Examine.com

Sleep
Supplement Guide

Written by the editors of Examine.com

Updated July 12, 2018

Medical Disclaimer

This guide is a general-health document for adults over 18. Its aim is strictly educational. It does not constitute medical advice. Please consult a medical or health professional before you begin any exercise-, nutrition-, or supplementation-related program, or if you have questions about your health.

This guide is built on scientific studies, but study outcomes are never homogeneous: individual results do vary. If you engage in any activity or take any product mentioned herein, you do so of your own free will, and you knowingly and voluntarily accept the risks. While we mention major known interactions, it is possible for any supplement to interact with other supplements, as well as with foods and pharmaceuticals.

A product may not contain the exact compounds and amounts listed on its label. Before you decide whether to take it, investigate it and its manufacturer. More than isolated compounds, herbs are prone to batch-to-batch variability, which can alter their efficacy and safety.

For evidence supporting the claims mentioned in this guide, please visit Examine.com.

Table of Contents

How to Use This Guide

The Examine.com team has been publishing research on nutrition and supplementation since March 2011. Drawing from all we've learned, we've designed this Stack Guide to help you figure out which supplements can help you reach your health goal, and which can hinder you or just waste your money.

Core supplements have the best safety-efficacy profile. When used responsibly, they are the supplements most likely to help and not cause side effects.

Primary options may provide substantial benefit, but only in the right context. A primary option is not for everyone, but if you read the entry and find that you meet the criteria, consider adding the supplement to your stack.

Secondary options have less evidence for their effects. They could work or be a waste of money. Keep them in mind, but think twice before adding them to your stack.

Promising supplements are backed by tradition or by mechanistic, animal, epidemiological, or anecdotal evidence, but not yet by convincing human trials.

Inadvisable supplements are either potentially dangerous or simply ineffective, marketing claims notwithstanding. Do not add them to your stack. At best, they'll be a waste of money; at worst, they can cause you harm.

Now that you've been presented with various supplements worthy of your interest, the time has come to combine them based on your objective. We'll guide you in **assembling your stack**.

Then comes the **FAQ**, in which we cover common questions that may arise when assembling your stack.

Lastly, we include information on **precautions and troubleshooting**.

With all this combined, you should be able to identify and assemble the supplement stack best suited to your objective.

Core Supplements

Magnesium

Why it's a core supplement

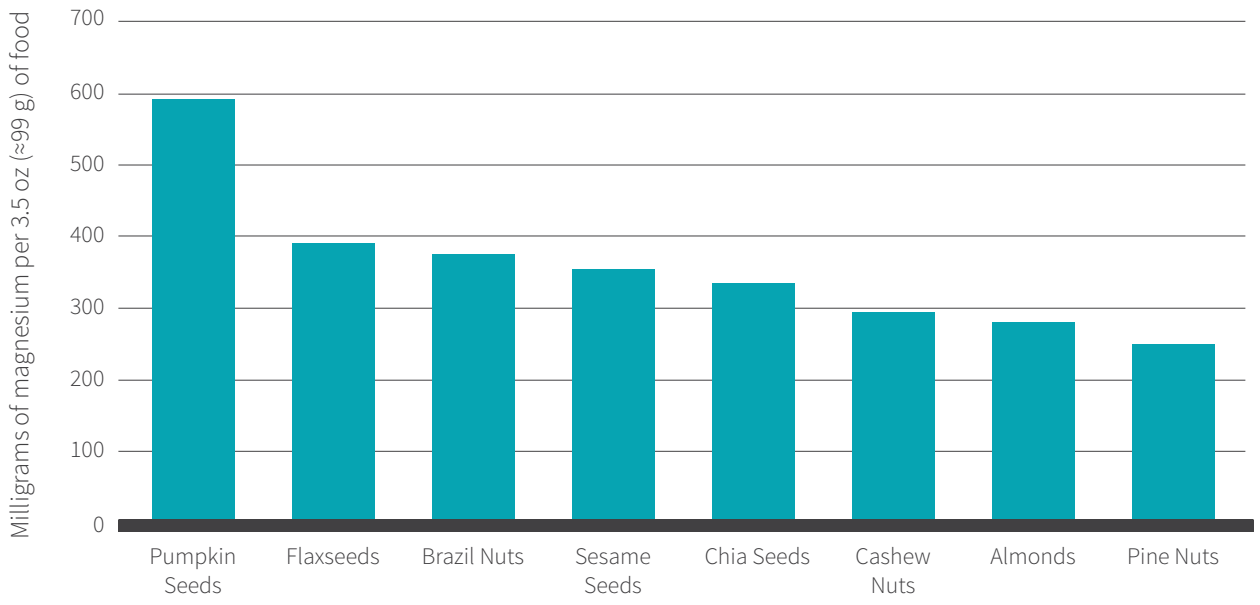
Magnesium (Mg) is a dietary mineral that plays an important role in the brain. A deficiency can result in abnormal neuronal excitations leading to impaired sleep. Magnesium is lost through sweat, so deficiencies are more common in athletes, but they are not unknown in the general population.

Magnesium is usually safe, but it may impair the absorption of some pharmaceuticals, notably bisphosphonates. Magnesium acts synergistically with calcium channel blockers to lower blood pressure, creating a risk of hypotension (i.e., low blood pressure). If you take any medication, talk to your doctor before you consider supplementing magnesium.

How to take it

A diet comprising magnesium-rich foods (such as fish, nuts, beans, and green leafy vegetables) renders supplementation unnecessary, at least for the purpose of improving sleep. In case of magnesium deficiency, adding or increasing dietary sources of magnesium should be the first option, but in the absence of practical ways of doing so, supplementation can be used.

Figure 1: Magnesium content of seeds and nuts



Low dietary magnesium can impact sleep quality. Nuts and seeds are a great source of magnesium. Incorporating some of the above foods into your diet can help ensure sufficient magnesium intake.

Commonly supplemented forms include citrate, gluconate, and glycinate. To increase absorption, magnesium gluconate should be taken with a meal; other forms can also be taken on an empty stomach. Magnesium oxide is better avoided: it has low bioavailability, which can cause intestinal discomfort and diarrhea.

The standard dose is 200 mg of elemental magnesium once a day, though up to 350 mg can be used. Because magnesium might have a sedative effect, it is often supplemented before bed.

Avoid taking magnesium, calcium, iron, and zinc at the same time in combinations of 800+ mg, since high amounts of these minerals will compete for absorption. Magnesium may also impair the absorption of antibiotics, notably those in the tetracycline class (e.g., doxycycline) and quinolone class (e.g., ciprofloxacin), so take magnesium and antibiotics at least six hours apart.

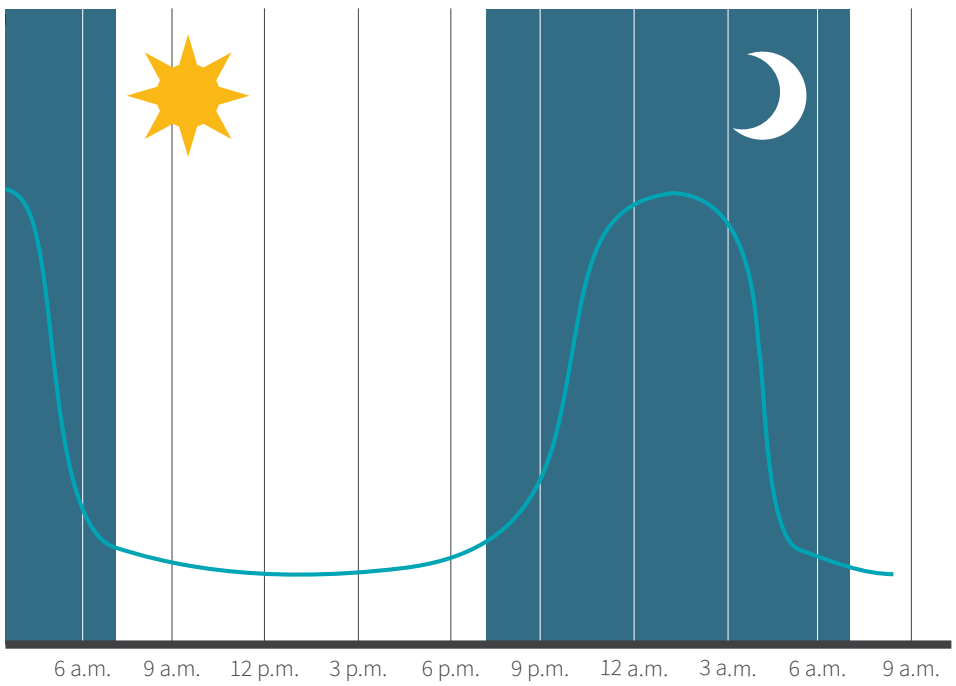
Melatonin

Why it's a core supplement

Melatonin is a hormone involved in the circadian rhythm (which dictates sleeping and waking cycles). As you wake up in the morning, melatonin levels go down, while at night, or if you dim the lights, melatonin production increases.

Melatonin's benefits hinge on its ability to decrease the time it takes to fall asleep. If you fall asleep easily, you do not need to supplement melatonin.

Figure 2: Natural melatonin variations throughout the day



Your body can make melatonin out of the amino acid L-tryptophan, but since supplemental melatonin is inexpensive, readily bioavailable, and more reliable than tryptophan, there is no reason to include tryptophan in your sleep stack.

How to take it

Take 0.5 mg (500 mcg) half an hour before bed. Increase by 0.5 mg each week until you find the lowest effective dose that works. Do not take more than 5 mg. Time-release melatonin may be more effective at sustaining sleep throughout the night.

Primary Options

Lavender

Why it's a primary option

Lavender (*Lavandula*) is traditionally used in aromatherapy for its relaxing scent. Because of the difficulty of blinding aromatherapy studies, a lot of the evidence for lavender's effects stems from lower-quality studies, but newer studies have examined oral supplementation to treat anxiety.

Intrusive thoughts can increase the time it takes to fall asleep; lavender can ease anxiety and reduce those intrusive thoughts. Lavender can also improves sleep *quality*, though more research is needed to determine the mechanism behind this effect. Likewise, more research is needed to confirm if lavender and lemon balm are indeed synergistic.

Because anxiety is prevalent in younger women, anxiety treatments are often taken along with contraceptive pills. One study has shown that lavender doesn't interact with a type of estrogen-based birth control: ethinyl estradiol with levonorgestrel.

Yet lavender may have hormonal effects. The Endocrine Society and the National Institutes of Health warn that there is mechanistic and anecdotal evidence that lavender oil has estrogenic properties and can cause gynecomastia (enlarged breasts in males). It is reassuring that none of the clinical trials have reported gynecomastia among their subjects, but still, if you are male and your breasts becomes tender, stop using lavender.

How to take it

Take 80 mg of Silexan, a lavender oil preparation standardized for the active component linalool at 25–46% of total weight, 30–45 minutes before bed. After two weeks, if no benefit has been observed, the dose can be increased to 160 mg (this is the *maximum dose*).

Lavender oil is also used in aromatherapy — burned as a candle, heated, placed in a vaporizer, or added to a hot bath. The number of variables (product concentration, proximity of the user to the source, size of the room …) makes recommending dosages exceedingly difficult, but studies have used at least 30 minutes of exposure in a well-ventilated room either at night or in the afternoon.

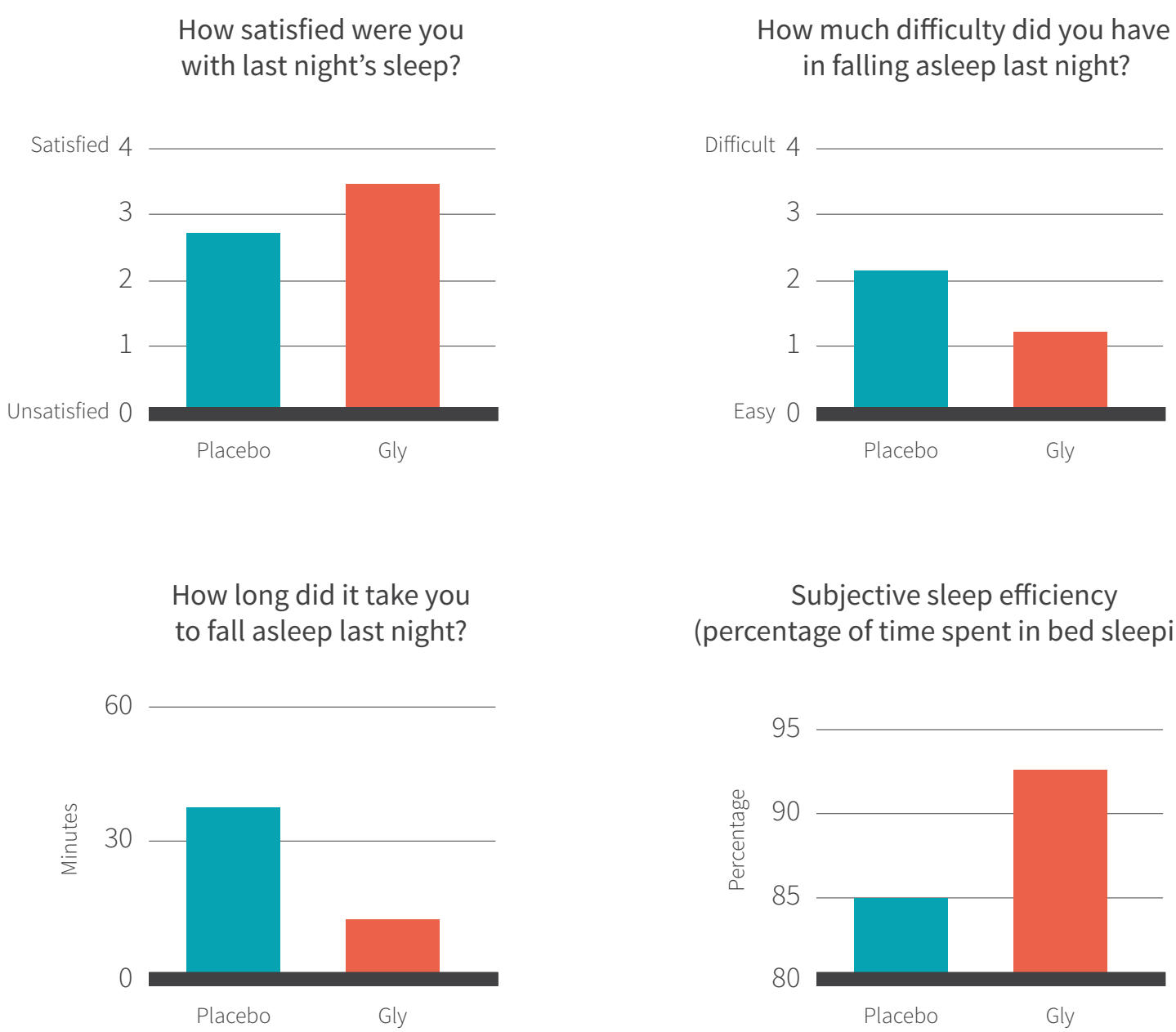
Secondary Options

Glycine

Why it's a secondary option

Studies on glycine have not found supplementation to improve sleep quality or reduce the amount of time it takes to fall asleep, but participants reported feeling significantly more rested the following morning.

Figure 3: Effects of glycine on subjective sleep quality



While some studies have shown improvements on the perception of sleep quality with glycine supplementation, those studies have all been short term.

Source: Yamadera et al. *Sleep and Biological Rhythms*. 2007.

Though glycine does not provide the health benefits that result from improved sleep quality, the perception of having had a good night's sleep makes for a comfortable and energetic morning. Plus, glycine is cheap and safe, making it a viable supplement option.

However, studies on glycine have all been short term (four days or less), and anecdotal reports suggest that benefits wear off. Therefore, glycine is probably best used intermittently.

How to take it

Take 3 g of glycine 30–60 minutes before sleep. Glycine is usually taken with food, but further research is needed to determine how important mealtime supplementation really is. If eating too close to bedtime disrupts your sleep, take glycine on an empty stomach instead.

Glycine can be purchased as pills but is cheaper as bulk powder, which should be mixed with water and tastes rather sweet.

Lemon Balm

Why it's a secondary option

Lemon balm (*Melissa officinalis*) is a light sedative. Like lavender, with which it may be synergistic, lemon balm can reduce the time it takes to fall asleep.

Unlike benzodiazepines, lemon balm is not potent enough to have addictive or habit-forming properties. Nevertheless, any supplement with a sedative effect can disrupt working memory and reduce attention span. Do not drive or operate heavy machinery after taking lemon balm or any other supplement with a sedative effect. Do not take lemon balm during the day.

How to take it

Take 300–1,200 mg of lemon balm 30–60 minutes before bed. Start with 300 mg; ramp up to 600 mg over the course of a week if no lower dose proves effective. Only take a dose larger than 600 mg if it provides noticeably greater benefits.

Lemon balm is also used in aromatherapy, but studies tend to examine oral supplementation because it is a more reliable delivery method.

Valerian

Why it's a secondary option

The root of valerian (*Valeriana officinalis*) was one of the first sleep aids on the market. Like glycine, it seems to improve subjective reports on sleep and mood (well-being, alertness) the morning after supplementation.

Valerian is one of the best-researched sleep aids, second only to melatonin, yet how it influences sleep on a neural level is still uncertain. Moreover, like St. John's Wort, it interacts with the enzyme CYP3A4 and so with many drugs.

How to take it

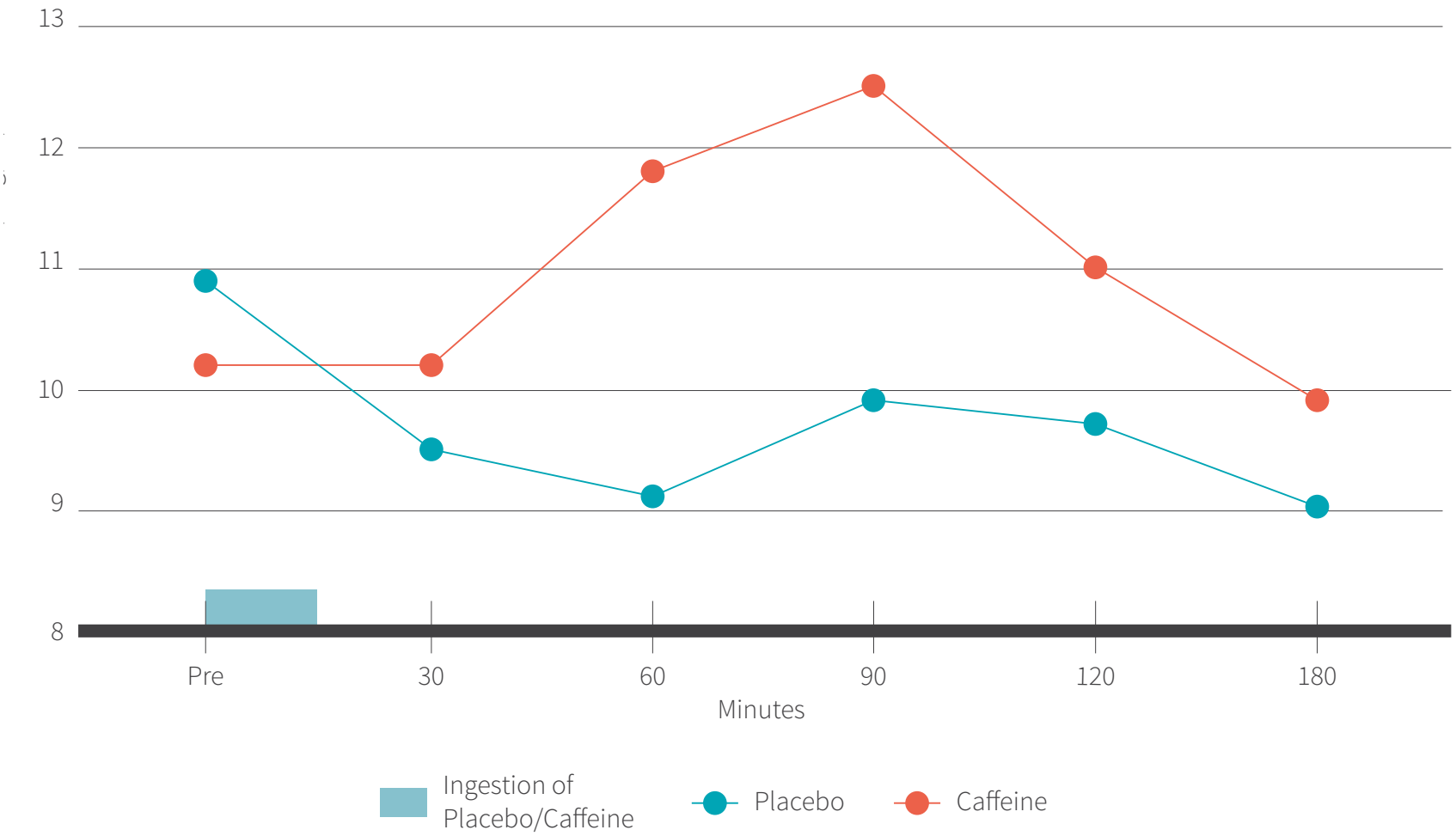
Take a capsule or prepare an infusion 30–60 minutes before bed. While infusions are difficult to dose due to variations in steeping, look for capsules that contain 450 mg of a valerian extract standardized for 0.8–1% valerenic acids.

Inadvisable Supplements

Caffeine

People with a caffeine tolerance may still be able to fall asleep after ingesting caffeine, but this stimulant will still negatively affect sleep quality. Caffeine should not be consumed before sleep even by the most veteran coffee drinkers. While some studies suggest that caffeine paired with 15-minute "power naps" can benefit alertness more than caffeine or naps alone, this benefit does not extend to longer sleep durations.

Figure 4: Effects of caffeine on cortisol levels



Source: Lovallo et al. *Pharmacol Biochem Behav*. 1996 Nov.

Assembling Your Stack

Incorporating Core Supplements

This stack contains two core supplements: magnesium and melatonin.

Eating a variety of healthy foods like leafy green vegetables, nuts, and fish will provide enough magnesium to make supplementation unnecessary. If your diet does not provide you with enough magnesium and you cannot modify it so it does, a bedtime dose of 200–350 mg of magnesium (in a form such as citrate, gluconate, or diglycinate) will alleviate a deficiency. Magnesium oxide, the cheapest form of magnesium, is associated with intestinal distress and is thus not recommended.

Start with the magnesium. If falling asleep is still a problem after two weeks, add melatonin: 0.5 mg (500 mcg) half an hour before bed. You can increase by 0.5 mg each week until you find the lowest effective dose that works, but do not exceed 5 mg (5,000 mcg). Melatonin can also help in case of jet lag.

Experiment with the core supplements for a month before you consider adding one of the following options.

Incorporating Options

For people with anxiety and intrusive thoughts

In addition to the core magnesium (200–350 mg) and melatonin (0.5–5 mg), take lavender (starting with 80 mg of Silexan per day, working up to 160 mg/day over the course of a week if no lower dose proves effective) and lemon balm (starting with 300 mg/day, working up to 600 mg/day over the course of a week if no lower dose proves effective) half an hour before bed.

For people who don't have trouble falling asleep but never feel rested in the morning

Take the core magnesium (200–350 mg) and melatonin (0.5–5 mg) daily, half an hour before bed. Prior to days when you most need to feel rested, add glycine (3 g) or valerian (450 mg of an extract standardized to 0.8–1% valerenic acids), also half an hour before bed.

FAQ

What if I fall into more than one category?

The sleep stack is simpler than other Examine.com stacks. When the time comes to incorporate options, if you happen to fall into multiple categories, feel free to combine supplements.

Can I add to my stack a supplement not covered in this guide?

Supplement your current stack for a few weeks before attempting any change. Talk to your doctor and research each potential new addition in advance. Check for known negative interactions with other supplements in your current stack, but also for synergies. If two supplements are synergistic or additive in their effects, you might want to use lower doses for each.

Can I modify the recommended doses?

If a supplement has a recommended dosage range, stay within that range. If a supplement has a precise recommended dose, stay within 10% of that dose. Taking more than recommended could be counterproductive or even dangerous.

Should I take my supplements with or without food? And at what time?

Answers are provided in each supplement entry whenever the evidence permits. Too often, however, the evidence is either mixed or absent. Besides, a supplement's digestion, absorption, and metabolism can be affected differently by different foods. Fat-soluble vitamins (A, D, E, K), for instance, are better absorbed with a small meal containing fat than with a large meal containing little to no fat.

Starting with half the regular dose can help minimize the harm a supplement may cause when taken during the day (e.g., tiredness) or in the evening (e.g., insomnia).

As an athlete with a low dietary intake of magnesium, I took 350 mg of supplemental magnesium and experienced diarrhea. Why is that?

If magnesium is indeed the culprit, then your diarrhea was probably caused by too large a dose reaching the colon. Alternatively, it could mean that your body's levels of magnesium are in fact sufficient, making supplementation unnecessary.

In the future, split your daily dose into multiple doses. If the problem persists, reduce your daily dose to 200 mg. If you are using magnesium oxide, switch to a different form of magnesium.

What's the difference between elemental magnesium and other kinds of magnesium?

"Elemental" refers to the weight of the mineral by itself, separately from the compound bound to it. For instance, consuming 500 mg of magnesium gluconate means consuming 27 mg of elemental magnesium. ***Product labels display the elemental amount.*** On a label, "27 mg of magnesium (as magnesium gluconate)" means 27 mg of elemental magnesium (and 473 mg of gluconic acid).

Precautions and Troubleshooting

Stack components are seldom studied together. The safest way to add supplements to your daily routine is one at a time, at least a couple of weeks apart, to better assess the effects (and side effects) of each new addition. Start at half the regular dose for a week, then slowly increase to the regular dose if you are not experiencing the desired effects.

Since minerals and vitamins (especially the fat-soluble vitamins: A, D, E, and K) can accumulate in the body, it is best to consider supplementation only after a dietary evaluation. Track what you eat for a week; if, on average, you are getting less than 80% of your Recommended Dietary Allowance or Adequate Intake, supplementation becomes an option, though first you should try eating more foods rich in the desired vitamin or mineral.

Any supplement that can affect the brain, especially supplements with a stimulatory or sedative effect, should first be taken in a controlled situation. Do not take a dose, least of all your first dose, before events such as driving or operating heavy machinery, when impaired cognition may be a risk for your safety and the safety of others.

After taking any supplement for the purpose of improving sleep, don't check your emails, don't log onto Facebook, just relax and prepare for sleep. Blue light (produced by most screens as well as by the sun) can keep you awake even after you turn it off. If you need to use a computer or mobile device before bed, consider using software such as f.lux, which will redden your screen light and get your body ready for sleep. Alternatively, wear blue-light-blocking glasses an hour or two before bedtime. Exposure to light can reduce melatonin in your body even when you're asleep, so turn off any disrupting light before hitting the hay. Finally, minimize the noise in your bedroom, since noise can reduce sleep quality in addition to making it harder to fall asleep.

Remember that supplementation is a solution of last resort, reserved for people who cannot improve their sleep through lifestyle changes. Do not feel you have to take your stack every night, either. If, as weeks go by, the efficacy of your stack wears off, try taking it only three to five nights a week. It may

take you a couple of months to determine your best stack, and a couple more to ascertain your best supplementation schedule.

Finally, pause supplementation after a month to determine if non-supplemented sleep quality has improved.