



RED LIGHT THERAPY

What is red light therapy?

Red light therapy, also commonly called photobiomodulation, is a therapeutic treatment that uses near infrared (NIR) wavelength red light to treat many conditions. NASA originally began experimenting with red light therapy on plant growth in space and then to help heal wounds in astronauts. Like many developments, other potential uses began to be investigated. Scientists have now proven that specific wavelengths of light have unique and beneficial effects on the human body.

What conditions is red light therapy used for?

Red light therapy has been shown to help with:

- Acne, eczema, psoriasis, fine lines, wrinkles, scars, hair loss, skin and wound healing
- Osteoarthritis and other degenerative joint diseases
- Healing muscle, cartilage and tendon injuries while reducing recovery time
- Diabetic neuropathy and other circulatory diseases
- All inflammatory disorders (inflammation is the root cause of most diseases)
- Joint pain, neck pain, back pain, muscle pain (fibromyalgia), ANY PAIN.
- Athletes looking to prime their body for peak performance and increase muscle recovery
- Weight management, metabolic dysfunction and hormone balancing
- Insomnia and other sleep disorders

How does red light therapy work?

During treatment, photons, or single units of light, are absorbed by the photosensitive molecules in your cells. Red/NIR light works by correcting four key mechanisms in the body: mitochondrial dysfunction, low collagen production, poor circulation, and chronic inflammation.

MITOCHONDRIAL DYSFUNCTION: Mitochondrial dysfunction can affect tiny organelles within cells known as mitochondria. These microscopic energy-makers are responsible for producing adenosine triphosphate (ATP), which is the body's primary cellular fuel. When mitochondria aren't able to produce enough cellular energy, cells suffer – and consequently, health also suffers. The skin is the largest organ in the human body and the place where mitochondrial dysfunction is the most visible, although just as much trouble could be brewing in the systems deep in your body. Whatever causes the cells to function poorly (the primary causes are believed to be oxidative stress and chronic inflammation), reversing mitochondrial dysfunction using red light therapy can be a powerful step toward healing. When NIR wavelengths are absorbed into the skin, photosensitive molecules called chromophores detect the incoming electromagnetic waves. This interaction stimulates the mitochondria to begin producing more ATP. More fuel energizes the cells so they can repair themselves and perform



their specialized functions. Increased energy production often sparks a positive chain reaction beginning with improved cellular functioning that then leads to improved systemic functioning.

LOW COLLAGEN PRODUCTION: Collagen is the protein that makes up about 80 percent of the skin, and it is responsible for the skin's firmness and structure. Collagen is also present in cartilage and muscle, which makes this structural protein vital for injury and wound healing as well as musculoskeletal health. Research has shown that red light therapy promotes collagen production. For example, researchers have found that red light therapy significantly improves skin complexion by increasing intradermal collagen density. Cartilage isn't just present in the skin. It is also a key component of connective tissue such as ligaments, tendons, cartilage, muscles, and even teeth. The collagen-boosting effects of red light therapy is encouraging news for anyone suffering from degenerative joint diseases, those who are recovering from injury, as well as anyone who wants to have healthier skin.

POOR CIRCULATION: Good circulation and healing go hand in hand. Not only do cells require oxygen and nutrients to be delivered by the blood, but they also need the lymphatic system to flush away toxins and harmful pathogens. Any condition you treat with red light will benefit from increased circulation. Red light acts as a vasodilator, which promotes the dilation of blood vessels. During one study, red light therapy was proven to aid vascular function in diabetic patients who were experiencing neuropathy. Another study again related to diabetes showed that after red light therapy treatment three times a week for eight weeks, patients experienced significant increases in blood circulation. This was a welcome finding since a sufficient blood supply is essential for wound healing.

CHRONIC INFLAMMATION: One of the hallmarks of red light therapy is its ability to reduce chronic inflammation that causes damaging oxidative stress in cells. Studies have shown that red light therapy has powerful anti-inflammatory properties. This makes it a powerful ally in treating rheumatoid arthritis, as well as other chronic inflammatory and degenerative joint disorders. For more than two decades, scientists have known that red light therapy can offer pain relief and increase the range of motion in joints affected by osteoarthritis and rheumatoid arthritis. In one of the earlier studies, the group treated with red/NIR light experienced up to 50 percent pain reduction after just a few treatments. This, along with increased energy production in the cells, increased collagen synthesis, and improved blood flow, can promote healing, reduce pain, and prevent further joint deterioration due to degenerative joint diseases. One of the mechanisms in which pain can be reduced using red light therapy includes the inhibition of the neurotransmitter substance-P. Elevated levels of substance P can increase the sensitivity of nerves to pain. Excess substance-P can lead to a variety of inflammatory diseases. Decreasing excess substance-P can thus lead to decreasing pain.



Why is red light therapy good for athletes and people who are active?

No matter if you're an elite athlete or a weekend warrior, you can precondition your muscles to prevent injury and prime the body for peak performance with a pre-workout or pre-competition NIR light therapy session. Whether post-workout or post-competition, NIR light session can speed up the recovery process. Faster muscle recovery means you could train harder and achieve your athletic goals; and if you are injured, accelerating the healing process causes a faster return to sport. A 2016 research review states that NIR light can stimulate, heal, and regenerate damaged muscle tissue. Studies have shown that red light therapy treatments both before and after exercise can increase athletic performance and recover faster from intense exercise. A study from 2016 involved university athletes who sustained injuries such as sprains, strains, tendonitis, contusions, and ligament damage. Over a period of 15 months, a total of 395 injuries were treated with 830 nm NIR light. The treatment group was able to return to play in just under 10 days, compared with the 19-day average return to play without treatment.

Can red light therapy help me with my metabolism and weight loss journey?

Yes! A number of studies have shown that red light therapy can help with weight loss. One of these studies was conducted in 2015 and involved a group of women aged 20 to 40. Treatment with 808 nm NIR light, along with aerobic and resistance training, resulted in reduced neck and waist circumference, and visceral fat. In cases where excess weight is linked to hormonal imbalances such as hypothyroidism (underactive thyroid), NIR light could help by safely balancing thyroid function. A 2020 study used 850 nm light to treat 350 patients with underactive thyroid glands. The treatment group experienced significant increases in T3 levels, T3/T4 ratio, vitamin D, selenium, and iron levels, and decreases in thyroid peroxidase antibody (TPO Ab) levels. Most significantly, many were able to reduce hormone replacement therapy. A 2013 comprehensive review shed some interesting light on the subject. It revealed that treatment with 635 nm red light therapy causes fat cells to temporarily leak and release lipids into the body. The fats are then converted into carbon dioxide, which the body expels. A 2016 review suggests that red/NIR light therapy can be extremely advantageous in athletic competitions since one of its effects is to gain muscle mass. In regard to fat loss, increased muscle mass raises the resting metabolic rate and results in more calories burned while resting.

Can red light therapy help with sleep?

People today are surrounded by artificial light from many sources. Some of these sources include computer screens, televisions, smartphones and overhead lighting. Too much artificial blue light can not only cause digital eye strain and headaches during the day, but in the evening, it can make it harder to get to sleep and stay asleep. This light throws the body's biological clock—the circadian rhythm—out of whack. Worse yet, research shows that it *may* contribute to the causation of cancer, diabetes, heart disease, and obesity. While exposure to typical room light in the evening has been shown to suppress melatonin (the 'sleep hormone') onset and shorten



melatonin duration in humans, red light therapy has been shown to have the opposite effect. In one study, those exposed to red light therapy regularly had a 75% increase in melatonin which dramatically improved sleep quality of the study's participants.

Are there any risks associated with red light therapy?

Certain medications and topical products may increase your sensitivity to light. For optimal results, your skin should be free of make-up, oils and lotions. Some individuals with particularly sensitive skin may experience mild redness and tightness after treatment. This temporary condition is believed to be a result of increased blood flow and disappears quickly. We ask that if you have any of the following conditions, you consult with your physician before using red light therapy.

Pregnant or nursing
Low blood pressure
Infectious disease
Taking nitrates
Epilepsy, seizures or sensitivity to light
Active carcinoma, malignant tissue or undergoing chemotherapy
Active bleeding, hemorrhaging, or taking blood thinners

How often do I need to use red light therapy in order for it to be effective?

Red light therapy is most effective when three to five sessions a week are administered. Optimal results can often be achieved within one to four months. You can safely continue with the treatment indefinitely with a session or two a week for maintenance, to prevent flare-ups of chronic conditions and to maintain healthy skin.

Does the type of red light therapy matter?

Absolutely! To get comparable results to those cited in clinical trials and clinical studies, you will need to use the right device with the right wavelengths, engage in consistent treatment, and have patience. Not all light therapy devices are equal. For example, handheld and most in home red light devices lack the power needed to deliver the maximum light energy output to your body. Red light therapy at Magic Moon Medicine is unique because it is a full body exposure medical grade FDA approved device and is utilizes many different wavelength settings so that we can change the wavelength to best treat your specific condition.