

The Effect of Sunlight and Full-Spectrum Light on Health, Wellness & Performance

Jacob Liberman, OD, PhD, D Sc.

The Power of Light

According to Goethe, “All life originates and develops under the influence of...light...” This becomes obvious when we experimentally place plants, animals, or humans in a darkened environment and notice that their life force gradually diminishes, bringing life to a halt. Without light there is no will to live, we are robbed of the spark that propels our spirit.

When the same experiment is repeated using artificial lighting, such as cool-white fluorescent tubes, the natural growth pattern of both plants and animals is significantly affected, reducing lifespan, and at times manifesting as physical abnormality. In humans, there is a decrease in attention, learning ability, performance, and productivity, an increase in stress, irritability, errors, and fatigue, and a major increase in cavities. However, when children are placed in classrooms that incorporate natural daylight, learning ability, test scores, and productivity significantly improve. Natural daylight in retail locations boosts sales by 40%.

All biological life is composed of, and dependent on, light. That is why “solar system” means of or derived from light. When Nobel Laureate Albert Szent-Gyorgyi says, “All the energy we take into our bodies is derived from the sun,” he is literally saying that light is the primal nourishment for life. The body is a biological light receptor, the eyes are transparent biological windows designed to receive and emit light, and all physiological functions are light dependent. As an example, routine exposure to sunlight reduces resting heart rate, respiratory rate, blood pressure, and blood sugar, while increasing energy, strength, endurance, stress tolerance, and the ability of the blood to absorb and carry oxygen. Light guides the eyes, physical movement, and physiological function, hence light and life are inseparable.

How does the oneness of light and life affect us personally? The spectrum of electromagnetic radiation ranges from cosmic rays to electrical waves. Within this vast range lies the tiny band of "visible" frequencies of light, containing a rainbow of colors that resonate with life itself. Every human function is light dependent. Thus, our ability to take in the entire visible spectrum of light determines the amount of life force available to us in each moment.

Light and the Eyes

How does light impact us so profoundly? It is said, “the eyes are the windows of the soul”. But what does that mean? In the New Testament, Luke 11:34 states, “The light of the body is your eye; when your eye is clear, your whole body is clear, your whole body is also full of light; but when it is bad, your body is full of darkness.” Most people are aware of the relationship between light and vision. However, few are aware that non-visual light-sensing cells in the eyes are present and functioning at birth, long before the rods and cones that process light into vision. This confirms the inseparable link between light, the eyes, and our survival.

The eyes are responsible for 90% of the information we take in during our lifetime. Of the 3 billion sensory inputs received by the body each second, 2 billion are received by way of the eyes. 98% of the sun’s light enters the body through the eyes, the other 2% by way of the skin.

Every 2 hours approximately 99% of the body's new blood volume is exposed to light as it circulates through the blood vessels on the back of the eye, continually altering blood chemistry.

Every substance ingested by the body has a maximum wavelength absorption characteristic. In other words, for any ingested substance to be fully digested and assimilated by the body, it must go through a series of chemical reactions, catalyzed by a specific portion of the electromagnetic spectrum. Blue light, for instance, is required for the breakdown and excretion of bilirubin, while ultraviolet is necessary for the synthesis of vitamin D. Anything we ingest must interact with a precise segment of the electromagnetic spectrum in order for it to be fully metabolized. Therefore, any portion of the spectrum we are not assimilating will affect our ability to fully absorb the nutrients in the food we eat.

Light entering the eyes also travels to the site of the body's biological clock within the hypothalamus. Known as "the brain's brain", the hypothalamus is the body's major integration center for information from the nervous system, endocrine system, immune system, and emotional centers, as well as the initiator and director of our reaction and adaptation to stress. In essence, the hypothalamus uses light activated information to regulate the body's vital functions.

Until recently, the pituitary was referred to as the body's master gland. However, it is now recognized that the body's real master gland is the pineal. Referred to as the "third eye" by Indian mystics and the "seat of the soul" by Descartes, the pineal is considered the body's "regulator of regulators". Acting as the body's "light meter," it simultaneously communicates information about time of day, time of year, spectral characteristics, and the earth's electromagnetic field with every cell in the body. In so doing, each cell orchestrates its internal function and synchronizes itself with Mother Nature. Light's stimulatory and regulatory effect on the human body occurs by way of the eyes.

The human energy system is in a continual homeodynamic state. This critical preservation of harmony is accomplished by constantly linking our vital functions with the chronology of the cosmos. Thus, our receptivity to the full spectrum of sunlight determines our degree of oneness with life.

The Impact of Full Spectrum Light

Just as poor diet can lead to malnutrition, ingesting poor quality light can result in mal-illumination, with similar effects. Dr. John Ott, pioneer in the development of full-spectrum lighting, demonstrated that only the full spectrum of sunlight induces full growth in plants. He also found that chickens living under artificial lights live half as long, are more aggressive, and produce eggs with significantly more cholesterol. Mice living under commonly used fluorescent lights lived half as long as those living under natural daylight. Dr. Ott also found that children in classrooms illuminated with full-spectrum light demonstrated a marked improvement in academic achievement within one month, significantly less hyperactivity, and 33% less incidence of cavities.

Under natural daylight or full spectrum light that duplicates natural light, visual acuity, accuracy, and productivity increase. Students and office workers experience far less fatigue and chance of error. Absenteeism due to illness decreases and people have more energy. When one company redesigned their facility with full spectrum light, they saved \$235,000 annually from reduced computer errors by employees.