostress recovery time with increased MPOD
- f. Subjective Feedback Results
- g. Baseball Statistical Analysis Comparison before supplementation and after supplementation

G. Impact of Formulation of bioavailability, stability and potency

- i) Importance of bioavailability
- ii) COAST Study
- iii) Carotenoids Stability – impact of formulation: powder vs. oil

H. Conclusion

- i) Review of key concepts
- ii) Implementing the Science in Clinical Practice
  - a. A review of how to communicate to patients what macular carotenoids are and how they impact or vision and our risk for macular degeneration