SCIENCE SUMMARY

BENEFITS OF ZEAXANTHIN & LUTEIN IN VISUAL PERFORMANCE

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Zeaxanthin and Visual Function (ZVF) Clinical Research Study

(Richer, et. al. - Journal of Optometry, 2011)

- 60 elderly subjects with early to moderate AMD were supplemented
- 12 month study period
- 3 study arms: (1) Patients were supplemented with 8 mg of dietary zeaxanthin per day or (2) 9 mg of lutein, or (3) a combination of the 2 carotenoids. (17 mg total)
- Results: Subjects supplementing high dose (8mg) dietary zeaxanthin daily achieved
    - Improved high contrast near visual acuity of 8.5 letters or 1.5 lines
    - Clearing of central scotomas
    - Improved foveal shape discrimination
    - Improved night driving skills
- Only EyePromise brands contain 8 mg or more dietary zeaxanthin

Macular Re-pigmentation Enhances Driving Vision in Elderly Adult Males with Macular Degeneration

(Richer, et. al. - Clinical & Experimental Ophthalmology, 2012)

- 60 elderly subjects with early to moderate AMD
- Supplemented 8 mgs of dietary zeaxanthin per day for 12 months.
- Self-described improvement of driving skills was strongly associated with macular re-pigmentation via high dose dietary zeaxanthin supplementation.

The Influence of Dietary Lutein and Zeaxanthin on Visual Performance

(Stringham, Hammond, et. al. - Journal of Food Science, 2009)

- Retinal increase of zeaxanthin and lutein (MPOD) reduced glare disability and improved photo- stress recovery time.
- Contrast sensitivity improvement was achieved in supplemented subjects.
- Glare induced photostress recovery times can be reduced by 5 seconds by increasing macular pigment via supplementation. This equates to 440 ft. of improved reaction time at 60 MPH while driving at night.

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BENEFITS OF ZEAXANTHIN & LUTEIN IN VISUAL PERFORMANCE

A Double-Blind, Placebo-Controlled Study on the Effects of Lutein and Zeaxanthin on Neural Processing Speed and Efficiency

(Bovier, Renzi, Hammond, et al. – Public Library of Science (PLOS), 2014)

- 64 subjects (young healthy adults)
- 18-32 years of age
- 4 month study
- 3 study arms
    - EyePromise Zeaxanthin (20 mgs of dietary zeaxanthin)
    - EyePromise vizual EDGE PRO™ supplement (26 mgs dietary zeaxanthin, 8 mgs lutein)
    - Placebo
- Subjects in the EyePromise Zeaxanthin and EyePromise vizual EDGE PRO arms experienced significant improvements in visual processing speed and reaction time, each P= <0.005:
- A 14% improvement in Temporal Contrast Sensitivity Function
- A 12% improvement in Critical Flicker Fusion Threshold
- A 10% improvement in Visual Motor Reaction Time
- A 20% increase in Macular Pigment Optimal Density (MPOD)
- High dose zeaxanthin and lutein supplementation improved visual processing speed, even among young healthy adults.
- Supplemented subjects achieved improved ability to process information and react faster.

A Double-Blind, Placebo-Controlled Study on the Effects of Lutein and Zeaxanthin on Photostress Recovery, Glare Disability, and Chromatic Contrast

(Hammond, Fletcher, Roos, et. al. – Investigative Ophthalmology and Visual Science, 2014)

- 115 subjects (young healthy adults)
- Average age of 22 years
- Macular pigment optical density increased significantly in the zeaxanthin and lutein arm versus placebo at all eccentricities (10, 30, 60, and 105 minutes from the center of the macula).
- Serum zeaxanthin and lutein increased significantly at first follow-up visit (3 months), and remained elevated throughout the 1 year intervention period.
- Chromatic contrast and photostress recovery time improved significantly versus placebo.
- Glare disability was correlated with increased macular pigment density during the study period.
- Daily supplementation with zeaxanthin and lutein resulted in significant serum increase, MPOD score, improved chromatic contrast, and photostress recovery.

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BENEFITS OF ZEAXANTHIN & LUTEIN IN VISUAL PERFORMANCE

A Randomized Placebo-Controlled Study on the Effects of Lutein and Zeaxanthin on Visual Processing Speed in Young Healthy Subjects

(Bovier, Hammond, et. al. – Archives of Biochemistry and Biophysics, 2014)

- 69 subjects (young healthy adults)
- 18-32 years of age
- 4 month study
- 3 study arms
  - EyePromise vizual EDGE PRO supplement (26 mgs dietary zeaxanthin, 8 mgs lutein)
  - EyePromise Zeaxanthin (20 mgs of dietary zeaxanthin)
  - Placebo
- Neither MPOD nor temporal contrast sensitivity function changed in the placebo arm.
- Both improved significantly with high dose dietary zeaxanthin supplementation.

Macular Pigment and Visual Performance in Glare: Benefits for Photostress Recovery, Disability Glare, and Visual Discomfort

(Stringham, Garcia, Smith, et. al. – IOVS, 2011)

- 26 healthy subjects
- Average age of 31 years
- Higher macular pigment levels correlated with all outcome measures
  - Improved photostress recovery time
  - Reduced glare
  - Diminished visual discomfort
- Higher macular pigment levels resulted in faster photostress recovery, lower disability glare contrast thresholds, and lower visual discomfort.

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BENEFITS OF ZEAXANTHIN & LUTEIN IN VISUAL PERFORMANCE

The Influence of Dietary Lutein and Zeaxanthin on Visual Performance

(Stringham, Bovier, Wong, Hammond, et. al. – Concise Reviews in Food Science, 2009)

- High-intensity lamps (such as stadium lights) often cause visual discomfort.
- Macular Pigment Optical Density (MPOD) filters high energy visible blue light .
- Visual discomfort was strongly attenuated for much of the blue region of the visible light spectrum, suggesting the filtering properties of macular pigment serve to reduce visual discomfort associated with central viewing of any light containing short wavelengths.
- Findings suggest small increases in MPOD could contribute to visual comfort benefits.
- There was a significant inverse relationship between photostress recovery and MPOD.
- Higher MPOD values resulted in shorter photostress recovery time.

The Effects of Macular Carotenoid Zeaxanthin on Visual Performance and Neural Efficiency in Young, Healthy Subjects and College Athletes

(Renzi, Bovier, Shon, et. al. – Macular carotenoids & AMD conference poster 2011)

- 7 college baseball players (male)
- Average age of 20.3 years
- Subjects supplemented with 20 mgs of dietary zeaxanthin per day experienced:
  - MPOD increase
  - Reduced glare and improved photostress recovery time
  - Improved contrast enhancement
  - Improved fixed and variable reaction times
  - Improved coincidence anticipation timing accuracy at the highest frequency
  - Improved temporal processing speed