The Critical Role of Macular Carotenoids in the Age of Increasing High-Energy *Blue Light* Exposure

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Consumers are aware of the damaging effects of sunlight and protect themselves...

But how many know that electronics emit high-energy **BLUE LIGHT**?

The Vision Council reports on digital eye strain, 2012.
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By 2020, 90% of indoor lighting expected to be LED/CFL—sources of high-energy BLUE LIGHT.

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TV and/or videos
• 29% of infants 1 ½ hours
• 64% of babies 2 hours

Computers
• 91% of children use one

TV screen media daily
• 7 hours daily consumption 8-18 years old

Adults spend on average 9.5 hours in front of a screen
“Blue spikes” are common from electronic devices and LED lighting

Even though it appears white (or “warm white” as in the case of LED lighting), electronic devices are characterized by an intense high-energy **BLUE LIGHT** component


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High-energy **BLUE LIGHT** penetrates deeper into eye

Most damaging wavelengths of blue light can be as low as 415 nm to as high as 500 nm$^{1,2}$

2. Environmental Health Perspectives. 2014; 122(3), A81.

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High-energy *BLUE LIGHT* exposure: An emerging risk factor for visual health and eye fatigue

<table>
<thead>
<tr>
<th>Short-term Exposure</th>
<th>Long-term Exposure</th>
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<tbody>
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<td>Eye strain, visual fatigue, headaches</td>
<td>Progressive loss of visual function</td>
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Consequences of repeated exposure to high-energy *BLUE LIGHT* are immediate:

- *Photo-cellular changes occur in as little as 3 hours*\(^1\)
- *Damage to the photoreceptor layer in as little as 18 hours*\(^2\)
- *Retinal damage and apoptosis (cell death) in as little as 9 days*\(^3\)

2. Environmental Health Perspectives. 2014; 122(3), A81.
Our eyes are bombarded with high-energy **BLUE LIGHT** daily...

...but lutein and zeaxanthin isomers support our eyes by:

- Filtering high-energy **BLUE LIGHT**
- Protect against oxidative stress


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Lutein, RR-zeaxanthin and RS-zeaxanthin—key macular carotenoids

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Lutein and Zeaxanthin broaden wavelength absorbency of high energy blue light


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LAMA I
Lutemax 2020 and MPOD: Advanced support for healthy eyes
LAMA I: Lutein, Vision and Mental Acuity I

• Characterize response dynamics in blood and retina of macular carotenoids versus placebo

• Supplementation effects
  – Psychological stress and overall health status
  – Oxidative stress
  – Inflammation

• RDBPC 12 week intervention trial (N=28)
  – Placebo (n = 5)
  – L 6 mg, Zi 1.2 mg (n = 7)
  – L 10 mg, Zi 2 mg (n = 8)
  – L 20 mg, Zi 4 mg (n = 8)
LAMA I study summary - rapid retinal response at all doses with Lutemax 2020

• Significant dose-dependent serum response

• Readily bioavailable, robust retinal response

• Significant ↑ MPOD
  – after 8 wks: 10- and 20-mg vs placebo
  – after 12 wks: 6mg vs placebo (faster than 10mg in other studies)

• Smooths out central dip (↑ central macular pigment)
Significant dose-dependent serum response for Lutein

Serum lutein concentration (µg/mL) vs. Time (weeks)

- Placebo
- 6mg
- 10mg
- 20mg

n = 27

MCC 2015
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Serum zeaxanthin isomers (µg/mL)

Significant dose-dependent serum response for Total Zeaxanthin

- Placebo
- 6mg
- 10mg
- 20mg

Time (weeks)

n = 27

MCC 2015
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Lutemax 2020 supplementation significantly \( \uparrow \) MPOD at all doses vs placebo

![Graph showing the relationship between lutein dose and MPOD response](image)

Higher the lutein dose greater the MPOD response

MCC 2015

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Improved spatial profile of MPOD at 12 weeks with Lutemax 2020

**Typical central dip**

**Increased central macular pigment smooths out dip**

http://www.gaeyeinstitute.com/vitreoretinal-surgery/
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Is dietary intake sufficient to support eye health?

- **60-70 mg** Acceptable Daily Intake (1mg/kg bw)
- **0.8-2.5 mg** EU Average Daily Intake (EFSA 2006)
- **10-40 mg** Study levels
- **6-10 mg** Healthy Populations
- **6-10 mg** Diseased Populations

Lutein intake far below healthful levels

Fisher 2009; Burke 2009; Fisher 2009; Pascucci 2010; Massaki 2010; Rock 2011

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↑ blue light exposure + ↓ dietary intake = a need for Lutemax 2020 for all age groups
Macular carotenoids for your digital lifestyle

- Exposure to high-energy blue light is a growing concern
- Use of digital devices/ energy efficient lighting leads to eye strain/visual fatigue
- Cumulative effects lead to progressive loss of visual function
- All three macular carotenoids act as natural blue light filters and provide broader protection to high-energy blue light
Award-winning Lutemax 2020: Complete eye health for your digital lifestyle

• Lutemax 2020 provides all three macular carotenoids in a 5:1 ratio as found in nature

• Manufactured under a fully vertically integrated supply chain

• FDA-accepted GRAS notification

• Proven faster retinal response and increased MPOD for quicker protection from high-energy blue light
Capsimax & CurcuWIN

Key points on formulation and science
The Capsimax Difference

- For consumers looking to mobilize more energy to support their active lifestyle
- Clean, science-backed, food-source ingredients containing actives shown efficacious in over 90 clinical studies
- Delivers effective levels of capsaicinoids without oral and gastric burning sensation of unprotected red hot peppers
- 2 mg capsaicinoids from Capsimax:
  - Supports lipolysis—the mobilization of fats—for energy production
  - Helps control appetite
  - Helps promote thermogenesis
- Flexibility in variety of formulas – tablets, capsules, protein/meal replacement powders and beverage powders

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Set your brand apart with CurcuWIN in the vast curcumin market

• Long history in curcumin

• 46-times greater relative absorption than standard curcumin

• Increased BA compared to other enhanced forms

• Long-lasting action

• Robust human clinical program
  – Lower dose in healthy population for claims substantiation
  – Once daily

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Thank you

For more information, please visit us at

www.omniactives.com