

## Other Lighting Applications

- **Bilirubin Light**
- **Bacteriocidal**
- **Myopia Prevention**
- **Seasonal Affective Disorder**
- **Fertility**
- **Blue Light Invasion & Retinal Protection**
- **Photo-Biomodulation**

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## Bilirubin Lights

**Bilirubin lights**, also called **bili lights** or phototherapy, are a treatment for newborn jaundice. They can help a baby with jaundice get rid of **bilirubin**. **Bilirubin** is a substance that is made each day as red blood cells break down. ... When there is a lot of **bilirubin**, the skin and whites of the eyes get yellow.



en.wikipedia.org

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## Neonatal Jaundice or Hyper- Bilirubinemia

- **Bilirubin** is a normal component of RBCs
  - Removed from the liver
  - Excess moves to the skin, sclera and organs
- **Physiological**
  - Occurs in 60-70 % of infants at gestational age of 35 – 38 weeks
- **Pathological**
  - Brain damage (kernicterus), hearing loss, growth delay & death
- **Phototherapy**
  - Historically "Suning infants" early morning or late day
  - Bilirubin absorbance spectrum is 400 nm – 520 nm where it is converted to the isomers photo-bilirubin and lumibilirubin.
  - Fluorescent light induces (10-30%) degradation over ½ - 3 hours



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## Bacteriocidal Applications



Is ultraviolet within sunlight impinging upon the skin, eyes and conjunctival vessels important for reducing pathogen load ?

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## Myopia and sunlight

Spectral distribution, Intensity, Bandwidth and Temporal frequency of Ambient Light

- An environment that deprives the eye of blue light stimulation, either from low color temperature tungsten bulbs, dim illumination, spectral filtering by spectacles, or reduced sunlight exposure, will tend to make the eye vulnerable to myopia at low temporal flicker frequencies.
- Without blue light, the compensatory changes in choroidal thickness (moving the retina anteriorly) are insufficient to compensate for the associated ocular elongation of the eye.
 

Rucker F et al. Blue light protects against temporal frequency sensitive refractive changes. Invest Ophthalmol Vis Sci. 2015; 56:6121-6131.
- **Long wavelength light is known to induce a myopic shift.**

Long, Q., Chen, D., Chu, R., 2009. Illumination with monochromatic long wavelength light promotes myopic shift and ocular elongation in newborn pigmented Guinea pigs. Cutan Ocul Toxicol. 28 (4), 176-180.

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## Blue Light Key Concepts

1. Our sun, modern Indoor LED lighting, cell phone / Pads / computer displays all emit "bad blue" radiation.
2. Ophthalmic Lens Manufacturers Have embraced blue light protection with new spectacle products, especially Zeiss.
3. Dietary Ocular Carotenoids (lutein / Zeaxanthin) also protect against "bad blue".
4. **Dietary Ocular Carotenoids, uniquely improve visual performance thru non-optical biological mechanisms while protecting the desirable circadian rhythm mediated "good blue".**
5. Synergy with external "sunglasses"

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### SAD (Seasonal Affective Disorder)

- 10,000 lux x 20 minutes
- Morning only
- Blue Light Best except for patients with AMD or Migraine

Lumie ARABICA SAD lamp



4 VALKEE 2 SILVER BRIGHT LIGHT



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### 10% of neurons from the retina are ipRGCs and help entrain the circadian rhythm.

#### Intrinsically Photosensitive Ganglion Cell Population

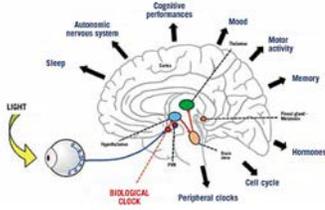


A few thousand ganglion cells in each of your two retinas are intrinsically photosensitive - they capture photons with their own opsin (melanopsin) and generate action potentials. Their axons end in many CNS regions, one of which (the suprachiasmatic nucleus of the hypothalamus) is the master circadian clock of the brain. These ganglion cells make sure the clock is set to a 24-hour schedule.

<https://blogs.hopkins-interactive.com/guest/2011/03/no-im-not-a-comp-sci-major/>

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### Human Biological Functions are controlled by our circadian biological clock (blue-green turquoise light = 480nm)



Vision Institute in Paris (UPMC, Inserm, CNRS)

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### BLUE MORNING LIGHT is desirable to set biological clock

NATURAL LIGHT x 15 minutes preferable for additional near IR enhancement Viewing a 5000 – 6500 Kelvin Daylight or High Luminance BLUE LIGHT BOX for 20 minutes. However, OUTDOOR best.



NATURE IS BEST  
UV + VISIBLE BLUE + IR

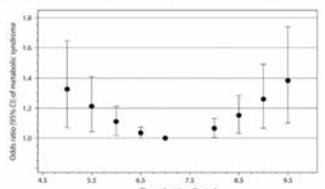
SKYLIGHTS AND / OR BLUE (5000 – 6500 K) LIGHTING

[https://c1.statistic.com/3/2550/4140731938\\_3625586699\\_b.jpg](https://c1.statistic.com/3/2550/4140731938_3625586699_b.jpg)

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### Sleep and Diabetes Risk

Both long and short sleep duration, as well as napping, are associated with increased risk of Metabolic Syndrome and type 2 diabetes



Nutrition & Diabetes (2013) 3, e65

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### Light and Fertility

- Arctic Eskimo woman cease ovulating during the winter.
- Summer Solstice Conception
  - 2X as many babies born in Spring compared to Autumn
  - Sunshine stimulates the testes for forceful growth with abundant production of vigorous sperm
- Equatorial climates have high fertility, but twin births are rare
- The farther north or south latitude, the more frequent twin births become
- Japanese research shows irradiating face and breast with red light stimulates milk production.
- Doubling the 24 hr light cycle for Hens doubles egg production.
- Chinchillas and Mice conceived under red light produce more males
- Chinchillas and Mice conceived under blue light produce more females



*Sunlight improves cardiac output, Hb oxygen carrying capacity And sex hormones (an aphrodisiac)*

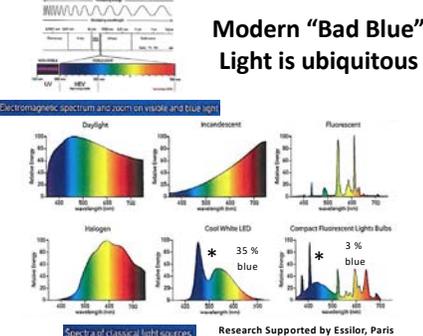
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## BLUE LIGHT INVASION

Compromising our natural Circadian Rhythm with LED & Digital Screen Device Overload depressing melatonin and raising body temperature

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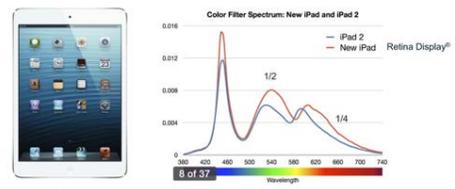
### Modern "Bad Blue" Light is ubiquitous

Spectra of classical light sources. Research Supported by Essilor, Paris

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### IPAD & SMARTPHONES

Both quantity and intensity of blue light exposure matter – emit up to 30 % blue light



Color Filter Spectrum: New iPad and iPad 2  
 — iPad 2  
 — New iPad Retina Display®

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### The Ophthalmic Lens Market Has Embraced protection against this "Bad Blue"

VSP  
TechShield®



**Hoya Recharge®**

Reflects Blue Light!  
Repels Scratchest!



**BluTech®**

99% Blue Light Blocking  
Anti-Reflective  
Anti-Static  
Anti-Scratch



**Essilor Crizal Previncia® & Transitions 7**

Blue light protection  
Anti-reflective  
Anti-static  
Anti-scratch



**Essilor**

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### Excessive and ill timed blue light exposure

➤ The average American spends 4 1/2 hours a day watching television and using screens at an early age at all times of day.



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### Sources of blue light



BENEFICIAL EFFECTS	HARMFUL EFFECTS
<input checked="" type="checkbox"/> Helps regulate circadian rhythm, the body's natural sleep and wake cycles	<input checked="" type="checkbox"/> Disruptions to the circadian rhythm
<input checked="" type="checkbox"/> Boost alertness	<input checked="" type="checkbox"/> Digital Eyestrain Syndrome: blurry vision, difficulty focusing, dry and irritated eyes, headaches, neck and back pain
<input checked="" type="checkbox"/> Helps memory and cognitive function	<input checked="" type="checkbox"/> Greater risk of certain types of cancers
<input checked="" type="checkbox"/> Elevates moods	<input checked="" type="checkbox"/> Greater risk of diabetes, heart disease, and obesity
	<input checked="" type="checkbox"/> Increased risk of depression
	<input checked="" type="checkbox"/> May cause permanent eye damage: may contribute to age-related macular degeneration which can lead to vision loss

http://eyevisionoptics.blogspot.com

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### Why should I care about inappropriate blue light ?

- 67% of adults spend 7 or more hours a day using a computer or handheld device
- 56% use a smart phone, computer or handheld device when reading a book
- 64% of Americans sleep with their cell phones



[www.connectedhealthstore.com](http://www.connectedhealthstore.com)

This slide courtesy – Dr. G Gnadt AAO 10 Oct 2015

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### EVENING / SLEEP LIGHTING

- Tungsten / Halogen lighting
  - Candle light- quaint
  - UV task lights- modern
- Warmer Color Temperature
- Smart Device in "night mode"
- Yellow / Red night lights
- Pitch Black quiet, EM free, sleep environment
  - Consistent sleep time 10:30 PM – wake early
  - Avoid too much sleep
    - or too little sleep w/o naps

*Journal of Psychiatric Research, 2017 – wearing amber lenses at night provides 30 minutes additional sleep time.*



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### Practical Strategies For Reducing Harmful Endocrine Effects of Blue Light

- Turn off devices  $\geq$  1 hour before bed time
- Reduce screen blue light emission at night
  - [www.f.lux.com](http://www.f.lux.com)



- Wear spectacle lenses that filter both blue-violet and blue-turquoise light at night (415-520 nm)
- Wear spectacle lenses that filter blue-violet light at day (415-455 nm)

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### Blue Light Protection [www.lowbluelights.com](http://www.lowbluelights.com)

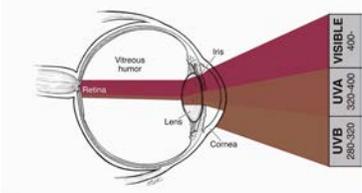
#### Circadian rhythm enhancement



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### Macular Pigment Protects

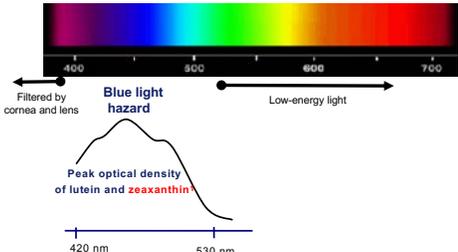
By absorbing stray Blue and UV A photons  
ESCAPING the Cornea and Ocular Lens



[www.artisanoptics.com](http://www.artisanoptics.com)

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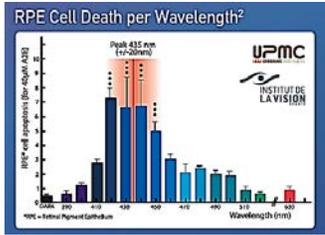
### In the retina "Blue" light absorption means better image quality, but



Bone RA, et al. Exp Eye Res. 1997;64(2):211-218.

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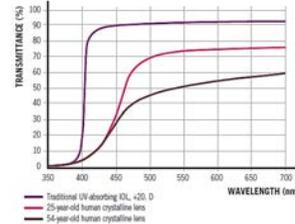
**Photochemical Induced Retinal Injury**  
 "Excess Bad Blue" = 415 - 455 nm



Research Supported by Essilor, Paris

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**"Excess Bad Blue" is especially bad for the 2 important demographics**  
**young & pseudophakic consumers**



Children do not have the natural buildup of crystalline lens pigment that comes with age to help protect them

Vision Institute in Paris (UPMC, Inserm, CNRS)

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**Beaver Dam Results**  
 young adult behavior matters for AMD risk

Leisure time spent outdoors as teenagers and in their 30s significantly associated with the risk of early AMD (OR 2.09; 95% CI, 1.19-3.65).

Slight protective effect for use of hats and sunglasses while teenagers and in their 30s (OR, 0.72; 95% CI, 0.50-1.03).

Red or blond hair slightly more likely to develop early ARM than people with darker hair (OR 1.33; 95% CI, 0.97-1.83).

There were no associations between estimated ambient UV-B exposure or markers of sun sensitivity and the incidence of early AMD.

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**Dietary Carotenoids**  
 Provide Both Protection & Performance

1. Building Higher Macular Pigment Protects Against Blue Light
  - A. Provides robust internal protection, complimenting immediate external blue light lens protection
  - B. Maintains our circadian rhythms
  - C. Does not limit light transmission
2. Dietary Zeaxanthin and Lutein
  - A. Protection against AMD
  - B. Protection against Cataract
  - C. Superior Visual Performance
3. Additional unique benefit of Dietary Zeaxanthin / Lutein
  - A. Protection against skin cancer
  - B. Protection against cardiovascular disease
  - C. Superior Cognitive function (emerging)

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**Night Driving Challenges**  
 (worse for 15% + drivers > 65 years)



GLARE Disability (GD)



Glare Recovery (PR)



Contrast (CSF)

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**Lutein and Zeaxanthin influence visual function through biological as well as optical mechanisms**

- Optical mechanisms
  - Glare Disability,
  - Glare Recovery
  - Color Contrast
  - VISUAL RANGE,
  - Contrast Sensitivity
- \* Biological mechanisms



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**"Vision Impairment due to glare is the # 1 source of vehicular accidents both in the day due to the SUN and at night due to BRIGHT HEADLIGHTS"** 日中の太陽及び夜の明るいヘッドライトにより引き起こされる視覚障害が乗り物事故の原因No.1



**GLARE Disability**  
グレア障害



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**SUMMARY: Carotenoids are Superior Internal Sunglasses with Vision & Emerging Cognitive Benefits**



- Improvement in responses to dark and light adaptation (i.e. Tunnels)
- Decreased Glare disability (GD) and better Glare recovery (PR)
  - Up to 5 seconds in a 60mph car = 440 ft. faster stopping
- Better Color Contrast (CC) and Mesopic Twilight vision
- Contrast sensitivity (CSF) - improvement up to 75%
- Can see up to 30% more on a hazy day (CC)
- Better Temporal processing speed (CFF)
  - means quicker decisions at intersections
- Expect overall daylight and night driving improvement.

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**3 Human Macular Pigments**  
**Lutein (meso-zeaxanthin\*) and Zeaxanthin**

**Carotenoid ratio L:Z:M**

Diet	5:1:0
Blood	3:1:0
Whole retina	2:1:0.5
Fovea	1:1:1 (2:1)

*meso-zeaxanthin\* is a metabolite of lutein found only in the fovea, and rare in nature (i.e. fish skin)*  
**Dietary Zeaxanthin also accumulates in the fovea**



Photomicrograph courtesy of Dr. Joanne Curran-Celestano.

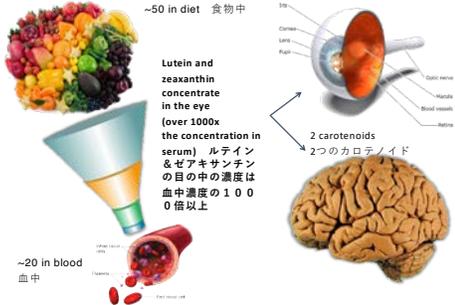
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**Carotenoids カロテノイド**

~50 in diet 食物中

Lutein and zeaxanthin concentrate in the eye (over 1000x the concentration in serum) ルテインとゼアキササンチンの目の中の濃度は血中濃度の1000倍以上

~20 in blood 血中



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**Meso-zeaxanthin is rare in nature**  
メソゼアキササンチンは自然界では稀

**Dietary Lutein and Zeaxanthin**  
ルテインとゼアキササンチン

**Mesozeaxanthin**  
メソキササンチン

**220 pounds of fish skin are required to create 2 mg of mesozeaxanthin**  
2mgのメソキササンチンを摂取するには100kgの魚の皮を摂取する必要あり

Madala et al.: MZ occurs in very small quantities in the skin of very select types of fish and other marine life

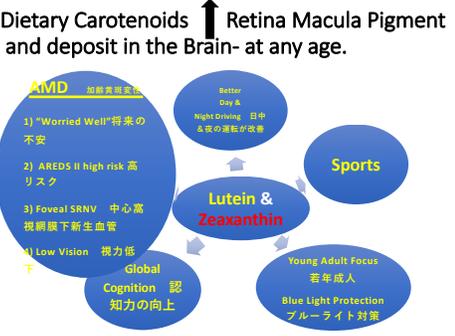
Dr. Elizabeth Johnson was unable to find any naturally occurring MZ in the food supply leading her to conclude: "The presence of meso-zeaxanthin in the macula is no [sic] likely due to dietary sources of this compound."



**2 Yellow peppers and corn**  
**2 Chinese Goji Berries**

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**Dietary Carotenoids ↑ Retina Macula Pigment and deposit in the Brain- at any age.**



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**Simulation of Average Glare Disability improvement from LOW MP to HIGH MP is about 40%**

Image simulation

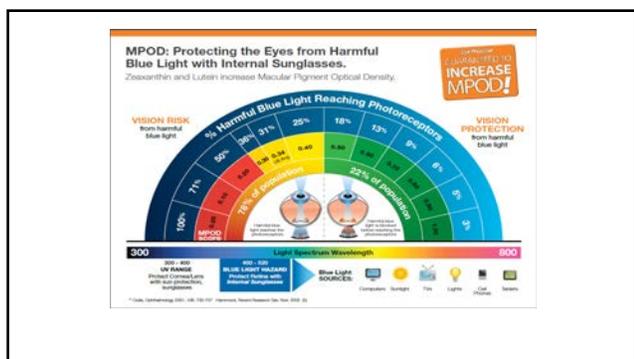
Increased stray light by 40%

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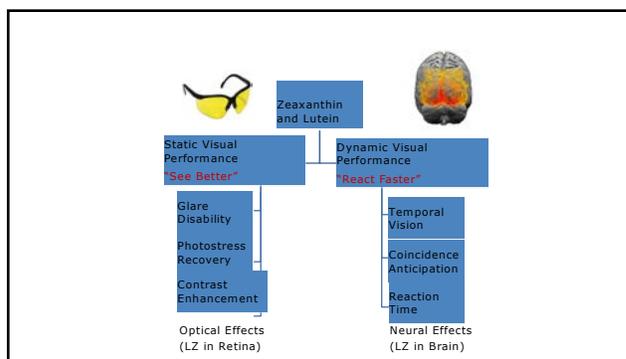
**MPOD Measurement**  
Heterochromic Flicker Photometry (HFP) is the Gold Standard

MPOD instrumentation has improved significantly

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[www.lumithera.com](http://www.lumithera.com)  
**(Photobiomodulation for AMD)**

Developing Photobiomodulation Treatments for Ocular Diseases and Disorders

Improve Visual Acuity, Improve Contrast Sensitivity, Reduce Central Drusen Volume

**VALEDA**

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Mitochondrial dysfunction and oxidative stress play a key role in age-related macular degeneration

Sep 22, 2016 - The technology— which uses light-emitting diodes of red (670 nm), yellow /orange (590 nm), and infrared (790 nm)

Mitochondria produce energy to sustain normal cellular function  
Cytochrome C oxidase (COX), a critical protein involved in regulation of mitochondrial activity, has been shown to be a key photoreceptor of light in the far red to near-infrared (NIR) spectral range. Oxidative stress and impaired mitochondrial function may contribute to several ocular disorders. Retinal cells are one of the most energy-dependent cells in the body. PBM at selected wavelengths can directly stimulate the production of mitochondrial energy.

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The **TORPA II Clinical Study** has now evaluated anatomical changes at the retinal level in dry AMD patient case series following PBM treatment. The study utilized 3 PBM sessions per week for 3 weeks with a multi-wavelength PBM treatment. PBM resulted in anatomical improvement evidenced with OCT of a decrease in drusen volume following PBM, while overall central retinal thickness and retinal volume remained constant.

Visual Acuity improved in over 90% of subjects with 59.5% achieving better than 5 letters score improvement and 11.9% achieving better than 10 letters score on ETDRS visual acuity testing, representing significant improvement in visual function. Improvements in detailed vision or contrast sensitivity were also significant and correlated to the improvements in visual acuity. The study results found benefits across all AREDS subgroups, which implies that PBM may be beneficial at early and later stages of dry AMD.

Journal article: <http://onlinelibrary.wiley.com/doi/10.1111/oa.13354/full>

Posted on September 7th, 2017 in [Research Articles](#) | Comments Off  
 Posted by [Clark Tedford](#)

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### Photobiomodulation "FINSSEN CLINICS"

- Treatment of psoriasis, eczema, vitiligo, T cell lymphoma w UVA &
  - Psoralens - a plant PIGMENT that absorbs UV A
- Treatment of Chickenpox and Small pox with red light



Niels Ryberg Finsen- Nobel Prize 1903

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Wrinkles collagen production and product penetration, anti-inflammatory

Photoaging damage

Dark spots

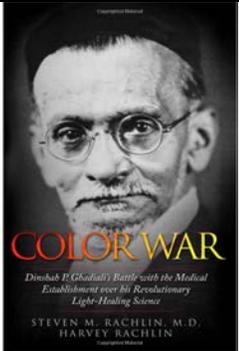
Kills bacteria, anti acne, reduces oil

Blue LED oral devices and toothbrushes for gum health & teeth whitening

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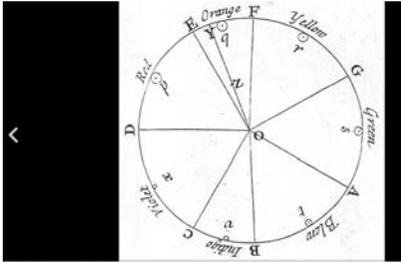
Dinshah P Ghadiali

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 Email: [dinshahhealth@aol.com](mailto:dinshahhealth@aol.com)



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### Newton 1704



Newton's color circle, from Opticks of 1704, showing the colors he associated with musical notes. The spectral colors from red to violet are divided by the notes of the musical scale, starting at D. The circle completes a full octave, from D to D. Newton's circle places red, at one end of the spectrum, next to violet, at the other. This reflects the fact that non-spectral purple colors are observed when red and violet light are mixed.

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### Baker – Miller Paint for Reduced Aggression

P-618, Schauss pink, or Drunk-Tank Pink  
 1979, Naval Correctional Institute, Seattle

A light red for love & romance - thought to be a calming color associated with love, kindness, and femininity and compassion with the shadow or negative aspect being 'self criticism'.

While pink's calming effect has been demonstrated, researchers of color psychology have found that this effect only occurs during the initial exposure to the color. (purple also considered feminine)

- Sports teams, Iowa Hawkeyes, sometimes paint the opposing team's locker room pink to keep the players passive and less energetic.
- Inmates become more agitated after long exposure.
- Older fluorescent lights induce cancer in animals (John Ott)

Can past experiences, **cultural influences**, personal taste, and other factors impact how a person feels about a particular color, including the color pink ??



15 minutes of exposure to reduce violent or aggressive behavior

Hex triplet: #FF91AF  
 sRGB<sup>®</sup> (r, g, b): (255, 145, 175)  
 CMYK<sup>®</sup> (c, m, y, k): (0, 43, 31, 0)  
 HSV (h, s, v): (344°, 43%, 100%)

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**AtEase**  
THERAPEUTIC GLASSES FOR ANXIETY

AtEase Glasses are easy to use and zero-risk. When you feel stress, anxiety, restlessness, or distraction, simply put on your AtEase Glasses. Sit still, read, listen to music, watch a movie, etc. for one to fifteen minutes. By blocking out visual noise, the glasses help your brain relax.

**WE CAN BEAT ANXIETY**

When experiencing anxiety, stress, or panic attacks, thoughts and emotions can infiltrate your mind from every angle. Distractions interfere and focusing on objectives turns into a difficult task. AtEase Glasses are patented and completely drug-free. You focus, and AtEase Glasses give you therapeutic value by limiting distractions, and ultimately improving neurological function and performance.

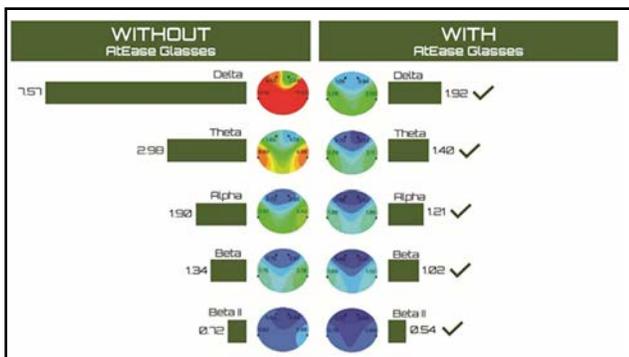
- Enhance Focus
- Limit Distractions
- Improve Neurological Function and Performance
- Users Gain Control of Their Lives

The lens injection, along with a patented amber and ultra-soft, non-toxic, biopolymer, blocks the effects of anxiety, hence, increased concentration.

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- AtEase Glasses are easy to use and zero-risk. When you feel stress, anxiety, restlessness, or distraction, simply put on your AtEase Glasses. Sit still, read, listen to music, watch a movie, etc. for one to fifteen minutes. By blocking out visual noise, the glasses help your brain relax.
- The double injection lens with a 6mm amber viewing window blocks peripheral distractions and creates visual occlusion.
- By utilizing specific light blocking and visual occlusion technology, AtEase Glasses enhance focus and limit distractions as therapy for neurological function and performance.
- Every pair comes packaged in a microfiber pouch and semi-hard case.
- Polycarbonate frames

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### Max Luscher (1923-2017) Swiss Psychotherapist

- Lüscher relates to his four fundamental colors to the following fundamental categories:
  - Blue: Contentment**
    - Feeling of belonging, the inner connection and the relationship to one's partner.
    - "How I feel towards a person that is close to me"
  - Green: Self-respect**
    - Inner control of willpower and the capacity to enjoy.
    - "The way I want to be"
  - Red: Self-confidence**
    - Activity, drive and the reaction to challenges.
    - "How I react to challenges"
  - Yellow: Development**
    - Attitude of anticipation, attitude towards future development and towards new encounters.
    - "What I expect for the future"

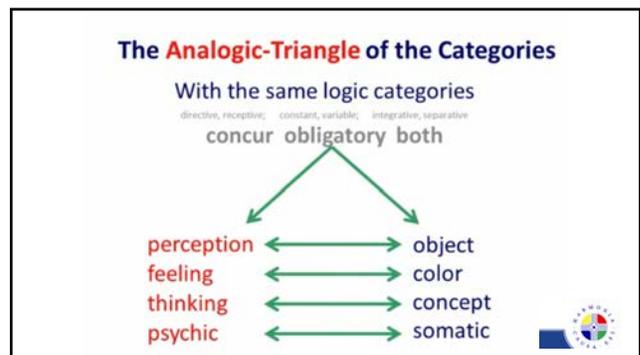
Prof. Dr. Max Luscher was the head of the Institute of Psycho-medical Diagnostics in Lucern (Switzerland).

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**What the Lüscher-Color-Diagnostics © and Therapy can do**

- Non-verbal, fast method about 5 minutes.
- Objectivity: No subjective factors either when administering the test or during its diagnostic evaluation.
- Direct and differentiated insight into the causes and psycho-vegetative structure of symptoms or complaints.
- Differentiates between underlying constitution and momentary disposition.
- Provides the physician with information from the patient's history.
- "Structural therapeutic strategy" for psychotherapy.
- Suggestions for homeopathic remedies.
- Provides the physical therapist with useful information. Underlying cause of the pain in a particular region.
- Suggestions for personal assessment.
- Computer-assisted diagnosis

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color is objective [www.luscher-color.ch](http://www.luscher-color.ch)

- The Lüscher-Color-Diagnostic® measures a person's psychophysical state, his or her ability to withstand stress, to perform, and to communicate. It uncovers the cause of psychological stress, which can lead to physical symptoms.
- Using 5015 precise definitions, the selections from among these pre-determined test colors measure the state of 23 personality traits, some of which lie outside the realm of the conscious.
- Because the color selections are guided in an unconscious manner, they reveal the person as he or she really is, and not as he or she perceives him- or herself, or as he or she would like to be perceived, which occurs when questions are asked directly or by questionnaires.
- The results of the Lüscher-Color-Diagnostic® (ca 5 pages) contains indications pertaining to personal assessment and special, professional

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[www.dinshahhealth.org](http://www.dinshahhealth.org)



The image shows a circular color wheel with 23 segments, each labeled with a letter and a color name. The colors include Infra-Green, Green, Ultra-Green, Blue, Purple, Magenta, Red, Orange, Yellow, and others. Below the wheel is a rainbow spectrum. To the right is the logo for Dinshah Health Society, a non-profit organization dedicated to advancing non-pharmaceutical home color therapy.

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Let There Be Light  
"Spectrochrome for Every Home"

- 320 diseases
  - ULTRA G Colors for Acute Inflammation
  - INFRA G Colors for Chronic Disease
- Systemic or Local Skin Tx
  - All colors reach skin capillaries
  - Why 30 to 60 minute Tx assures whole blood supply treated several times
- Traditional Thermal Source – 25 watt projector w gel filters
  - Intensity not important
  - Resonance Informational Tonation – important
  - Dark Room Best
- "Profound, Inexpensive, Safe"
- Need Tungsten Lamp Projector, Filters, Temp controlled room
  - Informational Color + Near IR Red
- Devices outlawed by FDA since mid 1940s

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**music / light / anti-stress therapy & circadian Rhythm / sleep hygiene**  
(driven by automatically by internal clock )

- Timed to known benefit of establishing a circadian rhythm
- **Morning Music / Light**
  - High Energy Music and 6500 Kelvin Daylight **High Luminance BLUE x 20 minutes**
    - Classical music
    - Beta and Gamma sound frequencies
    - Simulate skylights and an outdoor walk in sun
    - Useful in confined hospital / nursing care beds
- **Mid Day Stress reduction**
  - Green Dichroic Light simulation x 20 minutes
  - Calming Chakra compositions, composer Jonathan Goldman
  - Sounds and images of nature
- **Late Evening Sleep Routine**
  - Delta and Theta frequency meditation music
  - Relaxing imagery
  - Additional features
    - Built in cameras to see if patient has fallen asleep

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Visible Light as Therapy



The image shows four pairs of eyeglasses with different colored lenses: blue, red, green, and purple.

Eyelights

- Programmed to 8 different colors
- Lights on 2 seconds / off 8 seconds
- Can blink on non – dominant eye only
- Hemifield, right or left visual fields
- L / R eye only inferior field BRIGHT
  - Stimulates magnocellular pathway (parietal cortex)
- L/R eye only superior field BRIGHT
  - Stimulates parvocellular pathway (temporal lobe function)
- Blinking Lights (R or L) stimulates both brain sides

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**WARNING:** Wearing Color Therapy Glasses will alter your vision and may impair your ability to see traffic lights or other important visual cues. Do not wear Color Therapy Glasses while driving, operating heavy machinery, or any other hazardous activity. Do not wear for prolonged periods of time. Recommended use is **10-30 minutes per day**. This product can be dangerous if used improperly. Use common sense at all times.

**Violet**  
Assimilate nutrients and may control irritability

**Blue increases awareness**  
While aiding tension and stress – especially under fluorescent lighting

**Green is for Calming**

**Yellow generates muscular energy**  
Can be used outside to increase contrast in golf, shooting or skiing.

**Orange promotes happiness**  
Used while performing, playing music

**Red for evening repair**  
Stimulates and excites the nerves and blood, aiding in the deficiencies of smell, sight, hearing, taste & touch

**Clear Lenses**  
Used indoors while reading, studying or watching TV

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# EXTRA SPECTRAL COLORS

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### Turquoise (485nm)- a Dinshah ultra green color

- An Aqua Sea Green "Healing & Protective" frequency that activates the iPGC (intrinsically active ganglion cell complex at 485nm) – **BEST USED AM**
- C# note (565 Hz) or 554 Hz in modern adjusted frequency
  - Beethoven Sonata Quasi Luna Fantasia or "Moonlight Sonata"
    - Moonlight reflecting on Lake Lucerne- All 3 movements in C#
    - John Lennon, "Imagine"
- Applications
  - Optic nerve injury
  - TBI
- Absorbs Red
  - **Opposite = Dinshah Scarlet (between Dinshah red & magenta) a strong red stimulant, associated w courage, force, passion, heat & joy**
  - **Opposite = TheraSpecs Migraine / Epilepsy protection specs**
  - **RGB (255,36,0) – approximately 616nm- has some orange in it**

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[www.color-meanings.com](http://www.color-meanings.com) Dinshah 565 Hz sound equiv.

### Turquoise Color Meaning - The Color Turquoise

By JACOB OLSEN



The color turquoise helps opening lines of communication between the heart and the spoken word. It is a friendly and happy color that is enjoying life. In color psychology, it controls and heals the emotions, creating emotional balance and stability in this process. It can feel like an emotional rollercoaster that goes up and down, and it balances itself. Overusing the effect turquoise color meaning can lead to emotional stress.



As a combination of the color blue and a little yellow, turquoise lies between green and blue on the color scale. The color turquoise radiates peace, calmness and tranquility through the blue color, balance and growth through the green color, with an uplifting energy from the color yellow. Turquoise recharges our spirits during periods of mental stress and fatigue, and removes the feeling of loneliness. You just need to focus on the color turquoise, either on a wall or clothing, and immediately you will feel calm and relaxed - ready to face the world again! Turquoise is a great color to have around, especially in emergencies, because it helps you think clearly and make decisions. It also helps with the development of organization and management skills. The color turquoise affects us, more than it tells us or requires something of us.

color of regeneration

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### Photosensitive Epilepsy

[www.theraspecs.com](http://www.theraspecs.com)



Reduce migraines without drug side-effects

When worn regularly, our glasses provide natural migraine relief and reduce the frequency of migraines for many. In fact, a clinical study of the TheraSpecs tint showed that participants experienced **74 percent fewer attacks** per month. But TheraSpecs are so much more than migraine glasses, they also decrease fluorescent light sensitivity, photophobia and relieve headaches and eye pain.



- 50 million have epilepsy
- Only 3- 5 % are photosensitive
- But 40 % w juvenile myoclonic
- Frequencies of about 5-30 flashes per second
- More than 4 minutes
- Faulty fluorescent lights
- LED, TV, Computers
- Bright, sudden, camera flashes
- 30 % w striped high contrast patterns
- Close space

Classic TheraSpecs \$100.00+

TheraSpecs lenses block 80% of the most harmful blue-green light

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### Migraine Brains Are Smarter

Migraine is the world's most advanced health-monitoring system. Five Reasons Why...



Migraine

65

### FL 41 lenses block 480nm-520nm painful wavelengths for Migraine, Epilepsy, (TBI - Minneapolis VA)



TheraSpecs Indoor Lens - Filter

400 420 440 460 480 500 520 540 560 580 600 620 640 660 680 700 720 740 760nm

TheraSpecs blocks about 80% of most painful wavelengths

66

### BLUE --Traumatic Brain Injury Prescribe w 2 BD OU Yoked Prisms

**BLUE MIRROR**

Recommended for intense light/high glare, ocean fishing, snow sports

Patients polarized gray lenses are also available in a blue mirror option that is clear for environments with intense glare and light levels. The added mirror coat enhances the glare cutting properties of the standard gray lens and increases contrast by absorbing additional levels of blue light.

These Custom-tinted polarized gray lenses with blue mirror coat:

- 17% visible light transmission
- Polarized to eliminate blinding glare
- UV400 protection from UVA & UV rays
- Pass 80% of blue light (BLO)
- Provides natural color definition

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### 50 Medical Conditions - Photophobia

- Agoraphobia
- Albinism
- Alzheim syndrome
- Anorexia
- Ankylosing Spondylitis
- Autism
- Autism spectrum disorders
- Birth canal/retinal dystrophy
- Bilateral acute iris transillumination defects of the iris
- Blepharitis
- Blepharospasm
- Buphthalmos
- Chain Malformation
- Chronic fatigue syndrome (myalgic encephalomyelitis)
- Cogan's syndrome
- Coloboma
- Cone dystrophy
- Corneal diseases
- Corneal neuropathy
- Cortical visual impairment
- Crystalline keratopathy
- Cyclothemia
- Depression
- Diabetes
- Graves's ophthalmopathy
- Haplophobia
- IFAP syndrome (ichthyosis follicularis with alopecia and photophobia)
- Inflammatory bowel disease
- Interstitial keratitis
- Iris
- Keratoconjunctivitis
- Lyme disease, Lyme meningitis
- Magnesium deficiency (acromyia)
- Metabolic
- Meningeal irritation
- Metastasis
- Migratory parosmia (acromyia)
- Multiple Sclerosis
- Neurofibroma
- Occipital lobe hyperexcitability
- Ocular inflammation
- Optic nerve hypoplasia
- Optic neuritis
- Papilledema
- Photoreceptor dysfunction
- Pituitary tumor (including prolactin)
- Post-concussion syndrome
- PTH (paraneoplastic neuroendocrine and paraneoplastic lesions)
- Progressive supranuclear palsy
- Strabismus
- Scleritis
- Sensory disease
- Retinal dystrophy
- Retinitis pigmentosa
- Schynder corneal dystrophy
- Sensory processing disorders
- Sjogren's syndrome
- Subarachnoid hemorrhage
- Traumatic brain injury
- Trisomy
- Tyrosinemia
- Uveitis
- Vitreous disease
- Vitritis
- Zinc deficiency with exocrine insufficiency

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49% of all respondents have had light sensitivity for more than TEN YEARS

81% of patients reported that light DIRECTLY triggered their condition

Light was listed as a direct trigger for MIGRAINE ATTACKS in 88% of respondents.

54% said FLUORESCENT LIGHTING always triggered or worsened their photophobia

Nearly 60% reported FLASHING and FLICKERING lights were most likely to aggravate their light sensitivity

57% of Fibromyalgia patients experienced more sensitivity to light BETWEEN attacks (57%)

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### Activities most likely to be prevented or disrupted

Going into stores or public places	84.4%
Time with friends	83.1%
Family activities	81%
Work	77.9%
Using a computer, smartphone, tablet	77.9%
Watching TV or movies	75.1%
Outdoor activities	73.5%

A DARK ROOM was the most popular option for relief, but chronic dark adaptation worsens light sensitivity over time and may further keep people from their favorite activities.

85% of respondents found noticeable relief with PRECISION-TINTED LENSES, making them one of the most effective light sensitivity remedies.

© 2017 Therpeutix Company

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### Research References

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### Purple (Secondary Color via Combo of Red + Blue)

- Royal Color
- Depressant
  - Circulatory, Reproduction, Emotions
- Reverse Musical Polarity to Turquoise at 565 Hz - Plays at A# and E
- Lowers Blood Pressure
- Classic Pain Relief
- Evening Color, Improves Sleep Quality
  - (CNS depressant like bromide salts)
- Opposite = Lime

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• Opposite = Orange

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### Magenta ( 531.5 Reverse Polarity)

- Equilibrator
  - Circulation
  - Reproduction
  - Emotions
- "Rose Color Glasses" – calming effect for animals /humans
  - Decreased depression (acts like lithium)
  - Use with autistic children to calm them down in office and at home
- X –Chrome Lens
  - Expands CIE space / Better discrimination of color differences in patients with congenital color blindness
- Evening color
- Opposite = Green

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**Sensory Learning Therapy**

The Sensory Learning Program is a drug-free, non-cognitive, multi-sensory approach to developmental learning that uses light, sound and motion delivered simultaneously in this non-cognitive treatment. Brodie Sensory Learning is the only treatment of this type in North West Ohio and is positively changing the lives of those diagnosed with Autism, Asperger's, ADD/ADHD, Sensory Processing Disorder, Traumatic Brain Injuries/Concussions, Depression and Anxiety.

www.brodieoptometry.com

**BRODIE OPTOMETRY**

**How it works**

The Sensory Learning Program is a 30-day intervention. It consists of two 20-minute sessions per day for a child and one 60-minute session per day for teenagers and adults. This consists for 12 consecutive days including weekends and some holidays. During each session, the individual is lying on a table that gently moves in a side-to-side or front to back type motion to stimulate the vestibular parts of the inner ear that help control balance (part of the brain). While lying on the table the participant also listens to a therapeutic listening program through headphones to stimulate the auditory portion of the brain. Lastly, the participant looks at various colors of filtered light to stimulate the visual portion of the brain.

After 12 days of in-office sessions are completed, the participants follow-up the remaining 18 days at home. Maximum benefits in the vestibular and auditory therapy portions of the program can be achieved in 12 days. Light therapy, in order to have maximum benefits, needs to be administered for 30 days. This requires the participant to go home with a portable light instrument to continue the program with a 20 minute session each morning and evening. Follow-up visits are completed at days 30, 60 and 90.

Also -Cedar Rapids Vision in Motion – Dr Fitzgerald

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### Lemon (Lime)-TONATE for CHRONIC DISEASES

- "Infra Green" DHS Color (lemon to yellow to orange to red)
- Always take longer to treat
- Type II DM – Alexander Wunsch, MD
  - 1 tonation / day with Lemon
  - 1 tonation / day with Yellow
  - Decrease pancreatic insulin by 30%
- Liver Cirrhosis Alexander Wunsch, MD
  - Subject lived 36 years w lemon / red tonation – not 6 months

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### SCARLET- STIMULANT

circulation – reproduction -emotions

Applications

- low diastolic blood pressure,
- low tension glaucoma (LTG),
- positional hypotension / syncope,
- erectile dysfunction (ED),
- chronic kidney disease (CKD),
- congestive heart failure (CHF)

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### VIDEOS

- Retarded Wound healing in submarines and space station
  - No sunlight , low oxygen, fluorescent lighting
  - Muench 3<sup>rd</sup> Degree Burn Healing VIDEO - HEALING IN 14 DAYS
  - <https://vimeo.com/alexanderwunsch/alexander-wunsch-english/video/99538837>

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## DINSHAH CLINICAL COLOR APPLICATIONS (1920)

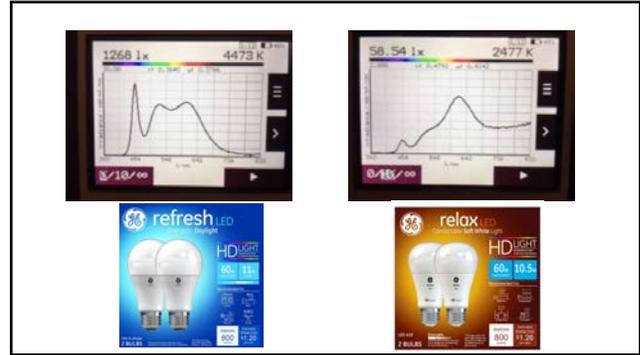
### PRIMARY COLORS

- **BLUE (VIOLET)** = anti-inflammatory i.e. TBI, Migraines, Burn Victims
- **GREEN** = Antiseptic i.e. hospital walls
- **RED** = Photo-biomodulation for Increased Blood Flow i.e. kidneys, thyroid, NAFLD, 18 % increased mitochondria function

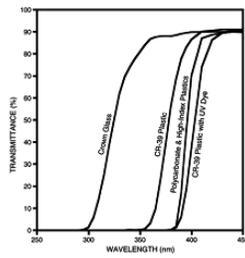
### SECONDARY COLOR MIXTURES - examples

- Turquoise** = healing, optic nerve trauma, TBI
- Purple** = lower blood pressure (Lime ? – raise BP ?), pain
- Indigo** = decrease hemorrhaging, pain
- Magenta** = equilibrator, calming color, X-Chrome lens, pain

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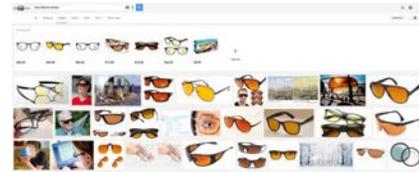


80



## spectacle lenses and UV protection

81



## TINTS

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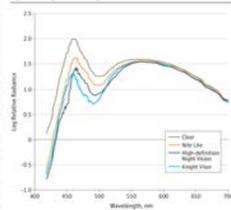
### Why Don't Yellow Night Vision Glasses Work?

Robert W. Masoff, PhD

Over the years, two things have happened that make night driving increasingly difficult for me: I have grown old and automobile headlights have grown whiter and brighter. With the transition from kerosene carriage lamps to sealed beam incandescent and, more recently, high-intensity discharge and light-emitting diode (LED) headlamps, the color and brightness of headlights have gradually evolved from a pleasant and romantic yellow candlelight to a light as harsh, glaring, and painful as the sun is to me. So, if I want to return to the good old days, what better solution could there be than to wear yellow-lensed glasses, which should make all headlights appear to be a nostalgic 2400°K color temperature.

In this issue of JAMA Ophthalmology in a study using a driving simulator that would be covered by players of Grand Theft Auto (Blockstar Games), Hwang et al address the question of whether yellow glasses promoted as night-driving aids actually help drivers, young and old, deal with headlight glare. The computer-generated view through the windows of the simulated vehicle is panoramically displayed on five 42-in flat-panel video screens arranged in a 225° arc that is 37° high. A real steering wheel, accelerator and brake pedals, shift stick, rear-view mirror, and instrument panel that interact with the computer are all in a driver's seat, complete the simulated driving

Figure. Log of Estimated Relative Radiance of the Simulated Light-emitting Diode Headlight



As a function of wavelength for the clear lens (black) and the 3 yellow night vision lenses (Nite Lite [Agile Eye Optics], Night Vision [Joker Village Co], and Knight's Vision [Bilaport Inc]) that were tested by Hwang et al.

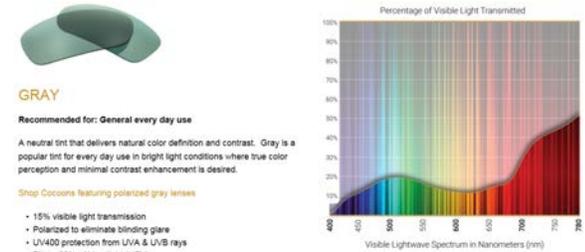
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## AMD- Controversy – yellow tints are helpful to read but no tints for driving at night !

- **AVOID DARK GREY TINTS !**
- Yellows improve edge contrast and visibility
  - Some Eschenbach magnifiers have built in orange – yellow and diffuser for light sensitivity,
- **Don't Promote Yellow Tints for driving as decreases light?**
- **Expert Dr. Scott Roberson-Milwaukee OD- Medical College of Wisconsin low vision clinic.**
- **Expert Dr Porter uses for optic nerve diseases and glaucoma.**
  - 1 hour Webinar



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**GRAY**

Recommended for: **General every day use**

A neutral tint that delivers natural color definition and contrast. Gray is a popular tint for every day use in bright light conditions where true color perception and minimal contrast enhancement is desired.

Shop Coccoons featuring polarized gray lenses

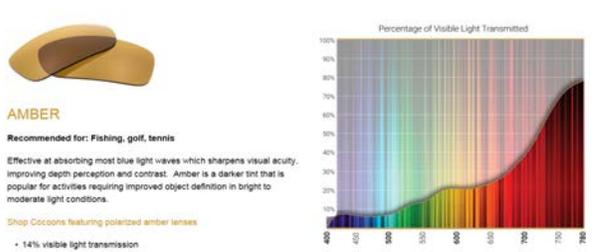
- 15% visible light transmission
- Polarized to eliminate blinding glare
- UV400 protection from UVA & UVB rays
- Filters 80% of blue light (HEV)
- Delivers natural color definition
- Also available in light sensitive photochromic options

Visible Lightwave Spectrum in Nanometers (nm)

Percentage of Visible Light Transmitted

Avoid with low vision patients, as reduces contrast

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**AMBER**

Recommended for: **Fishing, golf, tennis**

Effective at absorbing most blue light waves which sharpens visual acuity, improving depth perception and contrast. Amber is a darker tint that is popular for activities requiring improved object definition in bright to moderate light conditions.

Shop Coccoons featuring polarized amber lenses

- 14% visible light transmission
- Polarized to eliminate blinding glare
- UV400 protection from UVA & UVB rays
- Filters 90% of blue light (HEV)
- Sharpens object definition
- Also available in light sensitive photochromic options

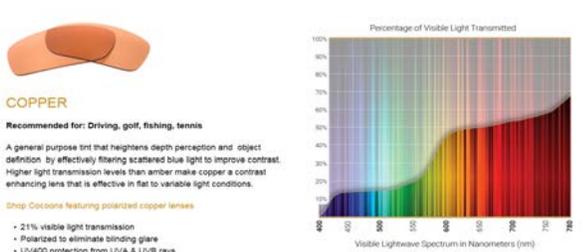
Visible Lightwave Spectrum in Nanometers (nm)

Percentage of Visible Light Transmitted

**AMBER – IS IDEAL FOR AMD, LOW VISION PATIENTS as IMPROVES CONTRAST ONLY FOR DAYLIGHT DRIVING (TOO DARK @ NIGHT)**

**PLUM MAY BE EVEN BETTER – MORE CONTRAST, BUT CAN BLOCK LIGHT TRANSMISSION (TOO DARK @ NIGHT)**

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**COPPER**

Recommended for: **Driving, golf, fishing, tennis**

A general purpose tint that heightens depth perception and object definition by effectively filtering scattered blue light to improve contrast. Higher light transmission levels than amber make copper a contrast enhancing lens that is effective in flat to variable light conditions.

Shop Coccoons featuring polarized copper lenses

- 21% visible light transmission
- Polarized to eliminate blinding glare
- UV400 protection from UVA & UVB rays
- Filters 90% of blue light (HEV)
- Improves depth perception with enhanced contrast
- Popular driving lens

Visible Lightwave Spectrum in Nanometers (nm)

Percentage of Visible Light Transmitted

TOPAZ..... popular tint

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We need to have a new respect for nature and natural light, and prescribing therapeutic light can heal.



88



**OWNNS**  
OCULAR WELLNESS & NUTRITION SOCIETY

A Society Focused on  
Ocular Wellness & Nutrition Education  
[www.ocularnutritionandsociety.org](http://www.ocularnutritionandsociety.org)

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