

LIGHT THERAPY

LIGHT DEFICIENT

Underlying the many things that can go wrong with the body as we age, or expose ourselves to injury, is a deficiency of light.

We all need light. Our bodies evolved for millions of years in a field of incoherent light from the sun, as did all our food sources. If you are feeling miserable in the depths of winter notice how uplifted you feel by the red holly berry, or the sparkling white when sunlight hits frosted trees. Plants use light for photosynthesis to manufacture carbohydrates. Animals and humans have receptors for light in the eye, and receptors in the skin. We are able to manufacture vitamin D from ultraviolet light, from the sun.

A truly holistic approach to health must include LIGHT. This is because the ability of our cells to communicate depends on specific frequencies of light. Every cell emits at least 100.000 light impulses per second at a variety of frequencies.

If light stimulates bodily processes, then it is obvious that if we are light deficient disease can take hold. Cancer cells are the only cells that do not emit light. As light beings, it makes sense to use light to stimulate the body in the way that it can recognise and respond to. Low level laser light allows us to absorb light from an outside source, in the correct frequencies, when we are depleted from within. Natural light from the sun and our concentrated light from our food sources is often not enough.

Yet despite the overwhelming evidence for the safety and efficacy of light we are still slow to recognise its primary importance! The only limitation on the application of this extremely safe technology is a rigid mindset that is closed to the possibility of healing with something as basic and simple as light.

Otherwise, why do we still think taking a pill or a vitamin is enough? Drugs have side effects. Vitamins have to be absorbed to be effective.

We can overdose on medicines and nutrition, but when we apply light, cells only take the photons they need. And if those cells are underperforming and not allowing nutrients to cross the cell wall, because of damage, the light can repair the damage.

Osmosis (transfer) of essential nutrients cannot occur across the cellular membrane of a de-polarised (sick) cell. Consequently, delayed healing, chronic disease, scars, fatigue, and accelerated ageing is observed! LLLT reenergises (repolarises) injured cell membranes and increases the mitochondria energy by 150%, which speeds and improves the healing process.

Light seems to be a primary intervention, upon which secondary ones, such as nutrition, depend!

HISTORY

The power of light to heal has been known from ancient times.

- Ancient Egyptians are said to have built special temples for healing with sunlight and coloured light
- Pythagorus used colour for healing five hundred years before the birth of Christ
- Reference to colour healing can be found in ancient Chinese and Indian texts.

EARLY RESEARCH

Neils Ryberg Finsen, Nobel Prize winner in 1903, demonstrated that the most refractive rays from the sun (the chemical rays) have a stimulating effect on the tissues. These rays are found to be more abundant at altitude, where the absorption of the rays by the atmosphere is less pronounced. This is why treatment of tuberculosis in mountain air was so successful, before the availability of drugs allowed us to forget the benefits of sunlight.

Finsen treated smallpox lesions with red light (1893) and lupus with chemical rays free from heat rays (1895).

LIGHT FROM WITHIN

In 1933 the Russian scientist Gurwitsch hypothesised that all cells emitted light. It took until the late seventies before German biophysicists (Popp et al.) provided evidence to show that he was right. Every cell emits at least 100.000 light impulses per second at a variety of frequencies. *

Experimenting with differences in light between the healthy and the ill, Popp found that whereas the healthy had light emissions, which followed set patterns, and biological rhythms, the sick did not. Thus cancer patients had lost the natural periodic rhythms, and their coherence. The means for the body to communicate with itself and the outside world was sabotaged because the light had become distorted.

When a cell is healthy, coherent light is emitted. When a cell is disturbed the light turns chaotic.

In summary, Popp demonstrated that weak light emissions of low intensity were able to control the body, and that light in the body may be the factor that determines health and illness.

In other words complex pathways of resonance and frequency form the body's communication system.

* Popp FA, Becker B. Electromagnetic Bioinformation, ed. 2, Urban and Schwartzengerg, Germany, 1988.

In quantum physics coherence means that these subatomic particles are able to cooperate with each other and highly linked by bands of common electromagnetic fields. As Dr Dietrich Klinghardt puts it 'cells gossip, inform, celebrate and grieve...When things go wrong, such as in auto-immune disease, they fight each other. Light (and sound) can have a profound effect on regulating and correcting inter-cellular communications.+'

+Textbook of Psycho-Kinesiology – a new approach in psychosomatic medicine -
Dietrich K. Klinghardt, MD PhD,
Verlag Herman Bauer Freiburg, Germany 1995

LIGHT AND THE BODY

Low level laser light is the therapeutic application of laser light at low intensity. This non-invasive treatment uses a light source that generates extremely pure light of wavelengths that are effective through photochemical reactions in cells, rather than through a thermal effect.

Low level laser light has a variety of names and terminologies, which can be confusing. High powered lasers are often called hot lasers, and low level lasers are called 'cold' or 'soft' lasers (low power). Low Level Photo Therapy was introduced in the 1960's and in the 1980s light emitting diode (LED) technology advanced to the point where the energy output equalled that of lasers for common therapeutic use, and became widely available.

An LED is a silicon microchip with various added substances, each of which releases a different wavelength (colour) of light when electrically stimulated. LEDs used to be used mainly as low-power indicator lights for electronic devices.)

Lasers convert one kind of energy (electrical) into another kind of energy (photonic or light energy). It is then capable of releasing energy through direct application to the part of the body needing stimulation; over skin, organs or acupuncture points. Laser light energy is one pure color (monochromatic) and coherent (synchronized or well ordered).

LED light is also one pure colour, but noncoherent (spreading) light and is brighter than laser light. It is most effective if is run at higher powers.

To understand laser energy you need to be familiar with the following terms:

- power density, or light concentration (measured in watts per centimeter squared)
- wavelength (measured in nanometers)
- frequency (measured in Hertz).
- photons - packets of light energy which travel in waveform at different frequencies.

When electrical current stimulates a specific medium or element, the atoms of that medium give off photons. Each photon, thus each waveform, is characterized by a different wavelength. Each wavelength interacts with a given substance in a different way, by altering the frequency of cells.

Everything in nature, including, tissue cells, bacteria and viruses, has a unique frequency. Biophotons are involved in cell communication through a process that is termed 'ultra-weak cell radiation'. The cellular source of radiation is DNA in the nucleus.

An example of malfunctioning communication between cells is between malignant tumor cells. Mutual light contact is missing, resulting in increasing cellular disorder.

RED AND NEAR INFRARED LIGHT

The high energy photons from gamma rays, x-rays, and UV rays tend to ionize matter and damage tissue. On the other hand red (visible) and near infrared (invisible) light have therapeutic benefits, and it is this light that is most found in low level laser lights.

The visible light ranges, while quite beneficial, are limited by their shallow penetration of 1 to 3 mm. The invisible or infrared light range penetrates much deeper. Research documents infrared penetrations from 10 to 15 mm, but clinical results indicate that the infrared beam penetrates 8 to 10 cm. However, when soliton waves ([click here](#)) are used, as in the Q1000 low level laser, energy is able to penetrate deeper into the body without changing or losing its wave form or the information it carries. This process enables lasers to carry electrons throughout the body to restore damaged cells.

SOLITON WAVE

From the Merriam-Webster Dictionary - A solitary wave that propagates with little loss of energy and retains its shape and speed after colliding with another such wave.

When these two solitary waves meet, it forms a soliton wave, a special type of non-linear light wave that doesn't change shape as it travels. A soliton wave is half a wave, either the crest or the trough, and a wave once considered impossible, - a wave that doesn't wave. The two waves look exactly as they did before colliding and do not generate small waves during collisions with other solitons.

Solitons have been observed in nature since before the nineteenth century, but only in recent years have been observed almost everywhere that scientists look; from the cosmos to the subatomic, including all levels of biology. It turns out that a soliton wave is very robust against perturbations and is not changed by objects (mass) and continues undistorted through objects such as fibre optics, water, air, and the body. According to James Oschman, 'A soliton can trap an electric charge and carry it along. Once the soliton is formed, this charge transfer does not require further input of energy; thus a sort of super conductor is created.'

By combining two or more laser diodes, controlled by microprocessors, a soliton wave is produced. The nature of the soliton wave in the Q1000 enables the energy to penetrate anywhere in the body without changing or losing its wave form or the information it carries. This enables the laser to carry electrons to damaged cells anywhere in the body and restore the cellular energy. When the energy of the cell membrane has been restored, osmosis of nutrients across the cell membrane can occur, resulting in better cellular health. Better cellular health leads to better tissue health, better organ health, better health systems, and ultimately better total body health.

SO HOW DOES LIGHT HEAL?

Worldwide studies have shown that laser energy is accumulative as well as cascading and reduces pain and inflammation via:

1. Bio-stimulation and photo-stimulation
2. Endogenous opiate production
3. Slowing sensory nerve production
4. Restoring cellular resonant energy
5. Stimulating the Na/K pump mechanism in the cell membrane
6. Inhibiting bradykinin & leukotriene production

Our Body is made up of approximately five trillion individual cells. Each cell must supply its own vital energy called ATP (adenosine triphosphate). Every job a cell must perform needs to be done with the aid of ATP. Light is the only medication that can directly increase the production of ATP. Our cell power plant, the Mitochondria, converts photon energy (light energy) into ATP (cell energy), when there is a

deficiency. Research has shown that low level laser therapy can increase cellular ATP (body fuel) by as much as 150%.

This new fuel is then available to carry out the many repair and regenerative functions of our cells. In essence, there is more energy to expel waste products, and replace nutrients and proteins, the building blocks of our cells. LLLT increases lymphatic drainage by doubling the size of the lymphatic drainage ducts. This allows easier movement of cellular waste products and older protein by-products of cellular metabolism or tissue injury. The result is a rapid reduction in fluid retention, swelling, and inflammation. The increased collagen and epithelial production is also accompanied by the production of new capillaries and an increase in the density of the capillary bed. There is a rapid formation of many proteins, including collagen, a clear sticky substance, which is nature's "repair" material. This newly formed collagen can then be used to regenerate tissue that once had been damaged.

The laser energy also changes the electrical potential across cell membranes. This causes a desensitization of nerve cells, which results in the *reduction of pain impulses*.

Osmosis states that no nutrient can transfer across the depolarized membrane of an injured cell. One of the most important functions of low level laser therapy is to re-polarize sick and injured cellular membranes. This allows for essential nutrients to transfer from the blood into the cell.

In summary, the photons produced by laser light normalise tissue by activating enzymes within cells, which triggers a chemical reaction in which more enzymes are activated in a domino-type effect. Low level laser therapy has no effect on normal tissue. Photons are only taken up by cells that need them.

How much light?

However, caution should be used not to overuse low level laser light. Overstimulation, whilst not having the potential to cause harm, can undo the good that the correct dose would have achieved. Excessive biostimulation is not beneficial. Kinesiology, or muscle testing, is an excellent way of determining how much the body requires. Another way, if pain is involved, is to note improvement in pain level as a guide to dosage.

SUMMARY OF HEALING EFFECTS

Light bio-stimulation influences functions in the following ways:

- **Acceleration of the inflammatory stages, to achieve quicker healing** - bursitis, tendonitis, arthritis,
- **the general healing of wounds and injuries** – diabetic ulcers, venous ulcers, bed sores, mouth ulcers, fractures, tendon ruptures, ligamentous tear, torn cartilage etc.
- **Pain control** - low back pain, neck pain, pain associated with inflammatory conditions, Carpel Tunnel Syndrome, arthritis, tennis elbow, golfer's elbow, post herpetic neuralgia, muscle cramps etc.
- **Stimulation of cellular replication** (which is the key to healing and the production of healthy tissue)
- **Increase of DNA and RNA synthesis**
- **Stimulation of collagen production** (collagen is the main supportive protein of skin, tendon, bone, cartilage and connective tissue.) – excellent for beauty therapy, wrinkle management, acne
- **Alteration of the immune system** (helps immune cells combat infection)
- **Stimulation of fibroblast activity** (aids in the production of collagen)
- **Enhancement of vascularisation** (aids in improving circulation - poor circulation in diabetes, massage therapy, relaxation)
- **Stimulates the sodium potassium pumps in cell membranes** which enables transport of essential nutrients into cells to allow healing.

Over the last thirty five years thousands of studies have shown that appropriate doses and wavelengths of light are therapeutically beneficial in tissue repair and pain control. Over 2000 studies worldwide show that LLLT (Low Level Laser Therapy) is totally safe.

The debate is no longer whether light has biological effects but rather how radiation from therapeutic lasers and LEDs works at the cellular and organism levels, and what are the most effective wavelengths and frequencies for their different uses.

THE DISCOVERY OF LASER LIGHT

LASER is an acronym that stands for Light Amplification by Stimulated Emission of Radiation. Early research only focused on high powered lasers. They have a single wavelength of coloured light (monochromatic) or a narrow range of wavelengths. They can produce light (ultraviolet and infrared) that is invisible to the human eye. Because of their ability to destroy (as in weapons) and their extreme accuracy in cutting (medical use for operations) they are restricted in their use to highly trained professionals. But an experiment to assess the ability of 'high power' lasers to destroy cancer tumours accidentally paved the way to a greater appreciation of the role of low power light. The laser used in the experiment was not as powerful as it should have been. Instead of killing cancer cells, it healed the skin wounds that resulted from implanting the cancer cells in the animals used for the experiment. Thus the therapeutic power of red light was discovered (in fact rediscovered, after ancient knowledge had been buried.)

Those in the 'laser' camp held to their view that only coherent focused laser light was therapeutic. Yet university, and clinical studies consistently disproved this hypothesis.

It is not the coherence of light that is important, given the body's ability to transform incoherent light, when the thin layer of cell suspension, and the thin layer of tissue surface are irradiated. The absorption of low intensity laser light by biological systems is of a purely noncoherent (ie photobiological) nature in these instances. Both coherent and noncoherent light with the same wavelength, intensity and dose provides the same biological response. What is more important for cell receptivity for healing is monochromatic light, or single colour light.

Much of the early use of LEDs and incoherent light (spreading light) was in the veterinary field – in fact it was veterinary physicians with laser therapy experience who used the prototype units. But it was the space program and NASA that prompted the interest in light therapy for humans. NASA originally developed LED technology to enhance the growth of plant tissue in space, as part of commercial experiments sponsored by industry. In space the lack of gravity keeps cells from growing naturally. The result is slow-growing plant life, and for the astronauts, loss of bone mass, atrophied muscles and wounds that do not heal. LED lights were enough to help plants grow. The plants grew, and by coincidence gravity induced symptoms in the astronauts - loss of bone mass, atrophied muscles and wounds that do not heal - were also reduced.

Dr Harry Whelan of the Medical College of Wisconsin, is a leading researcher in the field of LED technology. In association with NASA he studied the effects of LEDs on diabetic skin ulcers, serious burns and flesh wounds caused by radiation, and chemotherapy treatments.

Whilst there are many advantages to LEDs as the carrier of light, it should not be forgotten that for healing to take place in deeper layers of bulk tissue, the additional therapeutic effects from coherent laser light and polarised radiation is needed. In these situations the light from LEDs does not have the required penetrative power. To give greater range and effectiveness, therefore, for deeper tissue repair, the best low level laser tool will combine both laser and LED light, and ideally incorporate soliton waves.

However, in many situations, as evidenced by the positive research funded by NASA, LED light is just as effective as equipment that also has low level laser light. As with so many things, choosing the right tool depends on your problem, and your budget.

For scientific references, see:

www.laser.nu

The Laser Therapy – LLLT Internet Guide of the Swedish Laser Medical Society for up-to-date research references and abstracts, and discussions on LLLT