

Melatonin

Generic Name: melatonin (meh lah TOE nin)

What is Melatonin?

Melatonin is the natural hormone your body secretes that helps to maintain your wake-sleep cycle (also called “biological clock”). The wake-sleep cycle is the process of sleep and wakefulness; in humans this averages 8 hours of nighttime sleep and 16 hours of daytime activity. **Melatonin** is also made synthetically and available without a prescription as an over-the-counter (OTC) dietary supplement in the U.S.

Endogenous melatonin release (melatonin made by our bodies) is increased each day in response to darkness, peaking between 11PM and 3AM at roughly 200 picograms (pg) per mL. Nighttime melatonin hormone levels are roughly 10 times higher than in the daytime. Levels fall sharply before daylight, and are barely detectable in the daylight hours. The rise and fall in endogenous melatonin levels signal wake and sleep times, known as our circadian rhythm.

Natural melatonin secretion starts from the amino acid tryptophan, with serotonin as an intermediary, and then is released to the melatonin receptors in the brain, eye and other areas to help control the sleep and wake cycles. The melatonin half-life is short, roughly 20 to 50 minutes. It is metabolized (broken down) by the CYP-450 enzyme system in the liver and then excreted in the urine or feces.

Shorter periods of melatonin production occur in the summer with longer days, and more prolonged periods of production occur in the winter. Light at night (such as from smartphones or the TV) blocks the production of melatonin and can lead to sleep disturbances. Age also suppresses the levels of nighttime melatonin that are released, which may contribute to the problem of **insomnia** and early awakening often seen in older adults.

Melatonin supplementation has been suggested to have many uses, from sleep disorders to **cancer treatment**, but robust studies are lacking for many uses. However, it has been widely studied for treatment of jet lag and other sleep disorders. Additional, early research to define melatonin suggests it has an anti-oxidative activity, a role in modulating immune responses, and possible anti-tumor activity.

Is Melatonin a Hormone?

Melatonin is a natural hormone when produced in the body (the endogenous hormone). Melatonin is not a vitamin. **Melatonin supplements** (exogenous hormone) are made synthetically and all products and strengths on the U.S. market are available without a prescription at the pharmacy, nutrition stores, and other retail shops.

Melatonin is most commonly used to:

- help decrease jet lag
- adjust sleep cycles in the blind (non 24-Hour Sleep Wake Disorder, or Non-24)
- treat shift-work sleep disorders in people with alternating work schedules
- for general insomnias

How Does Melatonin Work?

Natural melatonin is a highly lipid soluble hormone produced in the pineal gland in the brain. It is synthesized from the amino acid tryptophan and then released into the blood and cerebrospinal fluid, crossing the blood-brain barrier. It sends messages to the melatonin receptor agonist in the brain and other areas of the body to help control the sleep and wake cycles.

Does melatonin help you sleep? When taken as supplement, the function of melatonin is to mimic the effects of the natural hormone. Drowsiness generally occurs within 30 minutes after taking melatonin. However, taking melatonin right before bed

may not be the best strategy for all sleep disorders. Ask your doctor about the best method of dosing melatonin. Melatonin does not work for everyone.

Before Taking This Medicine

Do not use melatonin if you are allergic to it.

Before using melatonin, talk to your healthcare provider. You may not be able to use this medication if you have certain medical conditions, such as:

- diabetes
- depression
- a bleeding or blood clotting disorder such as hemophilia
- taking a blood thinner like warfarin
- high or low blood pressure
- epilepsy or other seizure disorder
- if you are using any medicine to prevent organ transplant rejection
- an autoimmune condition
- using other sedatives or tranquilizers

It is not known whether melatonin will harm an unborn baby. **Do not use this product without medical advice if you are pregnant.**

High doses of this medicine may affect ovulation, making it difficult for you to get pregnant.

It is not known whether melatonin passes into breast milk or if it could harm a nursing baby. **Do not use this product without medical advice if you are breast-feeding a baby.**

Do not give any herbal/health supplement to a child without medical advice.

Melatonin Dosage

Melatonin is considered an effective treatment for jet lag and can aid sleep during times when you would not normally be awake.

Effective starting doses for **jet lag** range from 0.3 to 0.5 mg. One milligram tablets can be cut in half to achieve a 0.5 mg dose if smaller doses are not available for purchase. Lower doses may work for some people, while others may need a higher dose, up to 3 to 5 mg. However, higher doses may be associated with more side effects such as headache, next day grogginess, or vivid dreams.

Always start with the lowest melatonin dose. According to a **Cochrane review**, doses over 5 mg appear to be no more effective than lower doses. It is important to note that much higher doses are available for sale in the U.S., but these doses may result in excessively high levels of physiologic melatonin.

How to Use Melatonin for Jet Lag?

Jet lag is an air travel problem that causes difficulty in sleeping, fatigue, trouble concentrating, constipation, and other symptoms. Jet lag is **much more likely** if you cross over several time zones, and can worsen the more time zones you cross.

Effective starting doses for jet lag range from 0.3 to 0.5 mg. Smaller doses may work for some while others may need a higher dose. It may be more difficult to fly east, when time is lost, rather than to fly west, when you gain it back. High doses, such as 20 mg melatonin is available for purchase on the Internet, but such high doses are not normally recommended or needed.

Melatonin for Jet Lag:

- **Eastbound:** If you are traveling east, say from the US to Europe, take melatonin after dark, 30 minutes before bedtime in the new time zone or if you are on the plane. Then take it for the next 4 nights in the new time zone, after dark, 30 minutes before bedtime. If drowsy the day after melatonin use, try a lower dose.
- **Westbound:** If you are heading west, for example, from the US to Australia, a dose is not needed for your first travel night, but you then may take it for the next 4 nights in the new time zone, after dark, 30 minutes before bedtime. Melatonin may not always be needed for westbound travel.

Given enough time (usually 3 to 5 days), jet lag will usually resolve on its own, but this is not always optimal when traveling.

Other Uses for Melatonin

How to Take Melatonin for Sleep (Insomnia):

- Dosage: Take melatonin 0.1 mg to 0.5 mg thirty minutes before bedtime. Studies suggest melatonin for sleep may be effective in promoting but not maintaining sleep (early morning awakening).

How to Take Melatonin for Shift-Work Sleep Disorders

- Dosage: Take melatonin 1.8 mg to 3 mg thirty minutes prior to the desired onset of daytime sleep; melatonin may NOT lead to improved alertness during the nighttime work shift and may only improve daytime sleep time by about 30 minutes.

How to Take Melatonin for Delayed Sleep Phase Disorder

Delayed sleep phase disorder (DSPD) most often occurs in adolescents, possibly due to **reduced melatonin production** and melatonin deficiency at this age. Sleep onset is delayed by 3 to 6 hours compared with conventional bedtimes (10 to 11 pm). DSPD can negatively affect school performance, daily activities, and lead to morning drowsiness which can be dangerous for teen drivers. Any sleep disorder in an adolescent should be evaluated by a physician.

- Dosage: Take melatonin 1 mg four to six hours before set bedtime. Once a set bedtime is achieved, use maintenance doses of 0.5 mg melatonin 2 hours before expected sleep onset. Bright light therapy and behavioral management may enhance results. Be aware drowsiness may occur after melatonin dose, so avoid hazardous activities such as driving.

How to Take Melatonin for Non-24-Hour Sleep Wake Disorder (Non-24)

More than 70% of people who are totally blind have Non-24, a circadian rhythm disorder. For people who are totally blind, there are no light cues to help reset the biological clock. The sleep time and wake up time of people who have Non-24-Hour Sleep Wake Disorder shifts a little later every day. Sleep times go in and out of alignment compared to a normal sleep-wake phase. Extra minutes add up each day by day and disrupt the normal wake-sleep pattern.

Use of melatonin in Non-24 is to aid in stimulation to reset the biological clock with one long sleep time at night and one long awake time during the day. However, no large-scale clinical trials of melatonin therapy for Non-24 have been conducted to date.

- Dosage: Studies on the blind suggest that 0.5 mg/day melatonin is an effective dose.

Hetlioz, a prescription-only melatonin agonist is also approved for use in Non-24-Hour Sleep Wake Disorder in blind individuals.

- **Hetlioz (tasimelteon)**

Fast-dissolving Melatonin

Some melatonin tablets are available in fast-dissolving formulations in the U.S. To take the orally disintegrating tablet:

- Use dry hands to remove the tablet and place it in your mouth.
- Do not swallow the tablet whole. Allow it to dissolve in your mouth without chewing. If desired, you may drink liquid to help swallow the dissolved tablet.

Call your doctor if the condition you are treating with melatonin does not improve, or if it gets worse while using this product.

Store at room temperature away from moisture and heat.

Melatonin for Children

Parents may consider using melatonin to help their child who has a trouble falling asleep. Only use melatonin for your child under the care of a pediatrician or other medical sleep specialist. Insomnia or other sleeping disorders in children should always be evaluated by a medical professional.

Melatonin should not be used as a substitute for good sleep hygiene and consistent bedtime routines in children. According to Yale sleep specialist Dr. Craig Canapari, use of melatonin results in less difficulty with falling asleep, earlier time of sleep onset, and more sleep at night.

Products containing lower-dose melatonin for kids do exist on the U.S. market. However, long-term use of melatonin has not been studied in children and possible side effects with prolonged use are not known. Use for children with autism spectrum disorder or attention-deficit hyperactivity disorder should involve behavioral interventions and should be directed by a physician.

Delayed sleep phase disorder often occurs in teenagers and young adults, possibly due to alterations in endogenous melatonin production. Sleep onset is delayed by 3 to 6 hours compared with normal bedtime hours of 10 to 11 PM. Maintaining a **consistent bedtime free of electronics** for at least one hour prior to bedtime is especially important for children and adolescents.

Melatonin Side Effects in Children

The most common melatonin side effect in children is morning drowsiness. Other common side effects in children include:

- Bedwetting
- Headache
- Dizziness
- Nausea
- Diarrhea
- Possible **increased risk for seizures** in children with severe neurological disorders.

Dietary melatonin supplements can still have drug interactions or health risks if you have certain medical conditions, upcoming surgery, or other health concerns.

See also: Side effects (in more detail)

What Should I Avoid While Taking Melatonin?

- Avoid driving or operating machinery for at least 4 hours after taking melatonin.
- Avoid using this medication with other prescription medications, over-the-counter drugs, or dietary supplements without asking your doctor, pharmacist or other healthcare provider.
- Avoid alcohol while taking this medication.
- Avoid coffee, tea, cola, energy drinks, or other products that contain caffeine, as it may counteract the effects of the melatonin or increase levels of melatonin in your blood.

What Happens if I Miss a Dose of Melatonin?

If you miss taking a dose of melatonin, there is no cause for concern. However, melatonin may impair your thinking and reaction time. If you will be driving or doing any hazardous activity, skip your dose as melatonin can cause drowsiness.

Otherwise, use the missed dose as soon as you remember. Skip the missed dose if it is almost time for your next scheduled dose. Do not use extra medicine or double your dose to make up the missed medication.

Can You Overdose on Melatonin?

Melatonin is thought to be very safe in the short-term with a low risk for overdose. However, if you suspect a melatonin overdose, seek emergency medical attention or call the Poison Help Line at 1-800-222-1222.

Is Melatonin Safe?

Melatonin is a relatively safe supplement when used in the short-term, and **melatonin side effects** are uncommon. Melatonin safety in the long-term has not been determined in randomized, controlled studies. In general melatonin appears to be relatively nontoxic, even at higher doses such as 3 to 5 mg once a day.

Some people can have side effects from melatonin that may include:

- daytime drowsiness, dizziness, weakness, or confusion
- vivid dreams, nightmares
- feeling depressed, anxious, irritable
- headache
- loss of appetite, diarrhea, nausea, stomach pain
- blood pressure changes
- joint or back pain
- elevated risk for seizures

Melatonin and Pregnancy

Most dietary supplements like melatonin have not been studied in pregnant women, during breastfeeding, or in children. Seek advice from your healthcare provider before using any dietary supplement if you are pregnant, nursing, or considering the use of this product in a child under 18 years of age.

Melatonin Drug Interactions

Some important **drug interactions** can occur with melatonin even though it is a dietary supplement:

- Fluvoxamine (Luvox) - avoid with melatonin
- Sedative-type medications - avoid with melatonin
- Blood-thinner medications (anticoagulants) such as warfarin, heparin, or aspirin
- Medications for diabetes; blood sugar may increase with melatonin
- Caffeine
- Nifedipine

Other drugs interactions exist. Check with your doctor before you take melatonin with any medication. It is also important your pharmacist screen for drug interactions with any new medication, including OTC supplements, herbals, and vitamins. Do not stop using any medications without first talking to your doctor.

See the Drugs.com Slideshow: Melatonin: Worth Losing Sleep Over?

Is Melatonin Approved by the FDA?

Melatonin is not approved by the FDA for any use. Melatonin falls under the FDA's Dietary Health and Education Act as a dietary supplement. The FDA is not authorized to review the safety or effectiveness of dietary supplements like melatonin before they are marketed.

However, manufacturers must notify FDA about new ingredients prior to marketing. The FDA will only review (not approve) the ingredient for safety, but not effectiveness. If a manufacturer makes an unproven health claim or if the supplement is found to be unsafe the FDA can remove the OTC from the market.

Avoid buying **dietary supplements from the Internet** and from online pharmacies whose authenticity you cannot verify. It is important to remember that an OTC label that says "natural" melatonin supplement does not always mean it's "safe" for consumption. Formulations that are United States Pharmacopeial (USP) Convention Verified can be considered most reliable in this regard; the label "USP" is found on the outside of the bottle. For example, all Nature Made melatonin products are verified by the USP.

Do Electronic Devices Alter Melatonin Levels?

Light at night blocks the production of melatonin, and this has been shown to cause sleep disturbances in people who use electronics that emit light at night. Researchers have found that light from electronic devices can block the release of natural hormone melatonin at night. The effect was most significant for younger children, with nighttime melatonin levels reduced by up to 37 percent in certain cases. This can also be **problematic for children** between ages 9 and 16.

Studies show that light after dark lowers melatonin levels which may lead to difficulty in initiating sleep. Electronic light-emitting devices such as the television, laptops, smartphones and tablets often find their way into the bedroom at night, or are used after dark. Children should not have electronics, including TVs, in their bedroom at bedtime and everyone should avoid use of light-emitting devices and screen time at least one hour before bedtime.

Melatonin Reviews and Studies

Melatonin for Sleep Disorders

Researchers have conducted many studies on melatonin supplements for various conditions. Most studies have been conducted in sleep disorders, such as jet lag, shift work sleep disorders, delayed sleep phase disorder, and insomnia. However, studies are often not consistent in their results and questions still remain about its usefulness, dosage, length of treatment and long-term safety for some sleep conditions.

Melatonin can be effective for jet lag for many people when dosed at the appropriate time. Melatonin effectiveness for insomnia might slightly hasten the amount of time needed to fall asleep, but may not increase the overall sleep time. Melatonin does appear to be safe for short-term use (less than three months).

Melatonin for Other Conditions

Multiple areas for melatonin use have been investigated. However, not all trials are of adequate size or quality to make final conclusions about use of melatonin in these conditions:

- Cancer
- Boost the immune system
- Sunburn
- Irritable Bowel Syndrome (IBS)
- Fibromyalgia
- Systemic sclerosis
- Antioxidant and free radical scavenger
- Alzheimer's disease
- Ocular diseases
- Sleep aid for children with autism spectrum disorder or attention deficit hyperactivity disorder (ADHD)
- Amyotrophic lateral sclerosis (ALS)
- Nighttime blood pressure control
- Seasonal affective disorder (SAD)

How Does Melatonin Come at the Store?

In the U.S., melatonin pills can be purchased without a prescription in the pharmacy, grocery, or health food store. Melatonin strengths range from 1 milligram (mg) to 10 mg melatonin, but you should always start with the lowest dose to judge its effects. Some experts suggest to start with 0.3 to 0.5 mg thirty minutes before bedtime, instead of the higher doses. Cut a 1-mg immediate release melatonin tablet in half to get a 0.5 mg dose if lower doses are not available; don't do this with time release melatonin. Also, don't drink alcohol with the time-release preparation, as it can disrupt the time-release mechanism. Melatonin comes as:

- Melatonin tablet
- Melatonin capsule
- Melatonin lozenges
- **Time release melatonin** or extended release melatonin
- Liquid melatonin for kids
- Sublingual melatonin (under the tongue)
- Melatonin sprays
- Melatonin drops
- Chewable melatonin gummies

In addition to generic or store brands, examples of common melatonin brands in the U.S. include:

- Natrol Melatonin
- Nature Made Melatonin (all products **USP verified**)
- Nature's Bounty Melatonin
- Nova Nutrition Melatonin
- NOW Foods Melatonin
- SleepMate Melatonin
- Sundown Naturals Melatonin
- Vitafusion Melatonin
- Zarbees Natural Melatonin for Children

Ask your pharmacist about the best melatonin brands and products of high quality.

Does Food Contain Melatonin?

A study published in *Food and Nutrition Research* notes that certain food products do contain various amounts of melatonin as measured by immunological and chromatographic laboratory techniques. How consumption of these various foods might affect endogenous melatonin production sleep or was not evaluated:

- Tomatoes
- Walnuts
- Rice/barley cereal
- Strawberries, tart cherries
- Olive oil
- Wine, beer
- Cow's milk

Research finds that melatonin synthesis depends upon availability of the essential amino acid tryptophan, a needed component of the diet. If intake of tryptophan is severely restricted, synthesis of melatonin is significantly reduced in humans.

In the *Nurses' Health Study*, no link was found between the consumption of various nutrients, such as folate, vitamin B6 and zinc and increased urinary melatonin excretion.

Diets rich in vegetables, fruits and grain products will contain considerable levels of dietary melatonin. However, the overall effect of dietary consumption on the eventual production of nighttime melatonin is very limited. Melatonin production is primarily driven by the effects of light and darkness and by age, declining as we get older.

How Much Does Melatonin Cost?

On average a 120-count bottle costs about \$10.00, but prices can vary, depending upon the manufacturer and melatonin strengths purchased. Insurance will not pay for over-the-counter (OTC) melatonin product, although some plans may allow use of health savings account funds if a prescription for melatonin OTC is written by your doctor.

Bottom Line: Melatonin Pros and Cons

Melatonin benefits:

- Widely available in the U.S. over-the-counter (OTC) without a prescription
- Short-term use (less than 3 months) is relatively safe with little evidence of toxicity
- Inexpensive product with generics or store brands available
- Lower dose and orally-dissolvable products for children are available
- Comes in a variety of dosage forms and doses

Melatonin downsides:

- Not approved for any uses by the FDA (over-the-counter dietary supplement)
- Quality of some products cannot always be assured
- Studies for less common uses are not consistent
- Doses tend to vary between patients; always ask a medical professional for dosing advice in children
- Effective lower doses (0.1 to 1 mg) are not always commercially available
- Higher doses (2 to 10 mg) used over a prolonged period may lead to rebound insomnia and are not well studied.

Medically reviewed on Feb 26, 2017 by **L. Anderson, PharmD**

For More Information

- **Jet Lag Disorder Disease Reference**
- **Jet Lag Health Guide**
- **Melatonin Support Group**
- **Sleep Disorders Support Group**

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