red-light-therapy

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Red-Light-Therapy: Publications and Research from SwissMixIt

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PDF Version of the webpage (first pages)

Red Light Therapy Botanical Information

Red Light Therapy. LEDs stimulate the basic energy processes in the mitochondria (energy compartments) of each cell, particularly when near-infrared light is used to activate the color sensitive chemicals (chromophores, cytochrome systems) inside. Optimal LED wavelengths include 680, 730 and 880 nm and our labora- tory has improved the healing of wounds in laboratory animals by using both NASA LED light and hyperbaric oxygen. Increased healing of chronic wounds
• Improvements in sports injuries and carpal tunnel syndrome
• Pain reduction in arthritis and neuropathies
• Amelioration of damage after heart attacks, stroke, and nerve injury
Staring at Red Light for 3 Minutes Appears to Improve Eyesight in Over 40s. Scientists believe shining a special red light in the eye could help improve age-related vision problems. The study published in the Journal of Gerontology. RLT, red light therapy, Photodynamic therapy, PDT, Light-emitting diodes, phototherapy, photodynamic therapy, skin rejuvenation, acne vulgaris, periorbital wrinkles, Acne, Dermatology, Laser, LLLT, Low level laser therapy, Phototherapy, Skin disease, Skin Rejuvenation, Pigmentation, Vitiligo, photobiomodulation, photodermatology, Androgenetic alopecia, Alopecia, Wound healing, biostimulation, age-related macular degeneration, retinopathy of prematurity, far-red to near-infrared, retinal degeneration, amblyopia, retinitis pigmentosa, methanol toxicity, 670nm, 670, 670 nm light irradiation, Near infrared, Photobiomodulation, Hyperoxia, Retinal degeneration, Neuroprotection, Cytochrome oxidase, Oxidative stress, Retinal inflammation, Oxygen toxicity, photoinactivation, ultraviolet, photodynamic, photobiomodulation, germicidal, virucidal, photobiology, COVID-19, Coronaviruses, Photobiomodulation, Antiviral, Pulsed blue light, Red or near infrared light

Keywords: RLT, red light therapy, Photodynamic therapy, PDT, Light-emitting diodes, phototherapy, photodynamic therapy, skin rejuvenation, acne vulgaris, periorbital wrinkles, Acne, Dermatology, Laser, LLLT, Low level laser therapy, Phototherapy, Skin disease, Skin Rejuvenation, Pigmentation, Vitiligo, photobiomodulation, photodermatology, Androgenetic alopecia, Alopecia, Wound healing, biostimulation, age-related macular degeneration, retinopathy of prematurity, far-red to near-infrared, retinal degeneration, amblyopia, retinitis pigmentosa, methanol toxicity, 670nm, 670, 670 nm light irradiation, Near infrared, Photobiomodulation, Hyperoxia, Retinal degeneration, Neuroprotection, Cytochrome oxidase, Oxidative stress, Retinal inflammation, Oxygen toxicity, photoinactivation, ultraviolet, photodynamic, photobiomodulation, germicidal, virucidal, photobiology, COVID-19, Coronaviruses, Photobiomodulation, Antiviral, Pulsed blue light, Red or near infrared light
Description and Research Abstract: The term photoageing is used to characterise the ageing of the skin caused by solar radiation. Clinically, the skin becomes more flaccid, thicker and hyperpigmented, while there is an early appearance of wrinkles and other skin changes, such as skin cancer. Nowadays, there are numerous treatments for ageing skin, and one of them is with the use of phototherapy, which uses light-emitting diodes (LEDs). The objective of this study will be to evaluate the percentages of reduction in the volume of periocular wrinkles when treated with red and amber LEDs.

Infrared light therapy has been shown to trigger release of Nitric Oxide, a small endogenous molecule with multiple effects on body systems including fracture healing. The excerpts from published literature below highlight just some of the scientific and clinical investigations into the effects of infrared light and nitric oxide, suggesting mechanisms of action and pointing to potential clinical outcomes.

Photobiomodulation (PBM), also known as low level laser therapy, has recently risen to the attention of the ophthalmology community as a promising new approach to treat a variety of retinal conditions including age-related macular degeneration, retinopathy of prematurity, diabetic retinopathy, Leber's hereditary optic neuropathy, amblyopia, methanol-induced retinal damage, and possibly others.

Low levels of exposure to 670nm light protects against OIR and lung damage associated with exposure to high levels of oxygen, and may prove to be a non-invasive and inexpensive preventative treatment for ROP and chronic lung disease associated with prematurity.

Our data indicate that 670-nm light pretreatment reduces lipid peroxidation and complement propagation in the degenerating retina. These findings have relevance to the cellular events of complement activation underling the pathogenesis of AMD, and highlight the potential of 670-nm light as a non-invasive anti-inflammatory therapy.

Coronavirus disease 2019 (COVID-19) is associated with lung inflammation and cytokine storm. Photobiomodulation therapy (PBMT) is a safe, non-invasive therapy with significant anti-inflammatory effects. Adjunct PBMT has been employed in treating patients with lung conditions. Human studies and experimental models of respiratory disease suggest PBMT reduces inflammation and promotes lung healing. This is the first time supportive PBMT was used in a severe case of COVID-19 pneumonia. This report has presented supportive PBMT in a patient with severe COVID-19 pneumonia. Respiratory indices, radiological findings, oxygen requirements, and patient outcomes improved over several days and with- out need for a ventilator. Future controlled clinical trials are required to evaluate the effects of PBMT on clinical outcomes in patients with COVID-19 pneumonia.

670-nm light treatment reduces complement propagation following retinal degeneration.

Photobiomodulation at a wavelength of 670 nm has been shown to be effective in preventing photoreceptor cell death in the retina.

Daily tumor measurements demonstrated no measurable effect of LLLT on tumor growth. This experiment suggests that LLLT at these parameters may be safe even when malignant lesions are present. Further studies on the effects of photoirradiation on neoplasms are warranted.

Melatonin is well recognized for its role as a potent antioxidant and is directly implicated in the free radical theory of aging. Red light therapy (670 nm, 4J/cm(2)) has been shown to restore glutathione redox balance upon toxicological insult and enhance both cytochrome c oxidase and energy production, all of which may be affected by melatonin. The red light treatment has also been successfully implemented in the clinical setting for its effectiveness in reducing both the number of incidences and severity of oral mucositis resulting in part from the chemotherapy and/or radiation administered prior to bone marrow transplants. Moreover, red light therapy improves wound healing and is being further tested for its ability to ameliorate toxicant-induced retinal and visual cortical neuron damage. Researchers in the growing field of light therapy may be in a position to draw from and collaborate with melatonin researchers to better characterize this alternative treatment.

Low-level laser (light) therapy (LLLT) is a noninvasive, nonthermal approach to disorders requiring reduction of pain and inflammation and stimulation of healing and tissue regeneration. Within the last decade, LLLT started being investigated as an adjuvant to liposuction, for noninvasive body contouring, reduction of cellulite, and improvement of blood lipid profile. LLLT may also aid autologous fat transfer procedures by enhancing the viability of adipocytes.

At higher damage intensities, the highest dose of 670 nm light showed protection. In vitro , the Seahorse XFe96 Extracellular Flux Analyzer revealed that 670 nm light directly influences mitochondrial metabolism by increasing the spare respiratory capacity of mitochondria in 661 W photoreceptor-like cells in light damaged conditions. Our findings further support the use of 670 nm light as an effective treatment against retinal degeneration as well as shedding light on the mechanism of protection through the increase of the mitochondrial spare respiratory capacity.

Benefit deriving from the use of light is known since ancient time, but, only in the last decades of twentieth century, we witnessed the rapid expansion of knowledge and techniques. Light-emitted diode (LED)-based devices represent the emerging and safest tool for the treatment of many conditions such as skin inflammatory conditions, aging, and disorders linked to hair growth. The present work reviews the current knowledge about LED-based therapeutic approaches in different skin and hair disorders. LED therapy represents the emerging and safest tool for the treatment of many conditions such as skin inflammatory conditions, aging, and disorders linked to hair growth. Use of light as therapeutic approach is one of the oldest known methods to treat different health conditions, and its benefits are known since the ancient Egyptians, Chinese, and Indian populations. Nevertheless, large use and well-known benefits for more than thousands of years, the scientific basis of phototherapy was laid at the beginning of twentieth century when the term photodynamic therapy (PDT) was coined by Oscar Raab and Herman von Tappeiner as referred to the chemical reaction in which oxygen is consumed following induction by a photosensitization process.

Low-level laser therapy (LLLT) has been actively used for nearly 40 yr, during which time it has been known to reduce pain, inflammation, and edema. It also has the ability to promote healing of wounds, including deep tissues and nerves, and prevent tissue damage through cell death. Much of the landmark research was done by the National Aeronautics and Space Administration (NASA), and these studies provided a springboard for many additional basic science studies.

Low-level light therapy (LLLT) using red to near-infrared light energy has gained attention in recent years as a new scientific approach with therapeutic applications in ophthalmology, neurology, and psychiatry. The ongoing therapeutic revolution spearheaded by LLLT is largely propelled by progress in the basic science fields of photobiology and bioenergetics. This paper describes the mechanisms of action of LLLT at the molecular, cellular, and nervous tissue levels. Photoneuromodulation of cytochrome oxidase activity is the most important primary mechanism of action of LLLT