The Rejuvenating Light of DPL™ Therapy

How it Works:

Tissues of the body have the ability to absorb light and use it as a source of energy to stimulate cellular regeneration.

DPL™ Therapy Translates the process of plant photosynthesis into the workings of human skin cells, deploying the body's own cytochromes to build new proteins the same way plants use chlorophyll to convert sunlight into cellular building blocks. The LED shoot light through the skin's epidermis the fibroblast cells, which produce structural proteins, such as collagen and elastin. When the light hits the cytochromes inside the fibroblasts mitochondria, it stimulates the cell's energy transport system. The cell produces more structural proteins, which in turn puff up the skin and give it the appearance of improved tone and elasticity.

For acne LEDs increase the release of oxygen carrying endogenic porphyrins – that attack the P. Acne bacteria below the skins surface.

What it Does:

Stimulate the production of collagen. Collagen is the most common protein found in the body. Collagen is the essential protein used to repair damaged tissue and to replace old tissue. It is the substance that holds cells together and has a high degree of elasticity. By increasing collagen production less scar tissue is formed at the damaged site.

Stimulate fibroblastic activity, which aids in the repair process. Fibroblasts are present in connective tissue and are capable of forming collagen fibers.

Increase vascularity (circulation). Circulation is increased by increasing the formation of new capillaries, which are additional blood vessels that replace damaged ones. New capillaries speed up the healing process by carrying more oxygen as well as more nutrients needed for healing and they can also carry more waste products away.

Stimulate the release of adenosine triphosphate (ATP). ATP is the major carrier of energy to all cells. ATP provides the chemical energy that drives the chemical reaction of the cell. It is the body's fuel.

Increase lymphatic system activity. Edema, which is the swelling or natural splinting process of the body, has two basic components. The first is a liquid part, which can be evacuated by the blood system, and the second is comprised of the proteins, which have to be evacuated by the lymphatic system. Research has shown that the lymph vessel diameter and the flow of the lymph system can be doubled with the use of light therapy. The venous diameter and the arterial diameters can also be increased. This means that both parts of edema (liquid and protein) can be evacuated at a much faster rate to relieve swelling.

Increase RNA and DNA synthesis. This helps damaged cells to be replaced more promptly. Reduce the excitability of nervous tissue. The photons of light energy enter the body as negative ions. This calls upon the body to send positive ions like calcium among others to go to the area being treated. These ions assist in firing the nerves thereby relieving pain.

Increase phagocytes, which is the process of scavenging for and ingesting dead or degenerated cells by phagocyte cells for the purpose of clean up. This is an important part of the infection fighting process. Destruction of the infection and clean up must occur before the healing process can take place.

Induce a thermal like effect in the tissue. The light raises the temperature of the cells although there is no heat produced from the diodes themselves.

Why DPL™ Therapy is so successful:

DPL™ Therapy is successful because it is proven and it works!

Using the DPL™ Therapy system restores skin to its natural health state without the use of chemicals or painful abrasive techniques, injections or plastic surgery.

Led Light Therapy has been researched for over 40 years with over 2,500 scientific papers published worldwide on the topic.

DPL™ Therapy is:

- Safe and effective for all skin types
- Non- invasive
- Non-ablative
- No side effects
- No downtime
- No pain
- Fast, treat entire face in 10-15 minutes
- Simple to operate
- Reliable, with proper care it is engineered to last for years
- No after care needed
- Affordable and cost effective

LED lights are incoherent (out of phase) lights where lasers are coherent light which damages the skin and uses the skins own healing properties to fill in the wrinkles.

Other high-tech rejuvenation therapies use lasers or intense pulsed light (IPL) to thermally injure tissue initialing the skins natural healing process. DPL™ Therapy System is a natural, non-thermal, non-ablative process emitting less energy that a 25 watt light bulb to improve the appearance of aging and sun damaged skin without patient discomfort.

LED Studies

There are over 2,500 scientific studies on the uses of LED light for wound healing, reduction of wrinkles and as an aid in pain relief. Some of the most notable studies are the following:

The original work in this area was started much earlier in Russia by the acknowledged world leader in photobiological mechanism research,
Tiina Karu

Tiina Karu
Professor, Head of Laboratory of Laser Biology and Medicine, Institute on Laser and Informatic Technologies of Russian Academic Science

"The photobiological action mechanism via activation of the respiratory chain is a universal mechanism. Primary photoacceptors are terminal oxidases. Primary reactions in or with a photoacceptor molecule lead to photobiological responses at the cellular level through cascades of biochemical homeostatic reactions. Crucial events of this type of cellmetabolism activation occur due to a shift of cellular redox potential in the direction of greater oxidation. Cell-metabolism activation via the respiratory chain occurs in all cells susceptible to light irradiation. Susceptibility to irradiation and capability for activation depend on the physiological status of irradiated cells; cells whose overall redox potential is shifted to a more reduced state (e.g., certain pathological conditions) are more sensitive to irradiation."

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How Does it Work?

So how does tissue regeneration via improved cellular function actually work? Let's take a look at some research from NASA scientist, Dr Harry Whelan...

Dr. Harry Whelan
(NASA)

“Low-energy photon irradiation by light in the far-red to near-IR spectral range with low-energy lasers or LED arrays has been found to modulate various biological processes in cell culture and animal models. This phenomenon of photobiomodulation has been applied clinically in the treatment of soft tissue injuries and the acceleration of wound healing. The mechanism of photobiomodulation by red to near-IR light at the cellular level has been ascribed to the activation of mitochondrial respiratory chain components, resulting in initiation of a signaling cascade that promotes cellular proliferation and cytoprotection.”

“A growing body of evidence suggests that cytochrome oxidase is a key photoacceptor of light in the far-red to near-IR spectral range."

"Cytochrome oxidase is an integral membrane protein that contains four redox active metal centers and has a strong absorbance in the far-red to near-IR spectral range detectable in vivo by near-IR spectroscopy.”

“Moreover, 660–680 nm of irradiation has been shown to increase electron transfer in purified cytochrome oxidase, increase mitochondrial respiration and ATP synthesis in isolated mitochondria, and up-regulate cytochrome oxidase activity in cultured neuronal cells.”

“LED photostimulation induces a cascade of signaling events initiated by the initial absorption of light by cytochrome oxidase. These signaling events may include the activation of immediate early genes, transcription factors, cytochrome oxidase subunit

metabolism."

"In addition to increased oxidative metabolism, red to near-IR light stimulation of mitochondrial electron transfer is known to increase the generation of reactive oxygen species. These mitochondrially generated reactive oxygen species may function as signaling molecules to provide communication between mitochondria and the cytosol and nucleus."

Proceedings of the National Academy of Sciences USA. 2003 Mar 18;100(6):3439-44.
NASA photobiomodulation research with LED's published here
http://garm.dyndns.org/whelan_lab/1/

The **NASA** Light-Emitting Diode Medical Program -Progress in Space **...**
www.mcw.edu/whelan/00.pd

http://www.thorlaser.com/wound/clinical-research.htm

http://www.nasa.gov/home/hqnews/2003/nov/HQ_03366_clinical_trials.html

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Results

- Minimize fine lines and wrinkles
- Reduces crow's-feet
- Heals blemishes
- Improve skin tone
- Regeneration/stimulation of collagen
- Restores skin's natural cellular collagen activity
- Activates fibroblast cells which create collagen and elastin
- Helps sun-damaged skin
- Creates more skin moisture which will help fill out skin
- Increases circulation, providing a healthier skin tone
- Reduces melanin production, which causes brown age spots
- Promotes nutritional elements existing within the skin
- Helps irregular pigmentation
- Lessens skin coarseness
- Lessens pore size
- Stimulates and activates metabolic function in skin cells
- Smoothes texture
- Reduces skin degradation
- Reduces overall redness, flushing, dilated capillaries

In a recent multi-center study of 90 patients using LED therapy treatments 62% achieved improvement around their eyes and 36% achieved improvement around the upper lips.

Effect of low-power laser irradiation on cell growth and procollagen synthesis of cultured fibroblasts. Lasers Surg Med. 2002; 31: 263-267.
Pereira A, de Paula Eduardo C, Matson E et al

The cell growth and procollagen synthesis of cultured fibroblasts were studies by irradiation at energy densities ranging from 3-5 J/cm2 over a period of 6 days. To simulate a situation of stress the cells were grown in a 2.5% FBS solution (10% being optimal). The laser was a 120 mW GaAs laser. Irradiation at 3 to 4 J/cm2 increased the cell numbers about threefold to six fold, compared to control cultures. However, the effect was restricted to a small range of densities, since 5 J/cm2 had no effect on cell growth. The energy density of 3 J/cm2 remarkably increased cell growth, with no effect on procollagen synthesis, as demonstrated by immunoprecipitation analysis.

THE INFLUENCE OF IR-LASER ON THE PROLIFERATION OF FIBROBLASTS: AN IN-VITRO STUDY
Ph.van der Veen, Y de Rop, P. Lievens
To control the reproductability, the inter-and intra reliability, we cultivated cells coming from the abdomen of two different (NMRI) mice and we divided 4 groups per mouse. Two were irradiated, two were not. Then we did a BrdU-labeling with 4 flasks (2 were irradiated, 2 were control). Differences between the experimental and control groups were examined by means of a t-test and a non-parametric Mann-Whitney test. The results show a significant ($p<0,05$) increase of fibroblasts proliferation after IR-irradiation. The BrdU-labeling showed an increased DNA activity. There is also a perfect match between the increased number of fibroblasts and the DNA activity.