

the aware show

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Welcome To “The Light Therapy Revolution”

A Brief History of Light Therapy

“We are Human Photocells. Light is the ultimate biological nutrient.”
Dr. Gabriel Cousens M.D., Psychiatrist

Light therapy, the use of light for healing, has been in use for thousands of years. Ancient cultures understood that the sun and its light rays were essential to all of life. They recognized it as the bringer of life and energy for all living things on the planet, and in many cases deified it.

The earliest medicine recorded understood that light has special properties. The Greeks knew that exposure to light, or heliotherapy, was essential to health. Hippocrates, the father of modern medicine, encouraged patients to sit in sunlight as a cure for various disorders. Herodotus believed it helped heal the muscles and nerves. Ancient Egyptians believed bathing in various colored light would promote healing of ailments. According to Indian medical literature from around 1,500 BC, light therapy was used to treat skin disorders. Even Chinese texts dating from 1,000 - 2,000 years ago describe a range of color and light therapies for the treatment of skin and mental disorders.

In more modern science, the earliest work in light therapy was by Niels Ryberg Finsen, a Danish Physician, in the late 19th century. He was awarded the Nobel Prize for his work in 1903 when he demonstrated the beneficial effects of various light wavelengths in the treatment of tuberculosis. The device he created was the first that generated artificial sunlight to treat several conditions.⁵ Three decades later, vitamin D deficiency was identified as the cause of Rickets, a disorder that weakens and softens the bones. Vitamin D is normally produced by the skin’s exposure to sunlight. Eastern European researchers, in the 1950s, began publishing case reports that “soft” laser light helped relieve arthritis pain and Endre Mester of Hungary demonstrated the first early tests of laser phototherapy.

Independent research, starting in the early 1960s, has shown that Light Therapy has powerful therapeutic benefits to living tissue through a process called photo-stimulation. One well-known example is the practice of treating babies with light for jaundice, a common condition of newborns. More recent research has shown that a single red frequency combined with a topical cream kills certain types of skin cancer cells. It was also noted that skin tissue was stimulated to regenerate and the appearance of the skin improved. Research continues to show that with light therapy, circulation is increased along with fibroblastic activity, collagen production and the promotion of healing.

Early in the 1990s, NASA conducted a study using LED (light emitting diodes) light, specifically to figure out how to help plants grow in space. This resulted in a new understanding of how light interacts with biology. Scientific research soon turned to understanding how light affects animal and human cells. The results were astounding. NASA research found that the use of light to penetrate deep into tissues stimulated cell growth and promoted healing in zero-G environments. This same technology has proven to be effective in the fields of dentistry, dermatology, neurology and physical therapy. Research continues to this day and one can find a multitude of published studies on light therapy.

How does Light Therapy Work?

Light is a basic constant in life; it is easy to think of it as something that's simply there. In order to understand how light can affect our biology, it is important first to understand the basic physics of how light works. Light is energy. In most cases, it is emitted as a result of a thermal reaction, such as the sun's nuclear fusion or the hot filament in an incandescent bulb. Light may seem constant and connected, like a string connecting one thing to another, however light is essentially made up of packets of energy called photons that have the physical properties of both a wave and a particle.

Light particles travel closely to each other throughout the universe in a wave pattern like all forms of electromagnetic radiation (i.e., X-rays or AM/FM Radio). As these particles travel, they follow a wave pattern, and oscillate up and down between high and low points along the way. The distance between each peak is called the wavelength. Wavelengths are measured in meters, micrometers and nanometers; the shorter that distance, the higher the particle's energy and frequency. When light waves are close together, it is ultraviolet light. When the waves are far apart, it is infrared light. Visible light lies in between those two ranges (about 400 and 700 nanometers), and when the waves are moving at just the right frequency they can be seen.

Due to its particle composition, light can be absorbed by and interact with physical matter such as atoms, molecules, and cells. Even though light is seen as passive or ambient energy, it is possible for it to exhibit pressure; it can move things, although only very small things. The study of how light energy triggers chemical reactions when matter absorbs it is called photochemistry. The most commonly known photochemical reaction is photosynthesis, where plants create sugars from the reaction of light energy and carbon dioxide. In human biology, vitamin D is created as a reaction when the skin absorbs light from the sun. Light can be absorbed by human cells and this is key to light therapy of any kind.

How Light Works in the Body

Scientists in the US have recently documented the importance of the "light to body" processes for our health. Developing new techniques to study what activates nutrients to carry out their work within a cell, they have discovered the activity of a protein depends on that protein absorbing light. Through this research, they revealed that the symphony of life depends on light.

Light waves affect animal and human cells in a similar way to plant cells. This phenomenon is called photobiomodulation - the science of applying light waves to cause a biologic effect. Light therapy is essentially using light waves, at just the right wavelength, to positively affect animal and human cells.

Photobiomodulation has two key factors:

1. A wavelength of energy that can be most easily absorbed, which for human cells is either 670nm or 830nm, the far red, and near infrared end of the spectrum.
2. A cell's ability to absorb and use light energy to facilitate its metabolic functions.

Most cells are ultimately regulated by mitochondria (self-contained organelles with their own DNA that live inside cells), which are responsible for:

- Generating adenosine triphosphate, or ATP, the energy needed to keep the cell alive and functioning properly
- Cell differentiation
- Cell communication (signaling)
- Cell growth and mitosis (creating new cells)

When mitochondria are functioning at their best, they are producing enough energy (ATP) for a cell to divide, regenerate, and communicate with other cells. Producing the required ATP is a multi-step process and the crucial link in the chain is the enzyme cytochrome *c* oxidase. It is the most researched and reported on absorber of near infrared light energy.

Researchers have studied and reported on many benefits of light therapy, including:

- Increased adenosine triphosphate (ATP) release (the fuel for cells)
- Increased RNA and DNA synthesis (essential for protein synthesis and ATP production and cell repair)
- Stimulated fibroblastic activity (connective tissue that secretes collagen and elastic fibers)
- Increased vascularity (relating to fluid-carrying vessels)
- Stimulated collagen production (a protein found in skin, bone and other connective tissues)
- Increased lymphatic drainage (a fluid containing white blood cells that is drained from tissue spaces in the course of healing, it often carries away bacteria, viruses and cancer cells)
- Increased phagocytosis (a process of cleaning the blood stream and tissues of bacteria, waste and other foreign particles).

The primary effect of light therapy is energy production (increased ATP production). While the secondary effects include:

1. Nerve function (stimulation, healing, and pain reduction)
2. Reduces Inflammation
3. Wound healing, enhancing cellular proliferation and maturation
4. Improves Circulation (vasodilation, microcirculation, angiogenesis)

Medical evidence shows that Red and Infrared Light each enhance the release of Nitric Oxide from Hemoglobin. Why is this so important?

One of the most important benefits of light therapy is that it increases microcirculation immediately, AND after the light exposure. The increase in skin microcirculation produced by light therapy at the local and systemic levels is due to activation of nitric oxide (NO) synthesis in the treated area. By photobiomodulation, NO is released from the blood and the blood vessel walls.

Named “Molecule of the Year” by *Science* magazine in 1992, it is produced by the endothelial cell linings along 100,000 miles of blood vessels and capillaries in the human body. NO keeps blood vessels open, elastic and functioning properly. The NO pathway is the NEW metabolic pathway – it is EVERYWHERE in the body. *John Cooke, M.D., Ph.D* states “Most Americans are not producing enough “NO” in their blood vessels.” Poor blood circulation is one of the main reasons behind many chronic conditions, particularly patients with *diabetes*.

Dr. Jonathan S. Stamler, Professor of Medicine at Duke University Medical Center states "It does everything, everywhere. You cannot name a major cellular response or physiological effect in which (nitric oxide) is not implicated today. It's involved in complex behavioral changes in the brain, airway relaxation, beating of the heart, dilation of blood vessels, regulation of intestinal movement, function of blood cells, the immune system, even how fingers and arms move."

The Nobel Assembly at the Karolinska Institute in Stockholm, Sweden, awarded the Nobel Prize in Physiology or Medicine for 1998 jointly to Robert F Furchgott, Louis J Ignarro and Ferid Murad for their discoveries concerning "nitric oxide as a signaling molecule in the cardiovascular system."

Countless research studies show that light stimulates healing reactions in the body and the reactions continue for a time, even after the light is removed. Research by Professor Tiina Karu, a researcher based in Russia, exploring the specific ways single colors of LED light trigger healing, proved LED light improves metabolism. Metabolism is an all-encompassing term used to describe the chemical and biological processes within cells that sustain life.

Low Level Laser Therapy (LLLT) was the precursor to the advent of LED (light emitting diodes) light. An extensive body of research using LLLT has given direction to LED research. Professor Tiina Karu is considered a world-leader in both LLLT and LED research. She states that LED light is “... now used widely and successfully in clinical practice.” She also states that LEDs are equal to low level lasers.

“We are all light deficient and this deficiency may be the source of our physical and emotional problems.” Dr. John Ott, Light Therapy Pioneer

Enter “In Light Wellness Systems” – The Innovator in LED Light Therapy

There is one company that leads the research and manufacturing of LED Light Therapy Systems, and that is In Light Wellness Systems (ILWS). They are the ones that manufacture systems for others (OEM) and have led the way for over 25 years with leading edge technology and products that have helped thousands of people on their healing path with their own systems. Their systems are affordable, easy to use and can last a lifetime. ILWS has practioners and patients using their systems for, acute neck and back pain, ankle problems, arthritis pain and restricted movement, bone spurs, bone fractures, bruises, burns, bursitis, carpal tunnel syndrome, deep muscle problems, golfer’s/tennis elbow, fractures, hematomas, open wounds, inflammation, leg pain neuralgia pain relief, peripheral neuropathy, pressure ulcers, shoulder pain, sore backs, sprains, strains, swelling, tendon problems, tight muscles, reduction of scar tissue and general relaxation and well-being.

In Light Wellness Systems (ILWS) uses “Frequency” Continuous and Pulsed Pulsing light. That simply means a frequency has been added to the color of the particular LED. With an added frequency, the LED pulses the color. The added frequency offers additional healing

qualities. LED research has only begun to explore the benefit of pulsing or adding frequencies to LED light therapy. It is the experience of veterinarians and acupuncturists that has led the way with pulsing light. Pulsing light, using a series of frequencies that resonate with natural body frequencies, was discovered by Dr. Paul Nogier. These pulses are known as the Nogier frequencies and have been well documented for their healing benefits. The Nogier frequencies, as well as other pulse rates, when combined with the color of LED light therapy enhance healing effects. ILWS is the world leader in developing and deploying these systems for consumers and healers alike.

One critical element in light therapy is the energy of the light itself and how that light can be delivered most effectively. The head of the NASA-sponsored research, Dr. Harry Whelan, stated: "NASA developed LEDs to offer an effective alternative to lasers." LED light technology can readily be used for personal use in the home and has the advantage of being able to treat a larger area. In contrast, the use of laser units is more in the realm of healthcare professionals as it takes training to be used safely and usually treats smaller areas. Since the 1990s, LED technology has been used in research, in clinical practice, and by consumers very successfully.

LEDs have given us a convenient and easy way to use light therapy for health. LED technology has made it easy to add special healthy frequencies to light therapy. The Nogier frequencies, in particular, are known to boost the healing power of the LED light therapy. ILWS takes advantage of these Nogier frequencies in delivering LED light therapy, in all of their units.

LED Light Therapy is simple to use, non-invasive, with a long-standing history of therapeutic benefits. Light Therapy, in the form of LED Light, combines ancient wisdom with the best of today's technology. That is why we are so pleased and excited to present to you In Light Wellness Systems and their ground breaking systems.

"Light provides neurostimulation to revive the brain, and this leads to the overall healing process." Norman Doidge, MD, "The Brain's Way of Healing"



This paper has been created for your personal and professional use by The Aware Show in collaboration with In Light Wellness Systems and Candace McWhirter, MAcOM, Lac.

For more information about The Light Therapy Revolution and In Light Wellness Systems, please call or write Bo Rinaldi at bo@theawareshow.com or 877-896-5025 ext 1.

"Concerning matter, we have been all wrong. What we have called matter is really energy, whose vibration has been lowered as to be perceptible to the senses. There is no matter. There is only light and sound." Albert Einstein