

# SHINING LIGHT ON HEALTH



*The Science of Light, Circadian Biology,  
and the Healing Power of Full-Spectrum Living*

---

***Your light environment is your most powerful, most overlooked medicine.***

---

***A Comprehensive Guide to Photobiomodulation, Circadian Rhythm,  
Red Light Therapy, Melanin Science, and Optimal Light Habits***

**By: Robert Broe  
Florida Assembly  
Health & Wellness Committee**

# 1. Introduction: The Truth About Light and Health

---

For too long, the truth about natural healing has been buried under layers of institutional inertia and profit-driven priorities. The most powerful tools for healing are often free, abundant, and rooted in the very fabric of nature. Light and nutrition are not just supportive therapies — they are the foundation of true healing, capable of reversing disease, restoring vitality, and reclaiming the health that modern life has quietly stolen from us.

The ancient Greeks understood something that modern medicine has largely forgotten: sunlight is medicine. Long before the rise of pharmaceutical dominance, civilizations thrived using heliotherapy — the practice of harnessing sunlight for healing. Hippocrates, the father of Western medicine, prescribed sunbathing for a variety of ailments, recognizing that light was essential for vitality. Ancient Egyptian, Greek, and Roman civilizations all practiced forms of heliotherapy, using sunlight to treat everything from skin conditions to mood disorders.

In the late 19th century, Danish physician Niels Finsen pioneered the use of light therapy to treat skin tuberculosis, earning the Nobel Prize in 1903. His work laid the foundation for modern phototherapy, demonstrating the profound impact light can have on human health. Today, that tradition is being rediscovered and validated by a rapidly growing body of scientific research — over 6,000 peer-reviewed studies now document the proven health benefits of red and near-infrared light therapy alone.

Today we have been conditioned to fear the sun, slather ourselves in chemical-laden sunscreens, and spend our lives under artificial lighting that profoundly disrupts our biology. The result is an epidemic of vitamin D deficiency, disrupted sleep, hormonal chaos, metabolic dysfunction, and compromised immune systems. Sunlight is not the enemy. It is one of the most potent healing forces available to us, and its role in human health extends far deeper than most people — and most doctors — have ever been taught.

This guide is a comprehensive exploration of light science, circadian biology, photobiomodulation, melanin, mitochondrial health, and the practical steps you can take to reclaim your biology. The information here represents cutting-edge research that is reshaping our understanding of what it means to truly be healthy. We are creatures of light. It is time to start living like it.

---

***"Your light choices form your medical destiny. We are creatures of light who capture and transform the light of the sun into energy that cells use to create life and health."***

---

## 2. Light Is Not Just What We See: The Biology of Photons

---

Sound is not just something we hear — and light is not just something we see. Light is a physical force that interacts with us at a cellular, molecular, and quantum level. It is the primary signal that drives our biological processes. Everything in this world vibrates, and light is vibration at frequencies the human body has evolved over billions of years to respond to, absorb, and utilize.

Albert Einstein demonstrated that all living things produce unique vibrational frequencies, and that energy and matter are transferable and interchangeable. Light consists of subatomic units called photons, which act as both waves and particles — what quantum physics calls wave-particle duality. Charged particles like electrons and protons create electromagnetic fields as they move, and light is the carrier of that electromagnetic energy through space and through our bodies.

Humans are, in a very real sense, like batteries powered by light. We get most of our energy from electrons, and the electrons inside us interact with photons — with light. We have light receptors in our eyes, skin, melanin, mitochondria, blood, microbes, and in specific molecules like flavins. We also produce ultraviolet light inside our own cells — a phenomenon called ultra-weak photonic emission. In the most literal sense, humans are made of light and sound.

Adequate sunlight exposure drives all aspects of human health. For 4.6 billion years, life on Earth evolved from the light of the sun and stars. The vast majority of people alive today no longer live under that light source. This is one of the most profound and underappreciated mismatches in human history — and it underlies much of what currently ails modern humanity.

## **The Electromagnetic Spectrum and Human Biology**

There is a wide spectrum of electromagnetic vibratory frequencies, covering some 90 octaves. Any therapeutic action — whether it uses sound, heat, laser beams, herbs, aromas, or movement — involves one or more portions of this energy spectrum. Light provides a number of health benefits including immune and endocrine support, and different wavelengths interact with different biological systems in specific, measurable ways.

Most windows block most UV light, red, and infrared light, so we are not getting the full spectrum of colors that our biology requires. Instead, in modern society we are getting mostly blue light. We need the full spectrum of light that contains all the colors for optimal health — not just the artificial blue-dominant spectrum of screens and LED lighting. Cracking windows open helps restore access to full-spectrum natural light.

Light affects our biology through the photoelectric effect — when photons hit electrons, causing them to become excited and triggering downstream biological cascades. This is not metaphor; it is physics. Greater nighttime light exposure has been linked to increased risk of cardiovascular disease according to a large study published in JAMA Network Open, with dose-dependent associations between bright nights and coronary artery disease, myocardial infarction, heart failure, stroke, and atrial fibrillation — underscoring that it is not just the presence of light that matters, but its timing, spectrum, and intensity.

## **The Healing Power of Colors: Chromotherapy**

Chromotherapy deserves recognition for its ability to align and reset ailing aspects of the body. The colors used are those in the visible spectrum, which vibrate between 397 trillion times per second (red) and 665 trillion times per second (violet). These vibrations interact with the body's own electromagnetic systems, offering support to blocked or restricted areas of energy flow. Each color in the visible spectrum carries a distinct frequency and corresponding biological affinity:

- Red: Aids in awakening the senses and the liver, while stimulating the generation of blood platelets and hemoglobin
- Orange: Stimulates bone growth and supports thyroid function
- Yellow: Improves the digestive system and tones the muscles
- Green: Acts as a balancer and tension reliever, and builds cells and tissues
- Blue: Builds vitality and activates the pineal gland
- Violet: Calms the metabolic process, overactive organs, and the nervous system

## **Natural vs. Artificial Light: A Critical Distinction**

LED lighting is different from natural light sources like the sun and fire and represents a form of biological pollution when it does not emit pure white, full-spectrum light. There is a fundamental

difference between the three-dimensional nature of natural light and the two-dimensional nature of artificial light — a difference that makes a profound impact on human health. Mainstream science has yet to develop a comprehensive understanding of this distinction, but understanding basic physics reveals why the gap matters.

The use of natural light sources such as fire and candles provides a fundamentally different biological experience than modern LED and fluorescent lighting. Our technology has been far outpacing our understanding of the effects that our favorite devices — cellular telephones, Wi-Fi routers, Bluetooth technology — are having on our biology. The effectiveness of alternative healing methods relies on the body's innate electrical healing systems, and these same systems are being adversely affected by power lines, computers, microwave ovens, cell towers, and satellite dishes. Electromagnetic pollution has become more significant than air pollution in terms of health effects.

### **3. Circadian Biology: The Master Conductor of Health**

---

The idea of linking circadian biology to health was Mother Nature's idea 3.8 billion years ago, when there was just bacteria and archaea on Earth. Most organisms have evolved an internal biological clock called the circadian rhythm, which regulates various physiological, metabolic, hormonal, and behavioral processes that are primarily dictated by the 24-hour diurnal cycle of the sun. Humans are part of an assembly of circadian oscillators, ranging from fungi to mammals — synchronized to the orbit and rotation of the Earth, in and out of the sun's light.

Your circadian rhythm is your body's 24-hour internal clock, a master conductor orchestrating everything from energy peaks and valleys to hunger cues, hormone release, and mood stability. This rhythm is foundational to your entire physiological state, syncing your internal processes with the Earth's natural light-dark cycle. It is the bedrock of holistic health. Circadian biology is so fundamental to sleep and metabolism that it is more important than your macro or micronutrients — yet few people realize just how profoundly it shapes every aspect of their wellbeing.

When this innate rhythm is disrupted — by the artificial glow of screens late into the night, erratic work schedules, or living sealed off from natural daylight — it creates a devastating ripple effect. The master biological clock, located in the suprachiasmatic nucleus (SCN) of the brain, becomes confused. The result is a cascade of dysfunction: poor sleep, low energy, hormonal imbalances, metabolic dysregulation, and a compromised immune system. Staying awake all night disrupts the levels and patterns of over 100 proteins in the blood, including those governing immune function and energy metabolism. This is not merely feeling tired — it is a systemic breakdown of biological integrity.

The alteration of circadian rhythms is associated with a variety of mental and physical illnesses. Recent studies show a significant association between sleep rhythm disturbances and increasing prevalence

of obesity. Furthermore, reduced sleep quality and duration lead to decreased glucose tolerance and insulin sensitivity, thus increasing the risk of developing type 2 diabetes. The relationship between sunlight exposure and health is demonstrated by an inverse relationship between the amount of sunlight exposure and all-cause mortality — meaning that adequate sunlight exposure is one of the most powerful predictors of longevity available.

### **The Eyes: Windows to the Circadian Rhythm**

Our eyes are the windows to our circadian rhythm. Our entire body's blood passes through our eyes every 10 minutes. The eyes are densely populated with not only image-producing photoreceptors, but also non-image-forming photoreceptors called intrinsically photosensitive retinal ganglion cells (ipRGCs), located in the back of the eye, which regulate our circadian rhythm.

When UV light hits those receptors in the eyes, they excite the electrons in aromatic acids and in the melanin in the photoreceptors, triggering a chain reaction of signaling via the *retinohypothalamic tract* (RHT) to the *suprachiasmatic nucleus* (SCN) in the brain, which communicates with the entire nervous system. The SCN is the master conductor of the circadian rhythm orchestra. This electrical information reaches the master centers of the brain: the hypothalamus, pituitary gland, and pineal gland — which control the autonomic nervous system and hormone secretion, sending signals to organs and cells throughout the body that regulate all circadian functions.

You have clock timing mechanisms in your body called opsins. UV light receptors are called neuropsin; blue light receptors are called melanopsin. Melanopsin controls melanocytes throughout the body. Thyroid hormone production is also directly tied to morning light exposure — the thyroid hormone maker is located approximately 3 centimeters behind the eyes. If you cover your eyes for 20 to 30 years, it should come as no surprise when hypothyroidism develops. The complex pharmacy in your brain gets unleashed by the light rays that come through your eyes.

Besides our eyes, we have additional molecules called photoreceptors that absorb UV light throughout the body: aromatic compounds such as tyrosine, tryptophan, and phenylalanine, which are the precursors to several critical neurotransmitters, as well as heme, which creates hemoglobin so our blood can carry oxygen. A specific wavelength of UV light excites the electrons within the benzene ring of these aromatic acids, triggering molecular transformation — the biochemical basis of neurotransmitter synthesis driven by light.

### **Melatonin: The Master Hormone of Light and Dark**

Melatonin should be at its highest in the middle of the night, signaling to the body that it is nighttime. Melatonin is also a powerful antioxidant and regulates sex hormone production, puberty, fertility, and placental development. High levels of melatonin during the day have been associated with sex hormone

imbalances and depression. The light frequencies from the sun change throughout the day, and this changing spectrum is the master regulator of our circadian rhythm.

Melatonin and cortisol are the hormonal axis that controls the most fundamental aspects of biological timing. Melatonin controls autophagy and apoptosis — the body's cellular self-cleaning and renewal processes — because it is tied to cortisol. Sunlight controls both. The clock in your body controls leptin and melatonin. The better the clock works in your body, the easier it becomes to lose weight, to heal, and to maintain metabolic health. This is why morning light exposure is more important than the food you eat — it is the periodicity reference of the entire clock-timing mechanism.

### **The Science-Backed Morning Light Protocol**

The reset is astonishingly simple. Step outside within the first 30 to 60 minutes of waking for just five to ten minutes of unfiltered natural light. This should be done without sunglasses, and it remains effective even on cloudy days. This brief exposure sends a powerful, unambiguous signal to your SCN that day has begun. Every morning, go out and look in the direction of the sun — not through glazed windows, but outside, without glasses or contacts, with your feet on the ground. This sends the correct quantum signal through the retina to the hypothalamus through the leptin melanocortin pathway of the central retinal pathway.

Morning sunlight exposure powerfully suppresses melatonin, the sleep hormone that should be low during daylight hours. Simultaneously, it triggers a healthy, natural spike in cortisol — the body's get-up-and-go hormone for daytime alertness. This is not the chronic, damaging cortisol of modern stress, but the evolutionary, energizing pulse the body has always expected. Furthermore, this light exposure increases serotonin production — the feel-good neurotransmitter that later converts to melatonin, priming the entire system for restful sleep when darkness falls.

Your body is a predictive machine that thrives on regularity. A consistent wake time and light exposure routine trains your physiology to anticipate and efficiently meet its daily needs. This consistency is more valuable than any supplement regimen. The initial cortisol boost from morning light paradoxically lowers overall stress levels and builds resilience throughout the day. You cultivate metabolic health, as your body learns to process fuel efficiently according to the time of day — a concept supported by research into how circadian rhythms dictate glucose metabolism.

Every day, you are meant to fast. That is why the first meal of the day is called break-fast. Your last meal should be when the sun is still out, and should be small. The biggest meal from a circadian perspective should be breakfast, followed by a medium-sized lunch, followed by a small dinner. From dinner, you fast until the sun rises again. Light is recalibrating the clock in your body when you break your fast — and how you eat is tied to the circadian biology of photosynthesis, based on where you live.

## Circadian Disruption and Disease

In terms of the gastrointestinal tract, several functions are regulated by the circadian rhythm and thus by light exposure. Our microbes also have their own circadian rhythm, which affects different intestinal functions including mitochondrial signaling, neurotransmitter production, intestinal barrier function, and immune reactions. This has immense consequences for health. The near-universal prevalence of digestive, hormonal, metabolic, and mood disorders in modern society is not a coincidence — it is the downstream consequence of a population chronically deprived of adequate, properly timed sunlight.

Casinos have no windows and no natural light, which lowers dopamine levels. It decreases the reward response, so people have to pull the handle more times to get the same satisfaction. Every tech device has the same color temperature as a slot machine. Blue light by itself, with nothing in your mouth, raises blood glucose and increases insulin — effects that the diet world has been wrongly attributing to carbohydrates for decades. The most important thing you can do for your metabolic health is see the sun rise.

## 4. Melanin: The Overlooked Master Photoreceptor

---

Most people think melanin only provides pigment to our skin, eyes, and hair — but emerging evidence reveals that melanin is a key aspect of our overall health, including mitochondrial function, brain health, and immune regulation. Melanin is present in numerous organs and tissues throughout the body: the substantia nigra of the brain (neuromelanin), blood vessels, gut microbes, the cochlea of our ears, ovaries, testes, lungs, heart, connective tissue, and the pineal gland.

Melanin in our skin contains mostly tyrosine — an aromatic compound with a UV-absorbing benzene ring. UV light hits aromatic rings at a peak of about 280nm. The aromatic acids that make up melanin, primarily tyrosine, can break down to form thyroid hormone and dopamine. When UV light hits tryptophan, it breaks down into serotonin and then melatonin at night. Histidine breaks down into histamine, which converts to urocanic acid — a natural UV protection compound that signals when the skin has received enough sun exposure.

When UV light hits melanin at approximately 280nm, it excites the electrons, causing melanin to act as a semiconductor that regulates the electrical aspects of the body. This process splits the molecule into H<sup>+</sup> and O<sup>2-</sup>, creating free electrons — energy — for the body. Melanin captures energy from sunlight that drives energetic processes throughout the body, including an inverse relationship with ATP production that makes it a central regulator of cellular energy.

Melanin also has a high affinity for binding to metals like iron (Fe<sup>3+</sup>) found in neuromelanin, and copper (Cu<sup>2+</sup>), which helps reduce oxidative stress in the body. Neuromelanin, found in the dopamine-dense regions of the brain, protects against excessive oxidative damage. The reduced levels of neuromelanin

found in Parkinson's disease patients offer a compelling window into melanin's neuroprotective role. Melanin also protects against reactive oxygen species (ROS), particularly in the eyes, skin, and brain — making it one of the body's most sophisticated and underappreciated antioxidant and energy-management systems.

---

***"A major photoreceptor in our body is melanin. New evidence shows melanin is a key aspect of mitochondrial function, brain health, and immune regulation throughout the body."***

---

### **Vitamin D, Melanin, and Light: The Full Picture**

To convert skin cholesterol ester to 25-dihydroxycholesterol (vitamin D), the body requires a photoisomerization effect that depends on deuterium-depleted water from the mitochondria. The 25-dihydroxycholesterol vitamin D produced in the skin is not yet active — to become active, it must be converted to 1,25-dihydroxycholesterol in the kidney and liver. If there is leptin resistance from chronic blue light exposure, technology overuse, or living in a high-EMF environment, this conversion at the liver level is impaired, decreasing deuterium-depleted water production in the mitochondria.

If you have a good tan but a vitamin D level of only 25 or 30 ng/dL, that is the first sign to examine tech-abuse and screen time. You can be at the equator, but if you are in a city loaded with 5G or electromagnetic smog, you may still not be able to make adequate vitamin D. The way to assess this is to measure vitamin D levels at every equinox for the first year in a new location. The relationship between sunlight and vitamin D is real, but it is far more nuanced than simple sun exposure — it involves the mitochondria, leptin signaling, and your entire electromagnetic environment.

### **Vitiligo, Thyroid, and Light Deprivation**

Vitiligo is an autoimmune condition of the melanocytes. Just as leaves on a tree stay green when the sun is strong and change color when sunlight decreases in fall, vitiligo represents the human equivalent of light-deprivation signaling in melanocytes. People can develop vitiligo in summer because they never go outdoors. In severe cases, the body begins making antibodies against its own melanocytes — a proxy for underlying mitochondrial damage and leptin dysregulation. People with vitiligo tend to gain weight more easily because the leptin biology that depends on melanocyte signaling is disrupted.

Thyroid hormone — T3 and T4 — is synthesized in part through anterior pituitary signaling that depends on morning sunlight received through the eyes. If you are not getting adequate morning sun, you will never make sufficient thyroid hormone. Covering the eyes with glasses or contacts for 20 to 30 years reduces the quantum yield of sunlight reaching the thyroid-regulating centers of the brain. To correct hypothyroidism, you must address the leptin problem and the morning sunlight deficit together.

## 5. Mitochondria, Light, and the Energy of Life

---

Our mitochondrial health relies fundamentally on proper light exposure. Mitochondria are not simply energy factories — they are nature's version of a hydrogen fuel engine, and that engine is profoundly sensitive to both the quality of light it receives and the quality of fuel it is given. When UV light hits the photoreceptors in our mitochondria — specifically cytochrome c oxidase — it creates more ATP (cellular energy currency), melatonin, pregnenolone (the master sex hormone precursor), structured water (H<sub>3</sub>O<sub>2</sub>), and infrared heat.

Light determines how your mitochondria handle electrons and protons. The fifth cytochrome — ATPase — makes ATP, and ATP can only be made when the head of the ATPase turns exactly 3.4 revolutions. What makes it spin? H<sup>+</sup> — light hydrogen (protium). Deuterium, the heavier isotope of hydrogen, cannot fit in the spin. When deuterium accumulates in the mitochondrial matrix, it physically impairs the ATPase — your metabolic engine degrades from a precision instrument to a struggling, inefficient machine. This is how inflammation begins. This is how leptin resistance begins. This is how insulin resistance begins.

Sunlight deuterium-depletes the water created at cytochrome C oxidase. The water produced inside your mitochondria is fundamentally different from the water you drink — it is deuterium-depleted metabolic water, critical to maintaining the precision of the ATPase engine. Fat makes the most of this water in the mitochondria; carbohydrates make the least. When you do not make sufficient deuterium-depleted metabolic water, you become chronically dehydrated at the cellular level, regardless of how much water you consume externally.

In quantum terms, light regulates the cycles of our biology. Light excites our electrons and provides energy for the body to carry out its functions. Light also regulates most of the biological rhythms known as circadian rhythm — ranging from metabolic cycles that last milliseconds to annual cycles — keeping our bodies synchronized within a multidimensional biological time-space continuum. Blood is a hydrodynamic fluid that connects the Sun to the mitochondria wirelessly. This is nature's original wireless network.

### Light, Food, and the Photosynthesis Connection

The entire food chain is tied to photosynthesis. Anything not grown under the power of the sun is, from a mitochondrial perspective, problematic food. Food is an electromagnetic barcode of photosynthesis — and when you eat food that is not matched to your geographic and seasonal light environment, you introduce a mismatch that the mitochondria experience as chaos. In medicine, a synonym for chaos is inflammation.

The real reason the traditional cultures studied by Weston Price were so healthy is that they ate ancestral diets outside — in full-spectrum natural light. Someone living near the equator in the tropics can metabolize more carbohydrates than someone at northern latitudes, because those carbohydrates

are grown locally under the correct solar conditions. Eating a coconut or pineapple in Boston on December 31st creates a deuterium mismatch in the mitochondria — those fruits contain hydrogen profiles calibrated for a tropical solar environment, not a winter northern one.

Processed food is problematic not simply because of its ingredients, but because it is not grown under the power of photosynthesis, or has been produced through industrial processes that introduce incorrect deuterium ratios into the mitochondrial fuel supply. Polyunsaturated seed oils are a prime example — photosynthesis did not create them; a laboratory process did. There is no solar process that determines the deuterium content in those oils. The light you eat your food under matters more than most people realize — the electromagnetic footprint placed in food by photosynthesis is altered by the artificial light environment in which it is consumed.

Fluoride is a dielectric blocker in water, interfering with the electrical properties that make structured water biologically functional. Fluoridated pharmaceutical drugs — particularly MAOI inhibitors and antidepressants — produce similar dielectric-blocking effects. The optimal diet, from a light-biology perspective, is seafood and meat with seasonal vegetables — food whose photosynthetic and deuterium profiles are matched to your geographic location and the time of year.

## **6. Photobiomodulation: The Science of Healing with Light**

---

Light therapy — also known as photobiomodulation (PBM) — is not a new concept, though its scientific validation is accelerating rapidly. Ancient civilizations including the Egyptians, Greeks, and Romans recognized the healing power of sunlight and practiced heliotherapy. In the late 19th century, Niels Finsen pioneered clinical light therapy for tuberculosis of the skin, earning the Nobel Prize in 1903. Today, over 6,000 peer-reviewed scientific studies document the proven health benefits of red and near-infrared light therapy alone.

Photobiomodulation is the science of using light to modulate biology. While music therapy primarily addresses perception and emotional wellbeing, and neuroacoustics focuses on brainwave responses to defined frequencies, photobiomodulation targets the body's specific photoreceptor systems — modulating neuronal activity, supporting cellular coherence, and driving functional integration within biological systems. It is distinct from passive exposure — it is therapeutic, targeted, and dose-dependent.

Red light therapy works at the cellular level, healing the body from within by addressing root causes rather than surface-level symptoms. It tackles the inflammation that is silently breaking down the body — the inflammation underlying arthritis, brain fog, gut dysfunction, accelerated aging, and immune dysregulation. Red light therapy also works well in conjunction with supplements that increase ATP

production, and combines synergistically with methylene blue at the end of the electron transport chain to stimulate ATP synthesis without generating oxidative stress.

## **Cellular and Molecular Mechanisms**

Cells are directly susceptible to mechanical vibrations and sound frequencies in ways that influence their core functions. Specific frequencies — particularly in the 30 to 50 Hz range — increase cell-membrane permeability, facilitate nutrient absorption, and promote cellular regeneration, reinforcing that therapeutic frequencies are not just heard or felt, but acted upon at a biological level. Low-frequency ultrasound has been shown to stimulate stem cell activity, crucial in wound healing and tissue regeneration, with promising implications for regenerative medicine.

One frequency of particular significance is 528 Hz, often called the DNA repair frequency. This frequency upregulates mitochondrial function — essential for all physiological processes — and reduces oxidative stress at the cellular level, a key factor in preventing aging and disease. Artificially generated frequencies, when applied correctly, interact positively with organic rhythms. Improper use, however, may introduce biological disharmony. This is why therapeutic precision matters — a minute field oscillating at frequencies of 2.7, 10, or 15 Hz can stimulate healing of nerve, bone, ligament, and capillary tissue, while fields at 50 or 60 Hz can be harmful.

## **The Benefits of Red and Near-Infrared Light Therapy**

The documented benefits of red and near-infrared light therapy span virtually every system of the body:

- **Skin and aging:** Combats skin aging, wrinkles, and cellulite — stimulating collagen production and cellular regeneration for visibly younger-looking skin
- **Wound and injury healing:** Accelerates the healing of wounds and injuries, reduces pain, and improves joint health through enhanced cellular repair mechanisms
- **Metabolic health:** Enhances fat loss and improves overall metabolic and hormonal health by optimizing mitochondrial function and insulin sensitivity
- **Energy and mitochondria:** Supports mitochondrial health, helps overcome chronic fatigue, and improves sustainable energy levels at the cellular level
- **Physical performance:** Improves physical performance, amplifies exercise benefits including increases in strength, endurance, and muscle mass, and accelerates exercise recovery
- **Brain and cognition:** Enhances cognitive function and triggers neuroprotective mechanisms for long-term brain health
- **Anti-aging:** Activates systemic anti-aging mechanisms including growth factors and stem cell activation that enhance cellular regeneration
- **Inflammation and immunity:** Fights chronic inflammation, supports hair regrowth, and improves immune function through multiple cellular pathways

Optimal light exposure habits are as essential to good health as good nutrition. Red light therapy is one of the most significant health breakthroughs of the modern era. It is time to start using this powerful, well-researched, non-invasive tool.

### **Ultraviolet Light and Biological Applications**

Ultraviolet light frequencies occupy the 2 to 300 nanometer range of the electromagnetic spectrum. UV light is used routinely in blood transfusion and plasma processing precisely because it effectively eliminates pathogens without harming normal cells. Ultraviolet blood irradiation (UBI) combined with ozone therapy and high-dose intravenous vitamin C represents one of the most potent biooxidative therapeutic combinations available — three approaches working synergistically to support immune function, oxidative balance, and systemic health. UBI has unique clinical impacts that work synergistically with these complementary therapies.

## **7. Light, Brainwaves, and States of Consciousness**

---

Sound and light are both tools for accessing deeper states of consciousness. Brainwaves are synchronized electrical discharges from billions of neurons, directly linked to states of consciousness. Neuroscientific research has identified various brainwave frequencies associated with different mental and emotional states, regulating everything from sleep to creativity, from focused attention to deep meditative states.

Since Dr. Jeffry Thompson's 1989 discovery of the Epsilon brainwave, 22 brainwave states — or Neural Codes of Consciousness — have been identified, each linked to unique levels of awareness and physiological response. These neural codes are seen as reflecting both ancient wisdom traditions and modern neuroscientific insights, with applications spanning stress relief, cognitive enhancement, emotional healing, and personal growth.

### **The 40 Hz Gamma Revolution**

Among the most exciting developments in modern neuroscience is the therapeutic power of 40 Hz gamma frequency stimulation. A decade after scientists at MIT first tested whether 40 Hz sensory stimulation could treat Alzheimer's disease in mice, a growing body of evidence from research institutions around the world has confirmed its power to improve brain health in both animals and humans.

40 Hz stimulation — delivered via light, sound, or tactile vibration — has been shown to reduce hallmarks of Alzheimer's pathology including amyloid plaques and tau proteins, prevent neuron death, decrease synapse loss, and sustain memory and cognition. It increases release of the peptide VIP, which promotes clearance of amyloid from brain tissue via the brain's glymphatic system. People with

Alzheimer's exposed to 40 Hz light and sound experienced significant slowing of brain atrophy and improvements in cognitive measures compared to controls.

Researchers call this approach GENUS — Gamma Entrainment Using Sensory Stimulation. The more we understand the mechanisms and the circuits it affects, the more neurological disorders will be found to benefit from this approach. Beyond Alzheimer's disease, gamma entrainment shows promise for Parkinson's disease, stroke recovery, anxiety, epilepsy, the cognitive side effects of chemotherapy, and conditions affecting myelin such as multiple sclerosis.

### **Neuroacoustics and the Brain's Response to Frequency**

Once perceived by the ear, sound is converted into electrical impulses that travel along the auditory pathways to the cerebral cortex, where they modulate neuronal activity, support hemispheric synchronization, and influence different types of brain waves: alpha, beta, theta, delta, and gamma. Neuroacoustics studies these interactions, linking auditory input to the body's physiological and neurological responses — providing a scientific framework for understanding how specific frequencies produce specific biological outcomes.

Light regulates the cycles of our biology in quantum terms. Resonance — the tendency of systems to vibrate more strongly when exposed to their natural frequencies — and entrainment — the synchronization of oscillating systems when brought into proximity — are the fundamental mechanisms through which both light therapy and sound therapy produce their therapeutic effects. Just as a tuning fork sets a second identical tuning fork into resonance, therapeutic light and sound frequencies cause the body's own biological systems to synchronize toward more coherent, healthier states.

## **8. Practical Light Protocols for Optimal Health**

---

Individual, nature-centric acts of self-care can outperform and render obsolete many of the costly, invasive solutions of a system that does not always prioritize the foundational needs of human biology. The following protocols are practical, free or low-cost, and grounded in the science of circadian biology, photobiomodulation, and mitochondrial health. Your body is designed for harmony with the natural world. These practices honor that design.

### **The Morning Light Protocol**

- Step outside within 30 to 60 minutes of waking — this is non-negotiable for circadian entrainment
- 5 to 10 minutes of unfiltered natural light exposure to the eyes and skin is sufficient to set the biological clock for the day
- Do this without sunglasses, glasses, or contact lenses — glass blocks the UV frequencies the SCN needs

- Look toward the sun (not directly at it) — face east like a sphinx, with feet on the ground for grounding
- This works even on overcast days — cloud cover does not block the photonic signal needed by the SCN
- If you cannot get outside, turn on the brightest available indoor lights and prioritize outdoor exposure later in the morning

### **Circadian Eating Alignment**

- Eat your largest meal at breakfast, following morning light exposure
- Eat a medium-sized lunch
- Eat a small dinner — your last meal should be while the sun is still up
- Fast from dinner until you have received morning light and broken the fast in alignment with the circadian clock
- Align food choices with your geographic location and season — eat locally and seasonally wherever possible
- Minimize processed foods, seed oils, and out-of-season tropical foods if you live at northern latitudes

### **Red Light Therapy Practice**

- Use red (630-660nm) and near-infrared (810-850nm) light therapy devices daily or several times per week
- Sessions of 10 to 20 minutes at appropriate distances from the device are standard therapeutic doses
- Target areas of chronic pain, injury, or skin concerns directly
- Full-body sessions support systemic mitochondrial health and anti-inflammatory effects
- Consider morning sessions to complement the circadian light protocol, as red and near-infrared light in morning sunlight contribute to mitochondrial activation
- Combine with methylene blue and ATP-supporting supplements for synergistic mitochondrial support

### **Reducing Harmful Light Exposure**

- Eliminate or minimize screen use after sunset — evening screen light suppresses melatonin and disrupts circadian programming
- Use blue-light-blocking glasses in the evening if screen use is unavoidable
- Sleep in complete darkness — even dim light during sleep hours increases cardiovascular disease risk

- Replace LED and fluorescent lighting with warmer, full-spectrum options wherever possible
- Open windows during the day to allow full-spectrum natural light to enter living and work spaces
- Limit proximity to Wi-Fi routers, cell phones, and other non-native EMF sources, particularly during sleep
- Consider wired connections in place of wireless wherever practical

### **Grounding and Environmental Light Practices**

- Practice grounding — direct skin contact with the Earth — to support the body's natural electrical balance and counteract EMF accumulation
- Spend time outdoors in natural, unfiltered light throughout the day, not just in the morning
- Use natural light sources — candles, fire, incandescent bulbs — in the evening to signal the biological shift toward nighttime physiology
- Monitor vitamin D levels at each equinox for the first year in a new location to establish your personal light baseline
- Reduce fluoride exposure in water and be aware of fluoride-containing pharmaceutical drugs that may act as dielectric blockers

## **9. Reclaiming Your Light, Reclaiming Your Health**

---



We are creatures of light. For 4.6 billion years, life on Earth has evolved in intimate relationship with the sun — calibrated to its rhythms, powered by its photons, organized by its daily and seasonal cycles. In a few short generations, modern life has severed that relationship more completely than at any previous point in human history. The consequences are written in the chronic disease statistics of our time.

Reclaiming your health through light is a profound act of reclaiming autonomy over your own biology. It represents a return to a fundamental truth: your body is designed for harmony with the natural world. By stepping outside each morning, by nourishing your mitochondria with full-spectrum light, by protecting your melatonin with darkness at night, and by using the validated tools of photobiomodulation — you are working with your nature, not against it.

This is the essence of true, decentralized healthcare. It places control firmly back in your hands. The most potent medicine available often requires no prescription, no payment to any institution, and no waiting room. It requires only the willingness to step into the light — and the knowledge to use it wisely.

Your light choices form your medical destiny. The science is here. The protocols are simple. The tools — morning sunlight, red light therapy, circadian alignment, full-spectrum living — are accessible to anyone. What has changed is our awareness. And awareness, as every healer knows, is where all healing begins.

---

***"We are not separate from nature. We are nature. And nature runs on light."***

---

Begin where you are. Go outside tomorrow morning. Face the rising sun. Feel it on your skin and in your eyes. Know that in that simple act, you are doing something that billions of years of evolution designed your body to do. You are resetting the master clock. You are activating your mitochondria. You are telling every cell in your body: it is a new day, and we are alive, and we are home.

---

### **Begin Your Light Journey**

*For consultations, sessions, and further resources, contact us to begin your personalized light protocol.*

---