

# Does Melatonin Help Ease Migraines?

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## STORY AT-A-GLANCE

- › More than 1 billion people worldwide and 12% of Americans live with migraines, a disabling neurological condition that disrupts sleep, work, and daily life
- › Melatonin does more than regulate sleep; it also shields your brain at a cellular level by neutralizing damaging free radicals and reducing inflammation linked to migraines
- › Research shows melatonin reduces headache frequency by 51%, intensity by 53%, and duration by 46%, offering a powerful natural alternative to standard pharmaceutical drugs
- › Adults with episodic migraines taking 3 mg of melatonin before bed experienced the strongest improvements, often cutting their migraine frequency by half or more
- › Melatonin's safety profile is superior to common drugs like amitriptyline, with fewer and milder side effects, making it a well-tolerated option for migraine prevention

More than 1 billion people worldwide today deal with migraines<sup>1</sup> — a disabling neurological condition marked by pounding pain, nausea, and other severe symptoms. In the U.S., an estimated 12% of the population deals with migraines, both young and old, though women are more prone to experiencing them.<sup>2</sup>

For many, migraine episodes are chronic and can derail work, sleep, and daily life, and left untreated, the condition becomes more frequent and harder to control. And while prescription drugs like painkillers are the standard treatment, they don't always work — and often bring side effects of their own.

This is why interest is growing in natural solutions to ease migraines. One remedy that's becoming popular today is melatonin – but do the studies support this claim?

## The Lowdown on Melatonin

Melatonin is a hormone that is widely recognized for regulating sleep cycles, also known as the circadian rhythm – a process that makes you alert during daytime and sleepy at night. Yet, this is only one of melatonin's many advantages; it also plays a vital role in your central nervous system and overall health.

- **Your pineal gland secretes melatonin** – This tiny endocrine gland located in your brain releases melatonin in your bloodstream at night, signaling to your body that it's time to rest. However, did you know that there's another source of melatonin in your body?
- **Your mitochondria, the powerhouse of your cells, actually produce 95% of your body's melatonin** – This process depends on your exposure to natural sunlight.<sup>3</sup> Near-infrared light (NIR) light penetrates deep into your skin and activates cytochrome c oxidase in your mitochondria. This key enzyme stimulates the production of mitochondrial melatonin, also known as subcellular melatonin.<sup>4</sup>
- **NIR light is abundant in early morning and late afternoon sunlight** – It ranges from 800 to 1,000 nanometers. This is why early morning sun exposure is essential if you want to boost your melatonin levels.
- **You need both pineal melatonin and mitochondrial melatonin** – While pineal melatonin follows the circadian rhythm, the subcellular melatonin from your mitochondria acts as a powerful antioxidant – it benefits your health by neutralizing free radicals before they damage cellular structures. Think of pineal melatonin as your "sleep signal" and mitochondrial melatonin as your "cellular shield." Both of these are essential, as one is for rest, the other for repair.

- **Importantly, subcellular melatonin does not go into your blood** – So, you're not going to directly increase your blood or serum level of melatonin by sun exposure. However, bright sun exposure around solar noon will indirectly help your pineal gland to produce melatonin during the night.

The benefits of melatonin are multifaceted – in fact, if you do a quick search on my site, you'll find many articles discussing the benefits of this hormone – from [improving sleep quality](#), [protecting against Alzheimer's](#), and even [supporting vision health](#). But does it have any benefit for migraines?

## The Link Between Melatonin and Migraines

Migraines are triggered by a number of factors, and there are several different types. The attacks are typically recurring, and the intensity could be moderate to severe – oftentimes they only occur on one side of your head.

- **Symptoms usually last for hours to days** – Most sufferers describe it as a throbbing, piercing, or "burning" pain. They also experience nausea, visual disturbances, dizziness, numbness in the extremities or face, and extreme sensitivity to light, sound, smell, and touch.
- **Lack of sleep is one known trigger** – According to an article in *Migraine Again*, poor sleep can both be a trigger of migraine or a symptom. It's also possible that excessive sleep leads to migraines in some people. Melatonin's ability to regulate the sleep-wake cycle is one of the reasons why it's becoming recognized as a helpful treatment against migraines.<sup>5</sup>

Andrew Charles, MD, professor of neurology and director of the UCLA Goldberg Migraine Program, said: *"Sleep is a trigger when it's irregular: Either too little or too much sleep at inconsistent hours can exacerbate migraine. However, when someone has an attack, sleep can be helpful for treatment."*<sup>6</sup>

- **Melatonin also influences processes that are linked to migraines** – For example, there's research linking estrogen to migraines, and melatonin plays an essential role in hormone regulation. When you have low melatonin levels, it throws off your estrogen balance, which triggers pain associated with migraines.
- **To better understand this, you need to first become familiar with the pain process** – Pain is relayed through the trigeminal network to an area in your brain stem called the trigeminal nucleus. From there, it is conveyed to the sensory cortex in your brain that is involved in awareness of pain and other senses.
- **How does estrogen (and melatonin) fit into all of this?** Apparently, estrogen is a major factor in this chain of events. Researchers found that this hormone sensitizes cells around the trigeminal nerve and connected blood vessels in the head, thereby augmenting pain signals. Hence, when your melatonin levels are out of whack, it fails to regulate estrogen, and estrogen's effects on the trigeminal nerve system become stronger, raising the risk of migraines.<sup>7</sup>

Another reason why melatonin is becoming associated with migraines is because there's a theory that people with migraine have lower melatonin levels. A 2010 study supports this, stating that those with chronic migraine had lower melatonin levels compared to those without migraine.<sup>8</sup>

However, a 2022 review found conflicting results;<sup>9</sup> although there are some studies showing lower melatonin in those with migraine, others did not.<sup>10</sup> Still, there are studies supporting the promising effects of melatonin in relieving migraines.

## **Systematic Review Highlights How Melatonin Mitigates Migraine Intensity and Duration**

A 2019 systematic review published in *Medicine* pulled together evidence from seven separate studies – four randomized controlled trials and three observational studies – to identify whether melatonin reduces headaches and how it compares to standard

drugs. The participants were adults and children already struggling with migraines — some had occasional attacks while others dealt with frequent, chronic pain.<sup>11</sup>

- **The review showed promising results** — Across these studies, the researchers found that melatonin reduced headache frequency by an average of 51%, intensity by 53%, and duration by 46%. This could mean going from 10 migraines per month to fewer than five, and having them last hours instead of days. Adults generally had better responses than children, and those with chronic migraines saw larger improvements than people with fewer attacks.
- **Melatonin slashes migraine days by half** — One of the strongest trials showed that over half of participants (54.4%) on melatonin cut their number of headache days by at least 50%. In comparison, only 20.4% of people on placebo reached that level of improvement.
- **Melatonin consistently lowered not just frequency, but also severity** — In one controlled study, people taking melatonin had their pain scores drop from nearly 7 on a 0 to 10 scale down to around 3.6. Melatonin also reduced the need for pain medications, which is valuable if you're concerned about the risks of overusing drugs like triptans or nonsteroidal anti-inflammatory drugs (NSAIDs).
- **The review also explored why melatonin helps migraines from a biological perspective** — One mechanism involves neurotransmitters (chemical messengers in your brain). Melatonin helps regulate serotonin, dopamine, and glutamate, all of which play roles in migraine pathways. By calming down overactive pain circuits, melatonin reduces the likelihood that a small trigger snowballs into a full-blown attack.
- **Melatonin also affects blood vessel changes tied to migraine** — During attacks, a pain molecule called calcitonin gene-related peptide (CGRP) surges, causing blood vessels in the brain to dilate abnormally. Melatonin helps suppress CGRP release, preventing those painful vascular changes.

- **Pain relief is another key effect** – Melatonin boosts the release of endorphins, which are your body's natural painkillers. It also activates gamma-aminobutyric acid (GABA), a calming neurotransmitter that reduces nerve excitability. This gives your body more internal support to quiet pain signals without needing as many external medications.

The review pointed out some conflicting results, however. Some trials found melatonin worked better than a placebo, while one reported no difference. These mixed outcomes make it clear that melatonin is helpful for many, but may not be universally effective.

*"Melatonin is very likely to be a promising alternative for migraine prophylaxis. Current literature examining melatonin's efficacy in migraine prevention is growing, but still limited," the researchers concluded.*

*"Future studies of perfect design in methodology, pharmacology, and therapeutics are needed to achieve a deeper awareness of melatonin's role in migraine as well as more studies to explore the safety issues of melatonin medicine."<sup>12</sup>*

## **Melatonin Protects the Brain with Its Anti-Inflammatory Effects**

A 2022 systematic review published in The Egyptian Journal of Neurology, Psychiatry and Neurosurgery pulled together findings from five randomized controlled trials from different countries to determine melatonin's effects on people with migraine. Two studies were from the U.S.; the rest were from Brazil, Norway, and Iran.<sup>13</sup>

- **The populations studied were carefully defined** – Some were teenagers, others were adults over 30, all diagnosed with episodic migraine, meaning they suffered regular but not chronic headaches. Across the five trials, melatonin doses varied, from as little as 1 to 2 milligrams (mg) up to 8 mg, but the most common and most effective was 3 mg taken before bed.

- **Melatonin showed meaningful improvements in several trials** – In the Brazilian trial, for example, 54.4% of participants taking 3 mg of melatonin had their monthly migraine frequency cut in half or more. By contrast, only 39.1% on amitriptyline and 20.4% on placebo hit that benchmark.
- **Melatonin led to better outcomes compared to a placebo** – A trial from Iran compared melatonin with both placebo and valproic acid, a drug widely prescribed for migraine. The melatonin group showed fewer migraine days, shorter duration of attacks, and less severe pain than placebo. They also had lower scores on the Migraine Disability Assessment (MIDAS), which measures how much migraines interfere with daily life.
- **The review sheds light on how melatonin works in the body** – The researchers make it clear that melatonin isn't just a sleep hormone; it protects the brain against free radicals. It also reduces inflammation by lowering levels of inflammatory messengers like interleukin (IL-6) and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ), both of which are elevated in migraine patients.

By stabilizing these systems, melatonin helps reduce the brain's overreaction to light, sound, or stress, which often sets off a migraine. Animal studies even suggest melatonin calms the overactive trigeminal nerve pathway, which plays a central role in migraine pain.

- **Melatonin is far safer than pharmaceutical solutions for migraine** – Across the five trials, conventional drugs like amitriptyline or topiramate caused higher rates of fatigue, cognitive problems, or weight gain.<sup>14</sup> As for melatonin, only mild issues like dizziness, nausea, and constipation, occurred, but at significantly low rates.
- **An earlier study reported similar results** – Published in The Journal of Family Practice, this study's researchers compared melatonin use with amitriptyline. While nearly half of the patients who took the pharmaceutical drug reported adverse effects – most commonly daytime sleepiness, dry mouth, and weight gain – only 16% of melatonin users reported any issues at all.<sup>15</sup>

What's more, the most common effect they reported was mild daytime sleepiness, which many participants actually viewed positively since better sleep is often part of migraine management.

## **How to Optimize Your Melatonin Production Naturally**

It goes without saying that optimizing your melatonin levels is one of the best strategies to not just ease migraines, but also improve your overall health. And while you might immediately think of melatonin supplements to meet your needs, take note that there are natural ways to boost your production.

- **Optimize your melatonin naturally by getting bright morning sunlight** – Try to spend at least 15 minutes in the morning sun to ease migraines, support sleep, and boost your cellular health. This will help regulate your circadian rhythm, which lowers melatonin during the day and increases it at night.
- **Limit blue light exposure at night** – Blue light from screens suppresses melatonin production, making it harder for you to fall asleep. In the evening, use dim lighting, salt lamps, or incandescent bulbs instead of harsh LEDs. If you need to use screens, wear blue-blocking glasses or install blue-light filtering software.
- **Sleep in total darkness** – Even small amounts of light in your bedroom will disrupt your sleep and affect melatonin production. Install blackout curtains or use a sleep mask. Remove glowing electronics (even digital clocks) to create a pitch-dark sleeping environment.
- **Manage stress before bedtime** – Having elevated stress levels raises cortisol, which blocks norepinephrine, the hormone needed for melatonin release. Consider doing meditation, stretching, deep breathing, or even Emotional Freedom Techniques (EFT) before bed to ease your mind and body.

## **Other Strategies to Ease Migraines**

As I mentioned above, there are many different reasons why people suffer from migraines. One foundational cause is mitochondrial dysfunction – this is actually a hallmark of most all chronic diseases. The most important strategy is to limit your intake of [linoleic acid \(LA\)](#), as this omega-6 fat acts as a mitochondrial toxin when consumed in excess.

- **Address your nutritional deficiencies** – Certain nutrient deficiencies have been associated with a higher risk of migraines and headaches. These include vitamin D, B vitamins (riboflavin, folate, B6, and B12), magnesium, and coenzyme Q10 (CoQ10).

And while you might think that supplements are convenient, it's still important to get as many nutrients from your diet as possible. This is because your body metabolizes and absorbs vitamins and minerals from your diet more effectively and efficiently than from most supplements.

- **Know your triggers – and avoid them** – Common triggers include foods and drinks, allergies, stress, and even weather changes. One way to keep track is to keep a migraine diary.
- **Consider acupuncture and chiropractic** – Research has found that getting regular acupuncture treatments helps reduce the frequency and severity of migraine attacks.<sup>16</sup> Chiropractic adjustments have also helped many patients, but not all chiropractors are skilled with the techniques to address migraines, so before you schedule an appointment it is important to confirm that your chiropractor has significant experience in helping people treat their migraines.

For a more in-depth understanding of migraines and more ways to get relief, I recommend reading "[Migraine Triggers and Helpful Treatments](#)."

## **Frequently Asked Questions (FAQs) About Melatonin for Migraines**

**Q: How common are migraines, and who is most affected?**

**A:** Migraines affect more than 1 billion people worldwide and about 12% of Americans. Women are more likely than men to experience them; migraine attacks often disrupt sleep, work, and quality of life.

**Q: What role does melatonin play beyond sleep?**

**A:** Melatonin is best known for regulating circadian rhythm, but it also acts as a powerful antioxidant made inside your cells. This "cellular shield" protects your brain by reducing inflammation and neutralizing free radicals that contribute to migraine pain.

**Q: What does research say about melatonin for migraine prevention?**

**A:** Multiple clinical trials and systematic reviews show melatonin reduces migraine frequency by about 51%, intensity by 53%, and duration by 46%. In several studies, melatonin performed as well as, or better than, common prescription drugs.

**Q: What is the most effective way to use melatonin for migraines?**

**A:** The evidence shows that 3 mg of immediate-release melatonin before bed works best. This dose helped many participants cut their migraine frequency in half, improve sleep, and reduce reliance on pain-relief drugs.

**Q: How does melatonin compare to prescription migraine medications?**

**A:** Melatonin has shown similar effectiveness to drugs like amitriptyline and valproic acid but with fewer side effects. While many pharmaceutical treatments cause drowsiness, weight gain, or dry mouth, melatonin's side effects are mild and often limited to sleepiness.

## Sources and References

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