

Exposing yourself to artificial light at night is harmful to health

### Story at-a-glance

- Reading late at night, watching TV, or sending emails into the wee hours of the morning may be stopping your melatonin production dead in its tracks and depriving you of this hormone's many health benefits
- Melatonin is important for the proper functioning of your immune system, scavenging free radicals, reducing inflammation, and helping your body to rid itself of cancer cells; multiple studies point to the role of melatonin in protecting you from multiple types of cancer, including breast cancer
- Even the slightest amount of light in the white or blue bandwidths is enough to seriously depress your pineal gland's production of melatonin for the night, which is why sleeping in total darkness is so important
- Suggestions are given for optimizing your melatonin production, such as the one type of light that does not disrupt your melatonin production
- Light pollution is a growing problem that has adverse biological effects on plants and animals, particularly birds whose breeding and migration patterns are disrupted

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Exposing Yourself to Light at Night Shuts Down Your Melatonin and Raises Your Cancer Risk

### (QUR'AN EMPHASIZES SLEEPING EARLY IN THE DARK AT NIGHT)

By Dr. Mercola

Can reading yourself to sleep or texting into the wee hours of the morning raise your risk of cancer? You bet it can. Exposing yourself to artificial light at night shuts down your body's production of an important hormone called melatonin.

Melatonin has roles in cancer prevention, strengthening your immune system, and may even slow down cellular aging; in fact, it has been the subject of preclinical research on over 100 different disease applications. It's your body's "Superhero of the Night," and light is his number one nemesis. For the past century or so, the developed world has been performing an open-ended experiment on itself by lengthening its days and shortening its nights in an effort to become a 24-hour per day, ever-productive society. But light pollution generated by modern technologies is taking a heavy biological toll on humans, as well as other forms of life on Earth.

For more than 200,000 years, humans and other life forms evolved organs that took advantage of environmental cues. We developed a biological clock governed by Earth's cycles of light and darkness. Artificial lighting disrupts your biological clock and melatonin production, with unfortunate effects on your health. As Dr. Russel Reiter says in the presentation above, *light may be killing you.*

### The Dark Side of Night

In humans as with all mammals, your biological clock resides in the suprachiasmatic nucleus of your brain (SCN), which is part of your hypothalamus. Based on signals of light and darkness, your SCN tells your pineal gland when it's time to secrete melatonin.

Light comes in through your eyes and travels up your optic nerves to the SCN, which is exquisitely sensitive to cycles of light and darkness.

When you turn on a light at night, you immediately send your brain misinformation about the light-dark cycle. The only thing your brain interprets light to be is day. Believing daytime has arrived, your biological clock instructs your pineal gland to immediately cease its production of melatonin. Whether you have the light on for an hour or for just a second, the effect is the same — and your melatonin pump doesn't turn back on when you flip the light back off. Since humans evolved in the glow of firelight, the yellow, orange and red wavelengths don't suppress melatonin production the way white and blue wavelengths do. In fact, the range of light that inhibits melatonin is fairly narrow — 460 to 480 nm. If you want to protect your melatonin, when the sun goes down you would shift to a low wattage bulb with yellow, orange, or red light. Dr. Reiter suggests using a salt lamp illuminated by a 5-watt bulb in this color range.

## The Massive Health Benefits of Melatonin

The hormone melatonin produces a number of health benefits in terms of your immune system. It's a powerful antioxidant and free radical scavenger that helps combat inflammation. In fact, melatonin is so integral to your immune system that a lack of it causes your thymus gland, a key component of your immune system, to atrophy. Melatonin may even have a role in slowing the aging of your brain. In addition to helping you fall asleep and bestowing a feeling of overall comfort and well being, melatonin has proven to have an impressive array of anti-cancer benefits. Melatonin inhibits the proliferation of a wide range of cancer cell types, as well as triggering cancer cell apoptosis (self destruction). The hormone also interferes with the new blood supply tumors require for their rapid growth (angiogenesis). Melatonin can boost efficacy and decrease the toxicity of cancer chemotherapy.

### Melatonin May Be Breast Cancer's Worst Nightmare

Peer-reviewed and published research has shown melatonin offers particularly strong protection against reproductive cancers. Cells throughout your body — even cancer cells — have melatonin receptors. So when melatonin makes its nightly rounds, cell division slows. When this hormone latches onto a breast cancer cell, it has been found to counteract estrogen's tendency to stimulate cell growth.

In fact, melatonin has a calming effect on several reproductive hormones, which may explain why it seems to protect against sex hormone-driven cancers, including ovarian, endometrial, breast, prostate and testicular cancers. GreenMedInfo lists twenty studies demonstrating exactly how melatonin exerts its protective effects against breast cancer.

But melatonin's anti-cancer effects don't stop there. While causing cancer cells to self-destruct, melatonin also boosts your production of immune stimulating substances such as interleukin-2, which helps identify and attack the mutated cells that lead to cancer. *Through these dual actions, melatonin delivers a one-two punch!* The greatest area of melatonin research to date has to do with breast cancer. Some of the more impressive studies include the following:

- The journal *Epidemiology* reported increased breast cancer risk among women who work predominantly night shifts
- Women who live in neighborhoods with large amounts of nighttime illumination are more likely to get breast cancer than those who live in areas where nocturnal darkness prevails, according to an Israeli study
- From participants in the Nurses' Health Study, it was found that nurses who work nights had 36 percent higher rates of breast cancer
- Blind women, whose eyes cannot detect light and so have robust production of melatonin, have lower-than-average breast cancer rates
- When the body of epidemiological studies are considered in their totality, women who work night shift are found to have breast cancer rates *60 percent above normal*, even when other factors such as differences in diet are accounted for

### Melatonin Improves Cancer Patients' Longevity

Glioblastoma is a nasty, aggressive form of brain cancer with a poor prognosis and not much in the way of effective treatments. However, melatonin may offer some hope. In one clinical trial, patients with a glioblastoma were given either radiation and melatonin, or radiation alone. Twenty-three percent of the patients receiving the melatonin were alive one year later, while none who received radiation alone were still alive. Another study found that melatonin reduced the growth of prostate cancer. Studies show similarly encouraging results for lung, pancreatic, colorectal and other types of cancer. An article in *Life Extension Magazine* contains a table summarizing studies with one-year cancer survival rates that are *vastly improved* when melatonin is a treatment modality. Authors of a systematic review of melatonin for the treatment of all types of cancer concluded: *"Effects were consistent across melatonin dose, and type of cancer. No severe adverse events were reported. The substantial reduction in risk of death, low adverse events reported and low costs related to this intervention suggest great potential for melatonin in treating cancer."*

Due to the strength of the scientific research, in 2007, the World Health Organization (WHO) announced a decision to classify shift work as a "probable carcinogen." That puts the night shift in the same health-risk category as exposure to such toxic chemicals as trichloroethylene, vinyl chloride and polychlorinated biphenyls (PCBs). If this isn't a testament to the importance of melatonin for human health, I don't know what is!

### How to Optimize Your Melatonin Levels

Two common environmental "noise" factors that can make sleep elusive are light pollution and temperature. The following suggestions can improve your sleep hygiene and help you optimize your melatonin production. For a comprehensive sleep guide, please see my article *33 Secret's to a Good Night's Sleep*.

- **Avoid watching TV or using your computer in the evening, at least an hour or so before going to bed.** These devices emit blue light, which tricks your brain into thinking it's still daytime. Normally your brain starts secreting melatonin between 9 and 10 pm, and these devices emit light that may stifle that process.
- **Make sure you get BRIGHT sun exposure regularly.** Your pineal gland produces melatonin roughly in approximation to the contrast of bright sun exposure in the day and complete darkness at night. If you are in darkness all day long it can't appreciate the difference and will not optimize your melatonin production.
- **Sleep in complete darkness, or as close to it as possible.** Even the slightest bit of light in your bedroom can disrupt your biological clock and your pineal gland's melatonin production. Even the tiniest glow from your clock radio could be interfering with your sleep, so cover your radio up at night or get rid of it altogether. Move all electrical devices at least three feet away from your bed. You may want to cover your windows with drapes or blackout shades.
- **Install a low-wattage yellow, orange or red light bulb if you need a source of light for navigation at night.** Light in these bandwidths does not shut down melatonin production in the way that white and blue bandwidth light does. Salt lamps are handy for this purpose.
- **Keep the temperature in your bedroom no higher than 70 degrees F.** Many people keep their homes too warm (particularly their upstairs bedrooms). Studies show that the optimal room temperature for sleep is between 60 to 68 degrees.
- **Take a hot bath 90 to 120 minutes before bedtime.** This increases your core body temperature, and when you get out of the bath it abruptly drops, signaling your body that you are ready to sleep.
- **Avoid using loud alarm clocks.** Being jolted awake each morning can be very stressful. If you are regularly getting enough sleep, you might not even need an alarm.
- **Get some sun in the morning, if possible.** Your circadian system needs bright light to reset itself. Ten to 15 minutes of morning sunlight will send a strong message to your internal clock that day has arrived, making it less likely to be confused by weaker light signals during the night. More sunlight exposure is required as you age.
- **Be mindful of electromagnetic fields in your bedroom.** EMFs can disrupt your pineal gland and its melatonin production, and may have other negative biological effects as well. A gauss meter is required if you want to measure EMF levels in various areas of your home.

### Should You Supplement with Melatonin?

Current scientific research suggests that melatonin deficiency may come with some profound biological disadvantages, such as higher levels of inflammation, a weakened immune system, and an increased risk of cancer. One of the surest ways of compromising your body's natural melatonin production is by exposing yourself to artificial light at night — even briefly. Multiple studies have found that night shift workers have higher rates of cancer, particularly breast cancer.

Supplementation may be beneficial but it is FAR more beneficial and certainly less expensive to have your body produce its own melatonin. This way you will get the "perfect" dose of melatonin for you, the "Goldilocks" dose, not too much and not too little, because your body will use important feedback loops to adjust the dose just right. If, for whatever reason you are unable to increase your melatonin naturally as described above, then you can consider a supplement, but it would still be wise to continue the listed suggestions. In scientific studies, melatonin has been shown to help people fall asleep faster and stay asleep, experience less restlessness, and prevent daytime fatigue. Keep in mind that only a very small dose is required — typically 0.25mg or 0.5mg to start with, and you can adjust it up from there. Taking higher doses, such as 3 mg, can sometimes make you *more* wakeful instead of sleepier, so adjust your dose carefully.