

Red Light Therapy: Benefits, Side Effects And Uses

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Red light therapy uses the therapeutic application of light energy primarily to aid in the

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healing of skin and muscular conditions, such as scarring and tendonitis. By exposing the body to a low wavelength of red light (620 to 750 nanometers), red light therapy stimulates increased energy production in the cells, which may lead to myriad health benefits.

While there are promising studies suggesting the efficacy of red light therapy, more research is necessary to fully determine its potential benefits. However, it's already being used with success in many different clinical settings.

Read on to learn more, including potential benefits, side effects and how to use red light therapy.

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What Is Red Light Therapy?

When it comes to the discovery of potential benefits of red light therapy, you can actually thank voyages to outer space.

In October 1995, sources of red light—part of the visible spectrum of light—made their space shuttle flight debut on the second U.S. Microgravity Laboratory Spacelab mission (STS-73, Columbia) as part of experiments in plant growth.

“It was here that astronauts tending the plant growth chambers noticed little scratches on their hands began to heal,” says red light therapy researcher Janis T. Eells, Ph.D., a professor in the Department of Biomedical Sciences at the University of Wisconsin-Milwaukee. “Nothing heals in space, so NASA funded many years of research with these lights for human trials.”

These studies led to the discovery that red light therapy could be used deliberately as a type of photomedicine, which is the application of light for health and healing purposes. Visible light penetrates biological tissues, such as cells, muscle tissues and nerve tissues—

with red and near-infrared (NIR) light going deeper than green, blue or violet light.

“With red light therapy, you expose an area of your body to a specific wavelength of red light emitted by a device that can range in size from handheld to whole-body,” says Casey Kelley, M.D., founder and medical director of Case Integrative Health. “Essentially, the red light stimulates your cells to work at a higher level.”

How Does Red Light Therapy Work?

Red light therapy works by activating your mitochondria, or the powerhouse of the cell, explains Dr. Kelley. With this boost to the energy center of the cell, the cells can do their jobs—such as healing and growth—more efficiently. “Think of it as your morning coffee—red light therapy helps your cells wake up and get the job done!” says Dr. Kelley.

Red light therapy and other low-level light modalities take advantage of a phenomenon called photobiomodulation, which is how different components of our cells are activated or respond to different wavelengths of light, explains Erum Ilyas, M.D. a Pennsylvania-based board-certified dermatologist with Schweiger Dermatology.

To further explain the effectiveness, Dr. Ilyas says it’s helpful to compare how red light therapy works versus traditional skin devices, such as lasers and intense pulsed light (IPL).

Lasers cause controlled damage to the skin to trigger an inflammatory reaction to promote wrinkle reduction and reduced redness. Conversely, red light therapies don’t cause trauma to the skin, meaning positive effects are seen without the discomfort, healing time and possible reactive swelling of traditional lasers.

In other words, while red light therapy can penetrate the skin up to 6 millimeters beneath the surface, it doesn’t have to cause damage in order to boost cell activity, continues Dr. Ilyas.

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Potential Benefits of Red Light Therapy

There are many potential uses and benefits of red light therapy.

However, according to Elaine F. Kung, M.D., founder of Future Bright Dermatology in New York and assistant clinical professor at Weill-Cornell Medical College, it's important to keep in mind that many of the published studies using red light as therapy are often small (less than 30 people), animal or lab studies. As a result, most medical professionals agree that more quality research with more human participants is needed.

Preliminary scientific results look very promising, though. Here are some of the conditions that are showing potential for treatment with red light therapy.

Improvement for Skin and Hair Conditions

Using light to affect positive skin changes is not a new concept. In fact, dermatologists have employed various light wavelengths in treatments for over 50 years, explains Dr. Kung.

With this in mind, one of the most commonly cited benefits of red light therapy is improvements to the skin. "It has been used to address signs of aging and skin damage, such as fine lines, wrinkles and age spots by stimulating collagen production," says Dr. Kelley.

Perhaps the most notable benefit of red light therapy is the improved quality and texture of the skin, according to Dr. Ilyas.

Here are some specifics supporting these potential applications of red light.

Fine lines and wrinkles. A 2020 study in the *Journal of Drugs in Dermatology* found that light emitting diode (LED) phototherapy may be effective when it comes to treating aging skin, with red light therapy showing promise for positive skin rejuvenation effects by boosting fibroblasts—which make collagen and, in turn, gives skin its structure, strength and elasticity^[1].

Acne. Light therapy has been used to treat acne for years, especially in conjunction with medications and therapies meant to enhance the light absorption, explains Dr. Ilyas. Accordingly, red light therapy is being explored as an acne treatment. One recent, small study showed that treating acne with red light therapy reduced mild and moderate breakouts by 36%^[2].

Scarring. Skin fibrosis (i.e. scarring) annually affects more than 100 million people worldwide^[3]. Though more clinical trials are needed, there is a growing body of evidence that red light therapy may help modulate key cell characteristics that contribute to scarring. In this case, red light therapy is used to reduce collagen production in scar tissue, improving or preventing thickening scars, according to Dr. Ilyas.

Wound healing. Difficult-to-heal wounds like diabetic ulcers present a major skin treatment issue. However, Red light therapy is showing promise when used for the acceleration of healing. Researchers posit that it is once again likely the increase in cell mitochondria activity, fibroblast proliferation, and collagen production that may contribute to this potentially positive red light therapy effect.

Hair growth. Red light therapy has been shown to reduce the effects of androgenetic alopecia, the most common form of hair loss caused by a genetic predisposition to an excessive reaction to androgens like testosterone anytime after

puberty, explains Dr. Kelley. By decreasing inflammation and increasing blood flow and circulation to the scalp, it has the potential to bring more cell activity (and nutrients) to that area. Recent studies indicate that using red light therapy may promote increased hair thickness and density, but more research is needed.

Relief from Chronic Disease Symptoms/Reduction of Pain

One potential application of red light therapy is to treat chronic pain conditions, such as fibromyalgia. Recently, the FDA approved FibroLux, the first and only therapeutic laser to treat fibromyalgia pain. “When red light therapy was administered via FibroLux laser by a health care professional three times a week for a three-week period, patients experienced a marked reduction in fibromyalgia pain,” says Dr. Eells.

Red light therapy may also reduce neuropathy pain, according to recent research.

Additionally, it may mitigate the painful side effects of some cancer treatments. “For example, a phase-three clinical trial showed the benefit of red light in reducing oral mucositis [tissue swelling and irritation in the mouth] in bone marrow transplant patients through an extraoral (outside of the mouth) application of only a couple minutes,” says Dr. Eells.

Enhancement of Fat Loss

Though red light therapy is being advertised for fat and weight loss, the jury is still out on this one. However, there are a few studies showing that the application of red light may affect adipocytes (the cells that store fat).

One older study published in the journal *Obesity Surgery* in 2011 found that when 40 adults with excess weight were regularly exposed to red light therapy, their adipocyte cells released triglycerides, resulting in fat loss. Participants in this study lost approximately 2.1 centimeters of girth over a four-week period^[4].

Another 2015 study of 64 women living with obesity published in *Lasers in Surgery and Medicine* found that red light therapy could increase fat loss when coupled with exercise. In the study, two groups worked out for 20 minutes three times per week and then received red light therapy or a placebo light therapy. Those who worked out and then had red light therapy exhibited a greater reduction in fat mass, indicating that red light therapy may improve metabolic inflexibility^[5].

Acceleration of Sports Recovery, and Injury Prevention

“Light can speed up the respiration process in cells and increase ATP and other mechanistic factors,” says Dr. Eells. “You stimulate cellular energy, and you stimulate the body’s ability to repair.”

Because of this, red light therapy may be promising when it comes to the treatment and prevention of a range of musculoskeletal conditions, including tendonitis and carpal tunnel syndrome.

Promotion of Brain Health

Research is increasingly demonstrating the benefits of using red light therapy for [dementia](#), stroke, [depression](#), [anxiety](#) and other brain conditions, explains Dr. Kelley. Continued studies indicate that brain photobiomodulation therapy may enhance the metabolic capacity of neurons and stimulate anti-inflammatory and antioxidant

responses, as well as neurogenesis (the formation of new neurons). This may be particularly helpful for individuals dealing with memory or mood conditions.

Red light therapy may also help patients with [Parkinson's disease](#) manage their symptoms and sleep/wake cycles. Thanks to the minimal risk, many researchers believe that red light therapy for brain disorders will become one of the most important medical applications in the coming years and decades.

Side Effects of Red Light Therapy

In general, there are really no major side effects of red light therapy, according to Dr. Ilyas and Dr. Eells.

However, individuals who have a condition with photosensitivity like [lupus](#) or who are on medications that make them photosensitive shouldn't use red light therapy, according to Dr. Debra Jaliman M.D., a board-certified dermatologist based in New York and author of the book, *Skin Rules: Trade Secrets from a Top New York Dermatologist*.

Dr. Kelley also warns that pregnant women may wish to steer clear for now because red light therapy hasn't been well studied in relation to pregnancy.

Additionally, in recent years, there have been clinical reports that show visible light can induce melanin migration from the basal layer of the skin to the surface in darker-skinned individuals. "This means that visible light, which includes red light, can potentially aggravate hyperpigmentation and melasma in darker-skinned people," says Dr. Kung. However, more studies are necessary to confirm these findings.

As a result of this potential side effect, Dr. Kung suggests that people should remain aware of how long and how often they are using red light therapy, especially those with darker skin tones.

How to Use Red Light Therapy

LED red lights vary greatly in terms of strength and quality, making it difficult to give a blanket recommendation on frequency and duration of use, says Dr. Ilyas. Generally, each device will provide safety guidelines based on the dose and power of the LED red light.

Those looking to get the most benefit from red light therapy should first consider experiencing it in a clinical setting. Most studies are based on in-office medical-grade devices for which energy output and duration of therapy can be accounted, says Dr. Ilyas.

However, trying red light therapy at home—which might come in the form of a mask, lamp, or wand—may also be safe and effective.

"They're not dramatic treatments, but they're safe and easy to use at home and gradually improve skin quality, so many people find it more convenient than going to a dermatologist's office," says Dr. Jaliman. She adds it's probably okay to do red light therapy at home three to five times a week, as long as the manufacturer's instructions are carefully followed. However, Dr. Jaliman stresses that using eye protection, like LED-shielding goggles, is important.

Also, one needs to be realistic about the benefits a person can glean from a personal unit.

“Read the instructions, and don’t overpush your at-home device thinking that if you use it more or longer than the recommended time it will lead to better results,” says Dr. Kung. “Bottom-line is red light units at home are a no-harm no-foul type of thing, but, be realistic—a \$200 device on Amazon can’t deliver wow-factor results like an \$180,000 laser.”

Who to Speak to About Red Light Therapy

“What we are finding now is that light can and should be prescribed like any pharmaceutical—we refer to it as ‘photoceutical,’” says Dr. Eells. “Each and every condition has a different prescribed treatment designed to achieve a specific outcome.”

As a result, whom you need to speak to about red light therapy depends on what you’re looking to treat. A good start, however, would be a dermatologist or integrative/functional medical doctor with experience using red light.

“It’s always best to have another set of eyes whenever you’re adding something new into your wellness regimen,” says Dr. Kelley.

Sources

Footnotes

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For the past 25 years, Dr. Jessica Cho practiced medicine with a single mission: Help patients attain wellness and create a life full of joy, vitality and balance. As a physician, her passion is to educate and empower her patients. Her medical expertise is rooted in integrative treatments with a command of both Western and Eastern medicine. Her interdisciplinary background enables a variety of tools that help patients achieve success as she delves into the root causes of their challenges to understand why and how. She founded Wellness at Century City in Los Angeles in 2000, and she has been consistently recognized as one of the nation’s top doctors in integrative medicine and is known for her unparalleled success in promoting well-being in her patients. Philanthropy is her life’s purpose—for decades, she has traveled globally to serve the underserved in various free clinics and refugee camps on medical missions, as well as in her local Los Angeles area serving in free clinics for communities in need.

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