Lutemax 2020
LUTEIN & ZEAXANTHIN

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USP Verified Dietary Ingredient

Lutein For Every Age

PROTECTIVE ROLE OF LUTEIN & ZEAXANTHIN ISOMERS AGAINST HIGH-ENERGY BLUE LIGHT EXPOSURE: A NEED ACROSS ALL AGE GROUPS

Interest in supplements for eye health is increasing quickly and evident in the category's growth of 9% in 2018, well above the industry standard and expected to be a $530 million industry by 2021. An aging population continues to contribute to the category but the explosive growth in eye health is driven by the "modern condition" and the needs of the 21st century consumer. And as consumers spend more time sheltering in place, the COVID pandemic is serving as an unexpected driver for digital device use. Working and schooling from home, entertainment and staying socially connected is increasing user rates higher and faster than before. Post-COVID, those numbers are expected to remain high as these situational activities transform into lasting behaviors.

Quick Stats

The Blue Light Whitespace

73% of consumers report concern about prolonged exposure to blue light from digital devices

64% are interested in supplements to help protect against blue light

25% of the US general population comprises the new eye heath consumer

Adults nearly spend half of the day interacting with media—approximately 11 hours

84% of teens have their own cellphones and average 7 hours per day of use

Just over half of US children—53% — now own a smart phone by age 11 and spend more than 4 hours on them each day

Nearly half of the population spends 5 or more hours using their smartphone

A "DIGITAL" LIFESTYLE INCREASES BLUE LIGHT EXPOSURE: A CONCERN & OPPORTUNITY

These statistics are a small example of our exposure to blue light. Including other sources of blue light (sunlight, television, laptops, etc.) the amount if exposure can be substantially higher. And factoring in consumers' concerns represent how relevant blue light is becoming. This new eye health consumer is most receptive to taking supplements that proactively help their children and family deal with the consequences of a modern, digital lifestyle. And as they become more educated on the sources and potential consequences of blue light exposure, their intent to purchase almost doubles. Blue light is a white space opportunity for the modern lifestyle: to provide a frontline defense against prolonged exposure from all sources – sunlight and digital devices – by supplementing with nature's most effective eye nutrients, the macular carotenoids.

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BLUE LIGHT & EYE HEALTH:
THE CONSEQUENCES OF INCREASING EXPOSURE

The light the human eye responds to is a narrow band of electromagnetic radiation between 390 to 700 nanometers and within this band, blue light makes up some of the highest energy - between 400 to 500 nanometers. Unlike UV-light exposure, which is almost exclusively from the sun, blue light is emitted from a multitude of sources including sunlight, digital devices (e.g. computers/laptops, smartphones, television screens) and energy-efficient indoor lighting, specifically compact fluorescent and LED bulbs. Therefore, compared to UV-light, daily exposure to blue light from both outdoor and indoor sources can be significantly greater.

Absorption of UV vs blue light

Absorption of almost all ambient UV-light occurs primarily in the cornea and crystalline lens and results of long-term exposure can manifest within the outer layers of the eye as cataracts. Blue light, however, penetrates deeper into the eye and has the potential to damage retinal structures through photochemical and photo-oxidative reactions in the retinal pigment layer. Therefore, UV-light from the sun may be less of a causative factor for conditions associated with retinal damage (such as AMD) and there are several studies to suggest this.

Effects of short-term vs long-term exposure

Short-term exposure of blue light manifests as eye fatigue, eye strain and headaches, whereas long-term exposure may lead to gradual loss of visual function. In a mouse model, it was shown that damage from high-energy blue light can occur within three hours of exposure with significant photoreceptor loss after three weeks. The mechanisms by which blue light damages the eye are multifactorial but primarily mediated through photo-oxidative reactions and the generation of reactive oxygen species (ROS). Due to its high metabolic rate and exposure to high-energy blue light, the retinal pigment epithelial cells (RPE) are a primary target of photo-oxidative damage.

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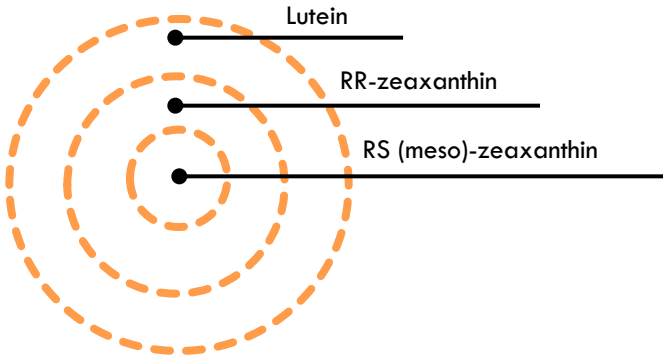
THE DAMAGING EFFECTS OF BLUE LIGHT ARE CUMULATIVE

A vicious cycle

Damage to the RPE is a vicious cycle of oxidative stress and inflammation: oxidative stress triggers an inflammatory response and, in turn, inflammation enhances the production of reactive oxygen species (ROS). Without adequate protection, increased oxidative stress inactivates a major proteolytic pathway called the ubiquitin-proteasome pathway (UPP). The UPP functions to degrade unneeded or damaged proteins in all cells and plays a major role in the regulatory mechanism central to cellular processing that includes inflammation, immune and stress responses, and antigen processing. A fully functioning UPP is required for cells to cope with various stress, including oxidation. However, extensive oxidative insults, as seen in RPE exposed to blue light, can impair UPP, resulting in the accumulation of damaged proteins, dysregulated cell processing and increased inflammation. Since the RPE is a major source of pro-inflammatory mediators and a primary target of photo-oxidative impairment of UPP, the formation of ROS from high-energy blue light may contribute to inflammation and eye-related issues, like AMD.

The macular carotenoids: Preferential protectors against blue light

The damaging effects of blue light is a cumulative process and often the result of a lack of protection by endogenous mechanisms and antioxidants. Several nutrients play critical roles in protecting the retina from photo-oxidative damage and perhaps none are more important than the macular carotenoids: lutein and the zeaxanthin isomers.



macular carotenoids are deposited in specific areas of the retina

Lutein and the two zeaxanthin isomers – RR-zeaxanthin (3R,3'R-zeaxanthin) and RS-zeaxanthin (3R,3'S-RS-zeaxanthin)—are the only three carotenoids found in the eye, specifically in the macula —the area of the retina responsible for highest visual performance and susceptible to the greatest amount of photo-oxidative damage. The location of their respective areas of deposition is highly specific: lutein is preferentially deposited in the peripheral macula, RR-zeaxanthin in the mid-peripheral macula and RS-zeaxanthin in the center of the macula. Increased dietary intake of lutein and zeaxanthin is associated with increased macular pigment density (MPOD – the thickness or density of the protective layer of carotenoids in the macula) in healthy adults. Epidemiological studies have reported an inverse association between dietary intake of lutein and zeaxanthin and the risk of developing age-related eye diseases such as AMD and cataracts.

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SCIENCE SHOWS THE NEED FOR A 3-IN-1 FORMULA

Science says three > one

Researchers, including Bone and Snodderly, have established that the basic biology of the macular carotenoids is protecting the retina and supporting visual performance by acting as blue light filters, quenching ROS and inhibiting lipid peroxidation of cellular membranes generated from photo-oxidation. Bian et.al also suggest that aside from its primary role as an antioxidant, lutein and the zeaxanthin isomers mitigate the inactivation of UPP and partially reverses photo-oxidation-induced inflammation of RPE. Ensuring optimal levels of all three carotenoids is critical to protecting the eye against high-energy blue light. Lutein and the zeaxanthin isomers absorb different wavelength bands of light and together, the three absorb a broader spectrum of high-energy blue light, which offers greater protection of retinal tissue. Supplementation with zeaxanthin resulted in increased levels in the macula and protected against light-induced photoreceptor death. After long-term deficiency, supplementation with lutein or zeaxanthin protected the fovea from blue light damage. Long-term supplementation with all three carotenoids has demonstrated improvements in eyesight, including visual performance and acuity, reduced glare sensitivity, enhanced contrast sensitivity, improved vision in dim light, and reduced chromatic blur.

The specialized locations and functions of each macular carotenoid suggests that the best way to support eye health and visual performance is to consume all three macular carotenoids through diet or supplementation. Given that the average US dietary intake of lutein and zeaxanthin is far below levels shown in research to be beneficial (less than 2 mg lutein and 0.5 mg zeaxanthin), supplementation may be a more viable approach to maintain optimal levels of the macular carotenoids and protect the eyes against high-energy blue light.

Why just lutein isn't enough

While lutein is a potent antioxidant that provides a significant amount of the total carotenoid content of the eye, healthy eyes require more than lutein alone and a formula containing all three macular carotenoids (lutein, RR- & RS [meso]-zeaxanthin) offers greater protection of retinal tissue. Another advantage of a complete macular carotenoid formula is that it improves serum and retinal uptake, increases macular pigment optical density faster than demonstrated in previous studies and, therefore, confers greater antioxidant protection.

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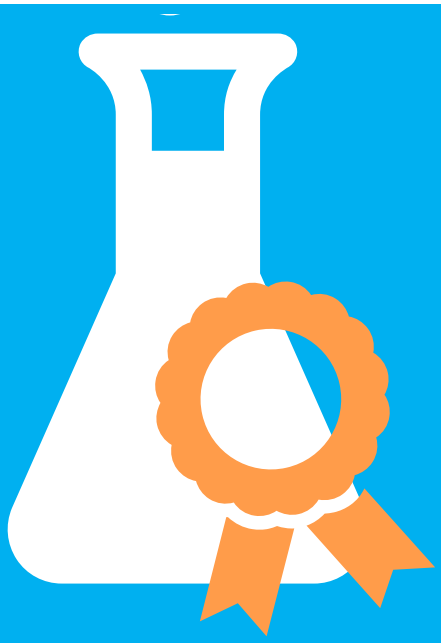
LUTEMAX 2020®: A BALANCED MACULAR CAROTENOID MATRIX TO HELP PROTECT AGAINST BLUE LIGHT



The award-winning science

Multiple randomized, double-blind, placebo-controlled studies using young, healthy subjects, and additional in vitro/in vivo research support the effectiveness of Lutemax 2020 supplementation to support the needs of the 21st century eye-health consumer:

Better bioavailability. Supplementing with Lutemax 2020 significantly increases serum lutein and zeaxanthin concentrations resulting in a rapid, dose-dependent increase in MPOD in as little as 8-weeks. Spatial profile of the macular pigment was also improved with increased central deposition.

Improved visual performance. Increases in MPOD improves lateral inhibitory processes, which corresponds to improved contrast sensitivity, the ability to distinguish between an object and its background or detect differences between similar shades of light and dark. Contrast sensitivity is especially important under conditions of low light, fog, or bright light conditions. Supplementation with Lutemax 2020 also significantly improved photostress recovery and disability glare thresholds (i.e. the ability of the eyes to "see" and recover under bright light conditions).

Blue light protection--an in vitro model. Lutemax 2020 enhanced catalase activity and inhibits cholinesterase, enzymes associated with increased antioxidant protection during exposure to sources of ultraviolet and high-energy blue light and reducing eye fatigue, respectively.

Reducing oxidative stress from blue light—an animal model. Lutemax 2020 provided functional and morphological preservation of photoreceptors against light damage by mitigating oxidative and endoplasmic reticulum stress.

The B.L.U.E Study. This first human clinical trial examining the effects of supplementation with macular carotenoids during prolong blue light exposure from various sources including digital devices. The significance of this study follows.

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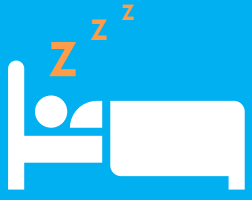
THE B.L.U.E. STUDY DEMONSTRATES BENEFITS OF LUTEMAX 2020 FOR DIGITAL DEVICE USERS

The B.L.U.E. study (an acronym for Blue Light User Exposure) is the first of its kind to demonstrate how macular carotenoids support visual function and reduce the symptoms of prolonged screen time, including sleep quality, eye strain and fatigue and headache frequency. B.L.U.E. was a 6-month randomized, double-blind, placebo-controlled trial in young healthy subjects exposed to 6-hours per day of screen time and supplementing with Lutemax2020 (20mg L/4 mg Zi) or placebo.

The result show that MPOD, indicators of visual performance (contrast sensitivity, disability glare, photo-stress recovery, visual processing speed), and symptoms resulting from prolonged blue light exposure (headache frequency, eye strain, eye fatigue and sleep quality) all significantly improved. The B.L.U.E. study and prior studies with Lutemax 2020, demonstrate a direct link between supplementation with macular carotenoids and their ability to provide a frontline defense against persistent blue light exposure.



	Lutemax 2020 B.L.U.E. Study Outcomes
MPOD	26% increase
Contrast Sensitivity	19% improvement
Disability Glare	44% improvement
Photostress Recovery	33% improvement
Eye Strain	29% decrease
Eye Fatigue	28% decrease
Neck Strain	5% decrease
Headache Frequency	34% decrease
Sleep Quality	20% improvement

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A CLINICALLY DEMONSTRATED HEALTH BENEFIT SOLUTIONS

Lutemax 2020 is a complete macular carotenoid formula containing lutein with zeaxanthin isomers in a balanced 5:1 ratio—as found naturally in the diet—and contains significantly higher levels of zeaxanthin isomers than other lutein ingredients. Clinical research has shown that Lutemax 2020 delivers multiple benefits for vision and cognitive health. In addition to a diet rich in fruits and vegetables, Lutemax 2020 is a convenient and effective way to optimize adequate intakes of lutein and the zeaxanthin isomers.

- USP & Non-GMO Project Verified
- FDA GRAS notified
- Winner: NutrAward Best Functional Ingredient 2018
- Manufactured under a fully vertically integrated supply chain

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usp Verified Dietary Ingredient

Powered by VersaBead

FOR IMPROVED BIOLAVAILABILITY & ABSORPTION

VersaBead takes all the science-backed benefits of Lutemax 2020 and provides improved formulation capabilities to meet the growing demand for blue light protection across different applications, including tablets, capsules, powders, gummies, foods beverages and beyond.

OmniActive HEALTH TECHNOLOGIES

OmniActive Health Technologies offers a wide range of scientifically validated, sustainable solutions from natural sources to address complex challenges for customers in the dietary supplement and functional food and beverage space. OmniActive brings added value, with a focus on healthy living as well as healthy aging through IP-protected, science-backed branded health benefit solutions that consumers demand in top categories such as: active wellness and physical performance; metabolic health and weight wellness; vision, cognition and mental wellness; and daily energy and productivity performance.

Lutein For Every Age™

Early and consistent macular carotenoid intake may help maintain healthy eyes of all ages. Lutein For Every Age™ is an award-winning, educational campaign created by OmniActive Health Technologies to raise awareness of the benefits of early and consistent macular carotenoid intake to maintain proper vision, cognition and mental wellbeing throughout a lifetime. For more info, visit LuteinForEveryAge.org.

What's Your B.L.U.E.?

What's Your B.L.U.E.?™ (Blue Light User Exposure) is an award-winning initiative based on scientific research and OmniActive's clinical studies to spread awareness of high-energy blue light exposure, its sources and ways to help protect the eyes from its effects with the support of the macular carotenoids. For more information, visit WhatsYourBlue.info.

FOR INDUSTRY PURPOSES ONLY.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

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