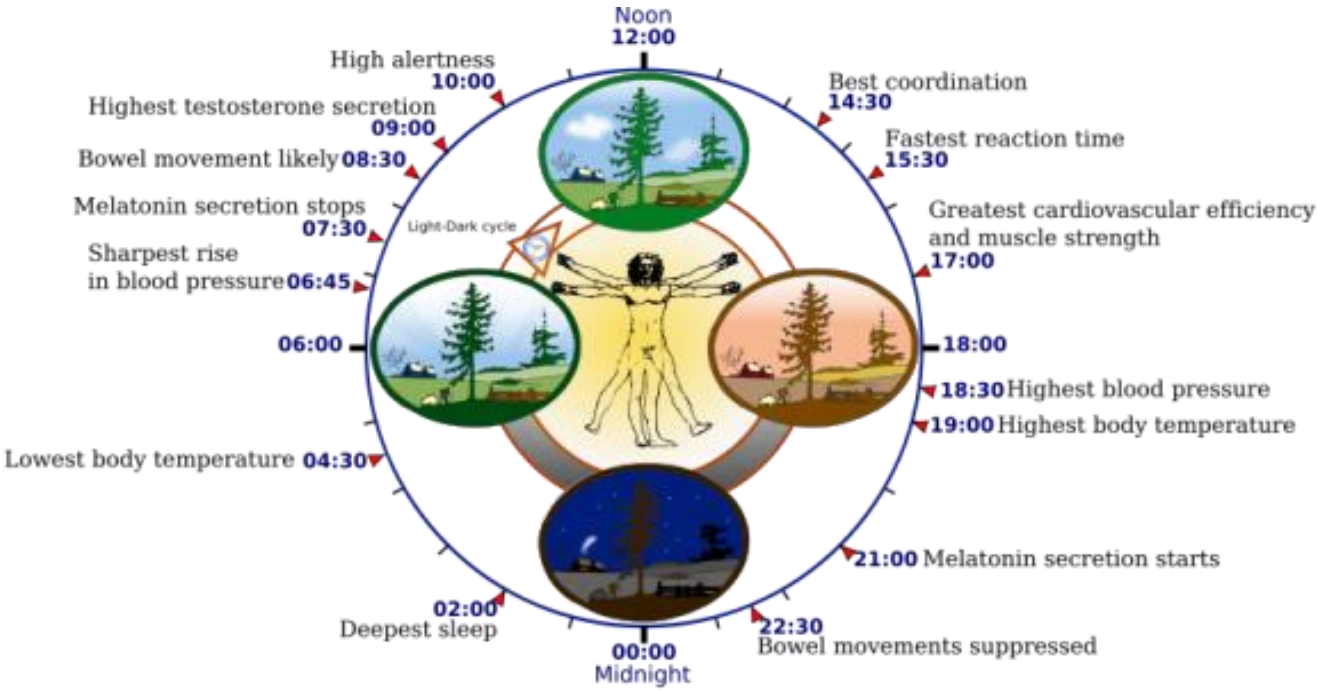
13 TIPS FOR AN OPTIMIZED BIORHYTHM AND PERFECT SLEEP

Your circadian (sir-kay-dee-an) rhythm is a daily (~24 h) cycle of biological activity. The biological activity with the most obvious circadian rhythm is your sleep-wake cycle. Think of your body as having an internal clock that regulates when to activate every system. Actually, the part of your brain called the suprachiasmatic nucleus (SCN) has built-in molecular oscillators that function very much like a pacemaker. That's why the SCN is often called your internal or biological clock. The SCN interacts with virtually every major system in your body, including hormone production and central nervous system activity. Look at the image below for examples of biochemical and physiological events with a 24 hour biorhythm.



Simply put, at different times of day your body is primed for different types of activities. When your biorhythm gets desynchronized from your daily agenda, your body does not function

optimally. The results of this include a decreased metabolism, more cortisol production and less anabolic hormone production, lower insulin sensitivity, poorer recovery from exercise, a worse cholesterol profile, more hunger, impaired mental performance and lower sleep quality. Not to mention feeling worse. It's not an understatement to say that practically everything you do benefits from a stable, synchronized circadian rhythm.

Here are 10 tips to stabilize your biorhythm and optimize your sleep quality.

1. Consistency is everything

As long as your lifestyle is consistent, your circadian rhythm will synchronize with your lifestyle on its own. Your body autoregulates your circadian rhythm quite well based on so called 'zeitgebers'. These include food and activity. So make sure your meal times and training times are consistent. People with a consistent lifestyle have significantly better sleep quality than people with an irregular lifestyle. Concretely, I recommend keeping your meal and workout times within 2 hour windows, so if you normally exercise or eat around 13:00 h, any time between 12:00 h – 14:00 h would be acceptable.

Sleep is even more sensitive to circadian rhythm disturbances. I recommend keeping your bedtime within a one hour window, e.g. 23:00 - 00:00 h.

Sleep quality around your regular sleep time is significantly higher than that at other times. So if you don't sleep at regular times, you'll need to average more than 8 hours a day across the week. That means if you sleep 6 hours a day on average during the workweek, you need to sleep on average *over* 13 hours a day during the weekend.

2. Get daily bright light exposure

Arguably the most important zeitgeber ('time giver') in your body is bright light. Throughout most of evolution, this equaled sunlight. Bright blue spectrum light exposure in the first part of the day improves sleep quality, productivity and subjective wellbeing [2, 3, 4, 5]. 'Winter depression', more formally known as Seasonal Affective Disorder, is the result of being deprived from bright light.

If it is difficult for you to get direct, intense sunlight exposure on a daily basis, you should consider investing in a daylight lamp AKA light box, artificial sun or full-spectrum lamp.

To be sure it's strong enough to mimic sunlight, buy one with an intensity of at least 10,000 lux. They last forever and you can get a good one for as little as $30 nowadays.

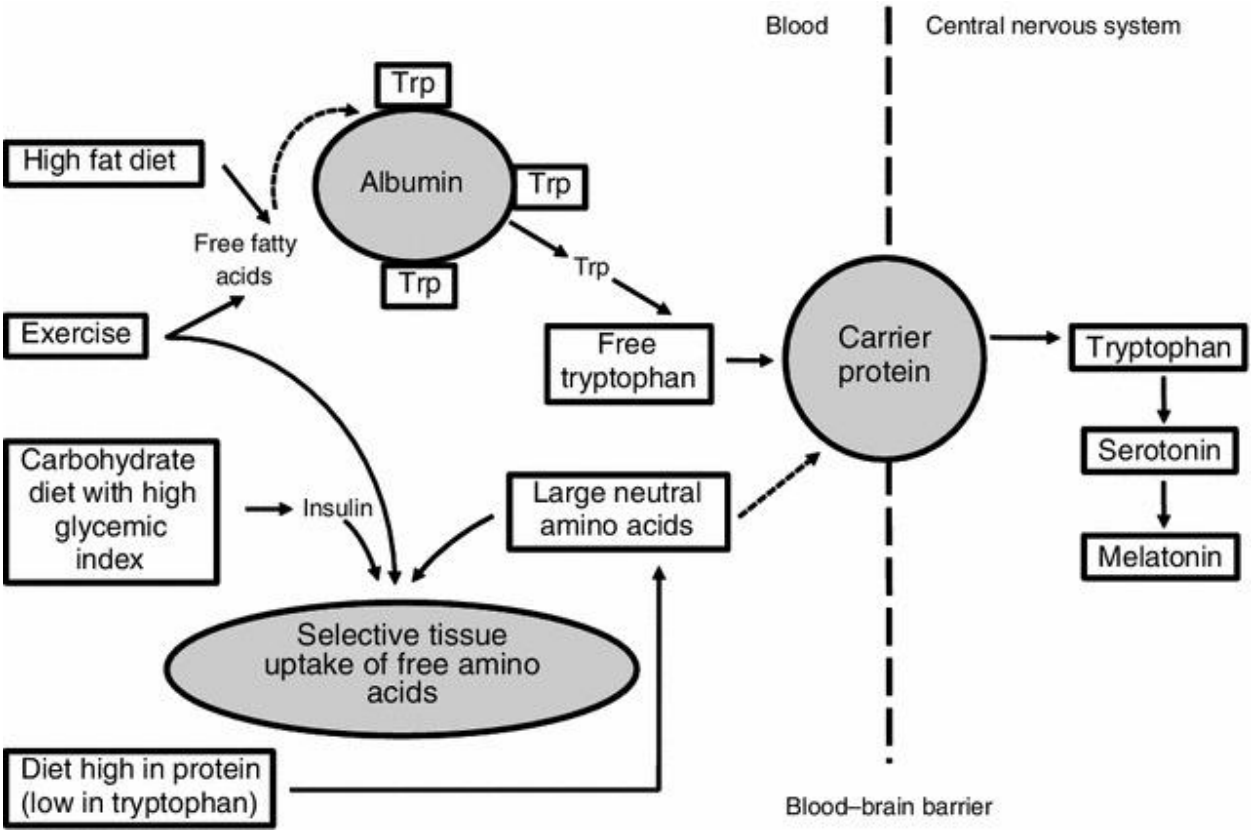
You can put it on your desk just like a normal lamp.

Ideally, get one with an artificial dawn simulator AKA wake-up light. It will help you wake up much more pleasantly and increase your morning energy level significantly. Why wake up to an annoying alarm when you don't have to?

3. Carbohydrates and protein pre-bed

At night, or specifically in the second half of your circadian rhythm, carbs induce significant postprandial somnolence (after-meal sleepiness) and parasympathetic nervous system dominance (rest and digest mode). This effect of carbohydrates is sometimes called 'carb knock-out'.

Carbs and protein can also increase the uptake of tryptophan to the brain, which converts to serotonin and ultimately melatonin. Melatonin is the hormone that effectively tells your body it's time to go to sleep.



How carbohydrates can improve sleep quality by promoting melatonin production.

Put simply, a high carb, low fat meal tends to help you sleep better [2, 3].

Protein can have a similar effect due to its insulinogenic nature, so don't limit your protein intake, only your fat intake. A high protein, low carb meal tends to promote sleep better than a low protein, high carb meal. Dairy protein seems to work better than other protein, probably because it induces a lot of insulin production. Be mindful of tip 5, however.

Your meal plan should already have a relatively high proportion of carbohydrates in your last meal of the day, but it's worth experimenting with the carb:pro:fat ratio of your pre-bed meal to see if you notice improved sleep quality from any particular ratio.

The ideal food choices are 'safe starches' like rice and potatoes. Wheat products like bread don't improve sleep quality, probably in part because they are stressful for your digestive system.

While most people have no problems eating a big meal right before going to bed [2], some research shows that it's best to have your last meal of the day a few hours before going to bed instead of right before going to bed. So if this fits within your optimal nutrient timing range, it's worth timing your last meal of the day to be consumed 2 – 4 hours before you go to bed.

4. Limit pre-bed light exposure

The term 'light pollution' is not a fable. Light exposure acts as a signal for your body that it's time to be active and prevents your body from producing melatonin to keep you awake. Light affects virtually every system in your body and light exposure in the evening, especially bright light, significantly decreases your sleep quality.

So to make your body unwind at night, it's best to get so-called blackout curtains or blinds that let virtually no light through. Your sleeping room should be pitch black. I'm talking "I can't see my pillow" dark. That means you may also need to cover up the lights of electronics, like your phone, your alarm and your AC. Turning your bedroom into an ultimate sleep lair will improve your sleep quality immensely.

If you want to use your computer in the hours before going to bed, install f.lux on it. Electronic devices have very strong lighting that significantly disrupts your biorhythm. f.lux is a nifty software automatically regulate your monitor's light spectrum to prevent this. Specifically, it decreases blue light at nighttime to turn the monitor's light more into that of sunset.
Red spectrum light doesn't disrupt your circadian rhythm as much as blue spectrum light [2]. I recommend setting the night light intensity as low as you still find comfortable. I personally like 1900k (candle light) and if I have to do something on my laptop just before I go to bed, I use the Darkroom mode.
The software takes up virtually no memory and doesn't require any maintenance, so I recommend installing it right now.

5. Limit fluid consumption in the hours before bedtime

No rocket science here. Don't drink a lot before going to bed and you won't have to wake up to pee as much. Having to wake up to go to the bathroom at night ('nocturia') impairs sleep quality.

6. Supplement melatonin

If the previous tips aren't sufficient to make you fall asleep within 20 minutes and it's not stress that's keeping you up, try supplementing melatonin. Melatonin is a key hormone that helps you sleep. It's effectively an internal messenger that tells your body it's bedtime. Supplementing melatonin improves sleep quality and makes it easier to fall asleep without any significant side-effects or addiction [2, 3, 4].

The maximally effective dosage is normally 3 mg taken 30-60 minutes before going to bed. However, people with very little natural melatonin production, shift workers and jetlagged individuals can benefit from 5 mg. In rare cases, people anecdotally benefit more from lower dosages, as little as 0.3 mg.

Melatonin is completely harmless, does not result in addiction and won't disrupt your natural production. Many people take it every day.

Just be careful not to use melatonin as a band-aid approach without improving your actual sleep hygiene. Even if you supplement melatonin, bright light exposure before going to bed still disrupts your circadian rhythm.

7. Make your bedroom temperature comfortable

Both heat and cold can disrupt your sleep quality, so make sure the temperature in your bed is comfortable. The optimal room temperature for perfect sleep is around 19°C (66.2 F). You can largely go by feel here, but err towards slightly cooler temperatures than you might intuitively select.

8. Take a warm shower before going to bed

Thermoregulation is a direct regulator of your sleep. Simply put, you're comfortable when you're warm and when you're comfortable, you sleep better. Taking a warm shower or bath can help you relax and significantly improve your sleep quality.

9. Meditate

Other than temperature and circadian rhythm factors, stress and hyperactivity can greatly mess up your sleep quality. If you can't wind down and stop thinking when you go to bed, relaxation therapy can significantly improve your sleep quality [2, 3].

Meditation is a particularly effective and popular form of relaxation therapy, though there's no need for any of the spiritual stuff. And yes, most of the studies on mindfulness training are flawed or poor, but that still leaves dozens of convincing studies.

Mindfulness meditation comes down to simply focusing intensely on something that does not evoke any emotional response, like a cube or a chair, for several minutes.

It sounds easy, but it's really not and will take consistent practice. It's easier to do in a quiet, unstimulating environment or with ear plugs, with your eyes closed, in a relaxed position (bonus points if you do it in lotus position in a blizzard).

Meditation effectively resets your mood state and your stress level. A computer analogy is clearing out your brain's cache. Other benefits are much less documented, but the reduction in stress is almost universal in research.

10. Take a GABA supplement

If meditation isn't enough to calm you down, try a GABAergic supplement. GABA is a neurotransmitter that calms you down. GABA itself does not effectively cross the blood-brain barrier, though GABA supplements do have some psychoactive effects. Still, you're better off taking phenibut.

Alternatively, consume some alcohol free beer to help you relax. Beer contains hop, a plant with effects on various neurotransmitters in your brain that make you relaxed (specifically GABA, 5-HT and adenosine).

The most popular GABAergic supplement is valerian. The valerian herb calms you down and can thereby improve sleep quality.

Note that actual sleep quality is generally unaffected by GABA: it just makes you calm, which can help you fall asleep.

11. Limit caffeine consumption

Caffeine directly affects your body's sleep-wake regulation by blocking adenosine's actions that promote drowsiness. It is common knowledge that caffeine is bad for your sleep, but the magnitude of this negative effect is generally underappreciated. Even a single double espresso consumed 16 hours before going to bed still impairs sleep quality by reducing the time you spend in deep steep stages. At that point saliva caffeine concentrations are close to zero already, since caffeine's half-life is ~5 hours. So caffeine's negative effect on your sleep is more prolonged than its direct effects and for optimal sleep, caffeine is often best avoided altogether.

However, there are several ways you can benefit from caffeine's effects without derailing your sleep quality much.

1. Consume your caffeine on an empty stomach. Fasted consumption increases the speed of absorption, giving you a faster and stronger peak effect.

2. Don't consume caffeine close to bedtime. Since there is significant interindividual variability in how fast people metabolize caffeine and how sensitive they are to its anti-sleep effect, it is good to experiment with how many hours before bed you can still consume caffeine. Realize, however, that caffeine continues to impair your sleep until after you've stopped feeling caffeine's effects. As a general guideline, caffeine is best avoided in the 6 hours before going to bed. If you are sensitive to caffeine or have trouble sleeping, that gap is best increased to 10+ hours.

Note that while you can develop a tolerance to caffeine's sleep impairing effect, this same tolerance generally means that caffeine also ceases to be net performance enhancing. At this point your body is addicted and what you feel as a stimulant effect is mostly just making you feel 'less worse' instead of better than you'd have felt without any caffeine if you were well rested.

12. Get a good bed

The importance of a good mattress is common wisdom and scientific research confirms this. But what makes a mattress good?

For one, it shouldn't be too soft. Very soft foam mattresses can result in back pain. Humans are better adapted to sleeping on hard surfaces and most people will automatically correct their sleeping posture to avoid breathing impairments or major joint pain. However, just because you cán sleep on the ground, doesn't mean that it's best for you. Most people sleep well on a mattress with a medium hardness level [2].

Most importantly perhaps, you should select a mattress based on your subjectively perceived comfort while lying in it. Adjustable airbeds generally result in very high sleep quality.

You can get used to a large variety of mattresses though. Since your sleeping posture adapts to what you generally sleep on, most people simply sleep best on the mattress they're used to, assuming it's not far too soft or hard.

The same criteria apply to your pillow: the best pillow for your sleep quality roughly corresponds with the one you find most comfortable, though you probably want to select a pillow that's a bit harder than what you intuitively find most comfortable to put your head on. Your pillow shouldn't be too soft: feather pillows tend to result in poorer sleep quality than foam or polyester pillows and most people actually sleep best on a harder rubber or latex pillow [2, 3]. There's no need for specially shaped 'contour' or 'cervical' pillows [3, 4].

13. Soundproof your bedroom

Environmental noise impairs sleep quality [2, 3, 4]. While you can get used to constant noises, like a quiet hum or the sound of a fan, due to sensory habituation, more irregular noises such as those from traffic or city sounds can greatly mess up your night's rest. If you quietly sit in your bedroom at night and can hear any kind of irregular noise, you may want to consider switching bedrooms, improving your bedroom's noise isolation or wearing wax earplugs at night.