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Jackson Widlic

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## Giving the Green Light to Red Light

Jackson Widlic

Emerging data suggests that light therapy offers a variety of health benefits. Absorption or reflection of light energy determines how light impacts the body. Different aspects of light exposure, including wavelength, duration, and intensity, can impact its ability to target human tissues. The longer the wavelength, the deeper it can penetrate the skin. Due to its long wavelength, red light therapy has been shown to improve sleep and enhance alertness by modulating hormone levels in the body. It has also shown benefit in those struggling with certain medical conditions, such as Parkinson's Disease. Incorporating red light into a daily routine can be an easy yet beneficial way to enhance sleep and optimize daily performance.

**Keywords:** *light therapy, Parkinson's disease, red light*

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The aspect of improving one's health has always been a focus for people across the globe. However, many overlook, underestimate, or ignore the power of what a good night's sleep can really do as a catalyst to refine all areas of our lives. The discussion then typically pivots to the topic of how sleep can be improved. While many current remedies and techniques exist and are proven, an unexpected yet intriguing new therapy has emerged onto the scene: red light. The effects of natural versus artificial light in the hours before bedtime can impact circadian rhythm, the internal clock that works to regulate human sleep and wake cycles. In fact, the effect of natural light's exposure on these sleep-wake rhythms is essential for the human brain to function at its most optimal level.<sup>1</sup> Exposure to artificial light, however, can negatively affect circadian rhythms. Different aspects of light exposure, including wavelength, duration, and intensity, can impact the brain and affect cognition.<sup>1</sup> Thus, red light has been shown to improve sleep quality which in turn improves overall performance throughout the day.

What makes exposure to red light so special? To begin, light therapy in general is a non-invasive, well-tolerated, and non-pharmacological method that is extremely simple to adhere to and implement consistently in everyday life.<sup>2</sup> Light is also consumed naturally every day with minimal to no effort, which makes compliance easier when compared to other treatments. There is a unique quality to red light, however, that sets it apart from other colors. A light's wavelength determines its ability to penetrate human tissue and target certain cells. Short wavelengths of light, such as blue and green, do not penetrate the skin well and are reflected off the body, close to the surface layer of the skin. Conversely, longer wavelengths, such as those possessed by orange and red, can penetrate deeper, past the dermis layer, into certain organs and tissue, and possibly even down to the bone. Absorption or reflection of light energy determines how light impacts the body. This is

dependent on light's molecular interaction with the absorbent properties of the skin, transforming the energy given off from light to energy used by the body.<sup>3</sup> Hence, photon energy has biologic impacts, but its effects depend on the light's color, intensity, and duration of exposure.

Due to its long wavelength and ability to penetrate deep into the skin, studies have found low-level red-light therapy to be effective for a variety of not only dermatologic uses such as acne, skin pigmentation, and wound healing, but for other uses such as vision loss, neuronal function, and sleep.<sup>3</sup> In particular, several studies have looked at the impact light has on wakefulness. Study participants subjected to shorter wavelength light at night report reduced sleepiness and increased attention levels.<sup>1</sup> This is the reason why it is recommended to avoid exposure to blue light before bed. On the other hand, when participants were exposed to longer wavelength, red-enriched light they had improved sleep quality.<sup>1</sup> Light therapy has also shown promise when used by shift workers. Viewing red light as opposed to blue light during the night shift has been found to promote alertness and improve performance without negatively affecting melatonin levels, a key hormone produced by the brain in the absence of light that regulates the circadian rhythm and sleep cycle.<sup>3</sup> Red light has also been shown to not increase cortisol, another hormone that plays a major role in stress and alertness, normally elevated in the morning to trigger awakening.<sup>3</sup> The longer wavelength's affinity with skin and tissues supports the potential health benefits seen with red light compared to other colors of the light spectrum.

The potential benefits of red-light therapy include not only regulating circadian rhythm in otherwise healthy adults, but those struggling with certain health conditions, such as Parkinson's Disease. About 90% of patients with Parkinson's Disease report excessive

daytime sleepiness as well as poor quality of nighttime sleep. A 2016 randomized study by Videnovic and colleagues compared the effectiveness of administering bright light versus dim red light to patients with Parkinson's Disease in terms of sleep, alertness, and daily living.<sup>2</sup> Patients were administered either bright light or dim red light for one hour twice a day for a total of two weeks. The dim red light was found to significantly improve sleep quality, resulting in a quicker time of sleep onset and fewer awakenings at night. Patients also showed improvement on their Unified Parkinson's Disease Rating Scale score - a tool that measures the impact of a patient's Parkinson's Disease on daily activities.<sup>2</sup> However, two weeks after the study had concluded and the participants were no longer receiving red light therapy, the previously recorded improvements on sleep and daily activities were lost. Although the impact was short-lived, red-light therapy appears to be an easy and tolerable way to help regulate circadian rhythm and alleviate sleep issues.

To benefit from this form of light therapy, it is important to know how red light should be administered. Viewing red light for a short period of time, as close to an individual's ideal wake and sleep times as possible, is necessary so that therapy correlates with the person's natural circadian rhythm. This internal biological clock is what plays the largest role in alertness, sleepiness, hunger, and overall energy levels. Importantly, without intervening, this clock only modestly adjusts up to an hour per day to shifts in light levels that correlate with our sleep-wake rhythm.<sup>4</sup> Thus, it is important to engage with red light therapy at a time that coincides with a normal sleep time (e.g., 10-11 pm). This helps stabilize the effects of light therapy on the circadian rhythm and benefits cognitive functioning. The process is as simple as obtaining any source of red light, such as a red-light bulb, albeit not too bright to the point it becomes painful to look at and placing oneself in its radiance. The goal is not to stare directly at the light itself, but let the light hit the eyes from a safe distance for a few minutes upon awakening or near bedtime.<sup>3</sup> The red light should be dim enough so that it will not inhibit melatonin production.

This breakthrough in the usage of light therapy enables people to ultimately accomplish whatever work is needed during the day but safely approach bedtime without the elevated levels of alertness that blue light may supply.

While the benefits of red-light therapy may be most apparent in those that choose to work late into the night to improve sleep, its potential effects on other tissues and bodily functions look promising. Further studies are needed to better understand the potential value of incorporating red light therapy into a daily routine. Whether it be improving daytime alertness, optimizing daily performance, enhancing sleep quality, or other niche uses such as reversing the effects of aging, there is only one mindset that should be applied to red light: give it the green light and explore its potential in improving different aspects of everyday life.

## REFERENCES

1. Struder P, Brucker JM, Haag C, et al. Effects of blue- and red-enriched light on attention and sleep in typically developing adolescents. *Physiol Behav.* 2019;199:11-19.  
doi:10.1016/j.physbeh.2018.10.015
2. Videnovic A, Klerman EB, Wang W, Marconi A, Kuhta T, Zee PC. Timed light therapy for sleep and daytime sleepiness associated with Parkinson Disease: a randomized clinical trial. *JAMA Neurol.* 2017;74(4):411-418.  
doi:10.1001/jamaneurol.2016.5192
3. Huberman A. *Huberman Lab Podcast*. Using Light (Sunlight, Blue Light & Red Light) to Optimize Health. April 18, 2022. Accessed February 13, 2023.  
[www.youtube.com/watch?v=UF0nqolsNZc&t=743s](https://www.youtube.com/watch?v=UF0nqolsNZc&t=743s)
4. Youngstedt SD, Elliott J, Patel S, et al. Circadian acclimatization of performance, sleep, and 6-sulfatoxymelatonin using multiple phase shifting stimuli. *Front Endocrinol (Lausanne).*  
doi:10.3389/fendo.2022.964681