

# Lights On, Sleep Off

## Having lights on during sleep is problematic for metabolism

*It can be hard to get a room completely dark to sleep in. We all probably have glowing clocks, phones, televisions, tablets, and other electronic devices in our bedroom. If we live in a city, we have streetlights and car lights streaming in our windows. What effect does nighttime light have on our bodies? What happens physiologically when we have increased light exposure during the night? How is the structure of our sleep affected by light exposure? What are the possible detrimental effects?*



### Abstract

This study tested the hypothesis that acute exposure to light during nighttime sleep adversely affects next-morning glucose homeostasis and whether this effect occurs via reduced sleep quality, melatonin suppression, or sympathetic nervous system (SNS) activation during sleep. A total of 20 young adults participated in this parallel-group study design. The room light condition (n = 10) included one night of sleep in dim light (<3 lx) followed by one night of sleep with overhead room lighting (100 lx). The dim light condition (n = 10) included two consecutive nights of sleep in dim light. Measures of insulin resistance (morning homeostatic model assessment of insulin resistance, 30-min insulin area under the curve [AUC] from a 2-h oral glucose tolerance test) were higher in the room light versus dim light condition. Melatonin levels were similar in both conditions. In the room light condition, participants spent proportionately more time in stage N2 and less in slow wave and rapid eye movement sleep. Heart rate was higher and heart rate variability lower (higher sympathovagal balance) during sleep in the room light versus the dim light condition. Importantly, the higher sympathovagal balance during sleep was associated with higher 30-min insulin AUC, consistent with increased insulin resistance the following morning. These results demonstrate that a single night of exposure to room light during sleep can impair glucose homeostasis, potentially via increased SNS activation. Attention to avoiding exposure to light at night during sleep may be beneficial for cardiometabolic health.

*This study examined the difference in physiological effects between dim light environments and moderate room light. Just one night of exposure to higher light levels while sleeping increased heart rate and sympathetic nervous system activity for the entire period of sleep. When tested the following morning, insulin resistance was noted with higher insulin levels needed to achieve normal glucose levels after a glucose challenge. These findings indicate negative effects on our metabolic health. Our sympathetic nervous system is charged with our fight or flight impulses. It prioritizes the release of glucose for quick energy and increases heart rate and blood pressure for quick reactions. While this is helpful when we are in a life-threatening situation, having chronically elevated sympathetic tone is not healthy as this is linked with high blood pressure, cardiac arrhythmias, lower heart rate variability, and changes in energy homeostasis leading to metabolic syndrome and central obesity (visceral fat) which is linked to insulin resistance, type 2 diabetes, cardiovascular disease, and premature mortality.*

*It certainly makes sense to avoid light in our bedrooms. Although this study looked at moderate light, any light can be disruptive to our sleep and thus our metabolism through increased sympathetic nervous system stimulation. To improve sleep, keep electronic devices out of our beds. Consider a [sleep mask](#) (link is a Tim Ferris favorite) to help avoid light exposure. It's good for our blood pressure, waistline, and insulin levels.*

Mason I, et al. Light exposure during sleep impairs cardiometabolic function. *Proceedings of the National Academy of Sciences* 2022; 119(12), e2113290119.