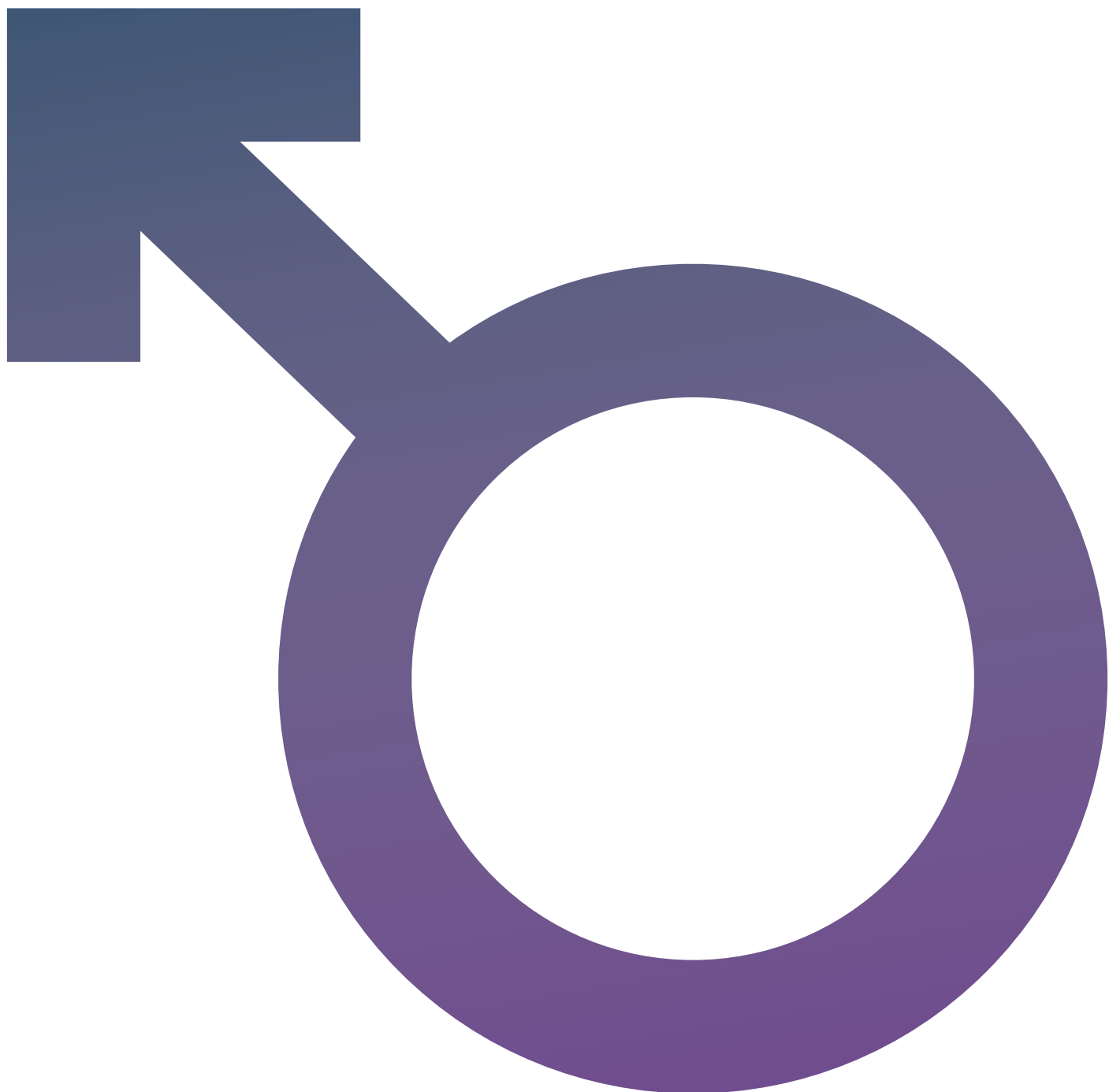


Examine.com

Testosterone Supplement Guide



Written by the editors of Examine.com

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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](https://www.examine.com).

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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.

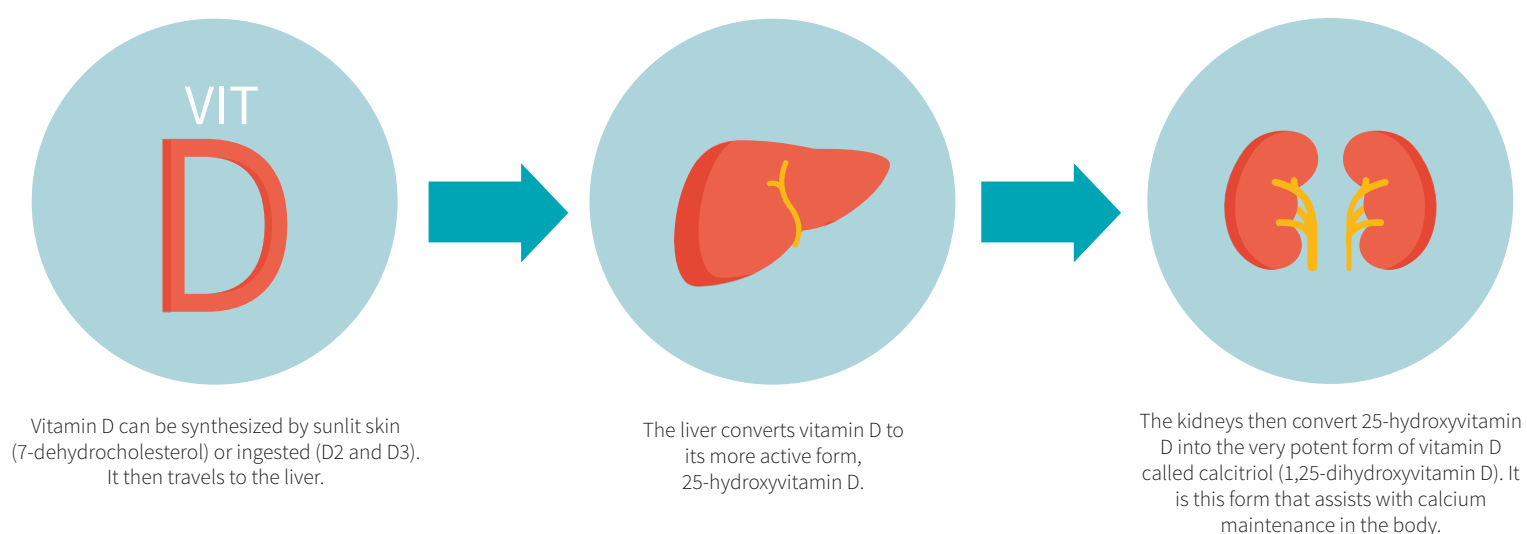
Core Supplements

Vitamin D

Why it's a core supplement

Suboptimal levels of vitamin D are common, especially in people whose exposure to sunlight (without clothes or sunscreen) is limited. Moreover, the darker your skin, the longer you need to expose yourself to sunlight to synthesize enough vitamin D. Still, if you spend a lot of time outside and live near the equator, you can skip supplementation!

Figure 1: How vitamin D is made



Vitamin D has often been researched in the context of male fertility. Vitamin D receptors can be found on sperm cells, and vitamin D may also play a role in the production of steroid hormones. In a study on men with low vitamin D levels, supplementing vitamin D₃ over the course of a year led to an increase in testosterone levels. Since the participants were all middle-aged men, however, they may have started the experiment from a state of age-related testosterone decline. The effect of vitamin D supplementation on younger men is currently unknown.

Vitamin D comes in two forms. Ergocalciferol (D₂) is obtained through the irradiation of some plants and fungi, whereas cholecalciferol (D₃) is the kind of vitamin D your body synthesizes from the cholesterol in your skin under the action of the sun's ultraviolet B (UVB). Vitamin D₃ is both more stable and more bioavailable than vitamin D₂; as a supplement, it is usually derived from lanolin, a

waxy substance secreted by the skin glands of woolly animals, but a vegan-friendly option (a lichen extract) is also available.

How to take it

Take 2,000–3,000 IU (50–75 mcg) of **vitamin D₃** with with a meal containing fat, either year round or only during the colder, darker months, when you are least likely to synthesize enough vitamin D from sun exposure. The lower end of the range is a typical dose, whereas the higher end comes closer to the doses used in studies on vitamin D and testosterone.

Doses higher than 3,000 IU may be warranted in cases of severe deficiency or non-response at lower doses, as ascertained by a blood test. Keep in mind that, over months, 10,000 IU/day can become toxic.

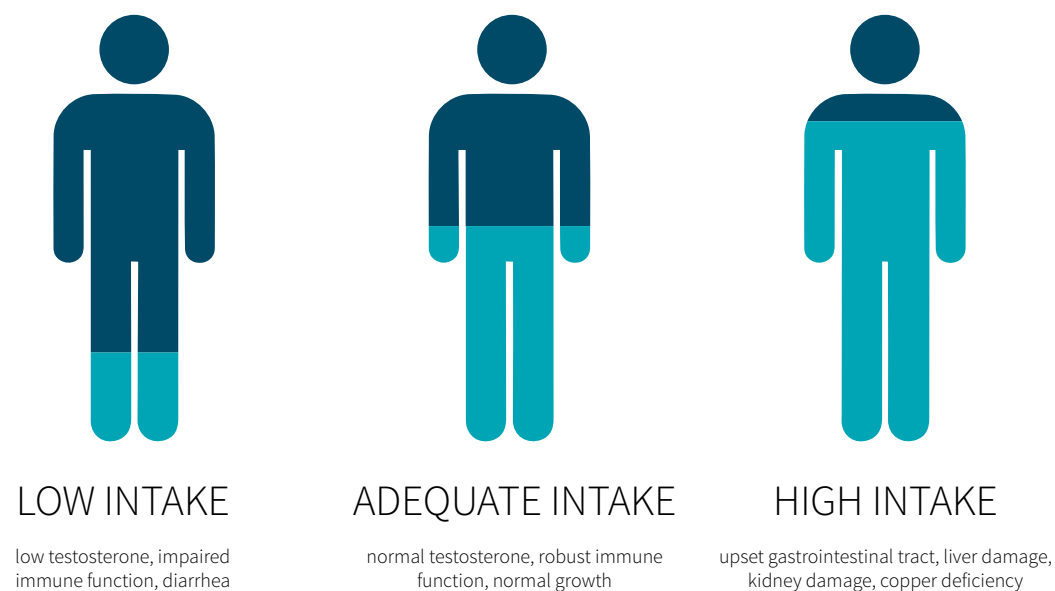
Zinc

Why it's a core supplement

Zinc (Zn) is an important mineral for general health and is often marketed as a testosterone booster. As with [magnesium](#), however, zinc supplementation can only help when low testosterone levels are linked to a zinc deficiency. If your body has enough zinc, taking more will not benefit you.

On the contrary, over time, high doses of zinc can irritate the gastrointestinal tract. They can also cause a copper deficiency, since zinc kick-starts the process of creating metallothionein, a protein that binds zinc but also other metals, notably copper; the bound metals then leave the body as waste products. Even higher doses of zinc can also damage the liver and kidneys, but the doses in this guide are too low to pose any of those risks.

Figure 2: Effects of low, adequate, and high zinc intakes



How to take it

Zinc requirements vary according to diet and level of activity. Sedentary people who do not sweat much and eat enough meat might not need to supplement zinc at all, and should otherwise limit themselves to 10–20 mg/day (15–25 mg/day for vegetarians and vegans). Athletes and other people who sweat a lot (which results in zinc loss) can take 25–30 mg/day.

Zinc should be taken with meals, so as to prevent potential nausea. Avoid taking [calcium](#), [iron](#), [magnesium](#), and zinc at the same time in combinations of 800+ mg, since high amounts of these minerals will compete for absorption. Though to a lesser extent than magnesium, zinc may also impair the absorption of antibiotics, notably those in the tetracycline class (e.g., doxycycline) and quinolone class (e.g., ciprofloxacin), so consider taking zinc and antibiotics at least 6 hours apart.

Primary Options

DHEA

Why it's a primary option

The hormone dehydroepiandrosterone (DHEA) circulates throughout the body and can be called to make other hormones, notably testosterone and estrogens. Supplemental DHEA can support normal testosterone levels; this effect is especially reliable in case of age-related low testosterone. People with healthy hormone levels will see no benefit from supplemental DHEA.

As DHEA is a mild CYP3A4 inhibitor, it should not be used alongside pharmaceuticals that are metabolized by this enzyme.

How to take it

Take 25–50 mg of DHEA once a day with a meal.

Magnesium

Why it's a primary option

You can get a blood test for either free testosterone or total testosterone. Total testosterone comprises free testosterone and bound testosterone. Testosterone can be weakly bound to albumin or strongly bound to *sex hormone binding globulin* (SHBG). Testosterone bound to albumin can be freed; testosterone bound to SHBG cannot. Only free testosterone is free to affect your body.

Magnesium supplementation can increase total testosterone. By inhibiting SHBG, it can also increase the percentage of free testosterone. Both increases are marginal, however, and only likely to matter in people whose diets are poor in magnesium. Since, like [zinc](#), magnesium is lost through sweat, athletes should be particularly mindful of magnesium levels in their diets.

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 testosterone normalization. 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.

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 since its low bioavailability 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 [calcium](#), [iron](#), magnesium, and [zinc](#) at the same time in combinations of 800+ mg, since high amounts of these minerals will compete for absorption. Like zinc, 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 6 hours apart.

Secondary Options

Coleus Forskohlii

Why it's a secondary option

Coleus forskohlii is an herb historically used in Ayurvedic medicine. It can increase the body's levels of cyclic adenosine monophosphate (cAMP). It might also increase the efficacy of other supplements that increase cAMP, such as [caffeine](#). An increase in cAMP levels in the testicles leads to an increase in testosterone synthesis. Supplementation of *Coleus forskohlii* has been noted to increase testosterone synthesis in one study on overweight men.

Because of its many bioactive compounds and a lack of information on its long-term effects, *Coleus forskohlii* should be cycled. It should not be taken with blood thinners, calcium-channel blockers, or pharmaceutical nitrates (supplementing nitrates through foods, such as beetroot juice, is fine), as this could result in hypotension (low blood pressure). In addition, it might not be safe for people suffering from liver ailments, as a rodent study noted an increase in liver fat (not due to forskolin but to other, unknown compounds in the herb).

Because of those caveats, and the limited number of randomized controlled trials in humans, *Coleus forskohlii* is only a secondary option.

How to take it

The main bioactive compound in *Coleus forskohlii* is called forskolin. More research is needed to confirm an ideal dosage, but the standard protocol is 25 mg of forskolin twice a day, 4 to 6 hours apart, for a total of 50 mg/day. Most *Coleus forskohlii* extracts are 10% forskolin, in which case 25 mg of forskolin translates to 250 mg of the extract.

Coleus forskohlii supplementation should last no longer than 12 weeks, followed by a 12-week break. Short-term use has been shown to be safe, but more research is needed to determine the long-term effects.

Promising Supplements

Boron

Like [magnesium](#) and [zinc](#), boron is a dietary mineral. As a supplement, it is sometimes recommended for postmenopausal women with low hormone levels. Some studies have also noted an increase in testosterone in men, even in young men, taking 10 mg of boron per day, but this effect is unreliable — its magnitude varies significantly between studies using similar dosages and methodologies. More research is needed to ascertain boron's effects on hormone levels and determine the mechanism behind those effects.

D-Aspartic Acid

D-Aspartic acid (DAA, or D-aspartate) increased testosterone levels in two studies. The one in healthy men reported a 42% increase with 3.12 g/day. The one in infertile men, which suffered from severe methodological limitations, reported a 30–60% increase with 2.66 g/day. However, two later studies in resistance-trained men noted no increase with 3 g/day; the latest even noted a 12.5% *decrease* with 6 g/day.

Research is still too scarce and results too inconsistent for DAA to be more than a promising supplement. What little evidence there is seems to indicate that men with low testosterone levels are more likely to benefit from DAA supplementation.

Inadvisable Supplements

Libido Enhancers

People often assume that an increase in libido reflects an increase in testosterone. This is not always true. [Maca](#), [fenugreek](#), and [Tribulus terrestris](#) are among the herbs that can affect your libido yet have no effect on your testosterone levels.

Some other herbs, such as [ginger](#) and [Eurycoma longifolia](#), can only support the testosterone levels of infertile men (or of men with testicular damage).

Many others herbs, like [horny goat weed](#), have not even been studied in humans yet.

[Stinging Nettle](#)

Studies have found that stinging nettle can benefit men suffering from benign prostatic hyperplasia, with no effect on their total testosterone levels. Their free testosterone levels, however, were not assessed.

In our bodies, testosterone is either bound (strongly to SHBG, weakly to albumin) or free. SHBG-bound testosterone cannot affect us. A lignan called 3,4-divanillyltetrahydrofuran, found in stinging nettle roots, binds to SHBG *in vitro* (i.e., in test-tube studies). Should this effect extend to oral supplementation, an increase in free testosterone would logically ensue, but human studies are needed to validate this theory. Moreover, this increase would probably be temporary; with time, the body can be expected to either decrease its production of testosterone or, more likely, increase its production of SHBG (sex-hormone-binding globulin).

Assembling Your Stack

Incorporating Core Supplements

With a meal containing fat, take [zinc](#) (10–30 mg), [magnesium](#) (200–350 mg), and [vitamin D₃](#) (50–75 mcg / 2,000–3,000 IU).

If you get plenty of sun, you may not need to supplement vitamin D. Similarly, eating [foods rich in zinc](#) and [foods rich in magnesium](#) can render supplementation unnecessary, especially on days you don't work out (i.e., on days you sweat less).

Still, should you decide to supplement with both minerals, you'll find in [ZMA](#) a combination of *zinc monomethionine aspartate*, magnesium aspartate, and vitamin B₆. Always read the label, however, for different manufacturers can use different proportions, and some even throw in additional ingredients you may or may not want to take.

The core supplements are recommended for most people; their efficacy and safety are backed by a significant body of evidence. Take them for a couple of weeks before you consider making any modification, such as adding one of the following options.

Incorporating Options

For young men (<35 years old) who want to increase their testosterone levels

With a meal containing fat, take [zinc](#) (10–30 mg), [magnesium](#) (200–350 mg), and [vitamin D₃](#) (50–75 mcg / 2,000–3,000 IU).

Take [Coleus forskohlii](#) (25 mg of forskolin twice a day) for 2 weeks, then take a 6-week break.

For middle-aged men who want to support their testosterone levels

With a meal containing fat, take [zinc](#) (10–30 mg), [magnesium](#) (200–350 mg), [vitamin D₃](#) (50–75 mcg / 2,000–3,000 IU), and [DHEA](#) (25–50 mg).

Supplementation should complement a healthy diet and exercise plan.

FAQ

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).

I have an iron stomach. I have never felt nauseous from supplements. Do I still need to take precautions to avoid gastrointestinal upset?

If you have never had any issues with nausea or vomiting, you may have an easier time ingesting large doses of certain supplements. Nevertheless, it is not a good idea to disregard the warnings on a product.

I took 400 mg of a magnesium supplement 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/zinc and other kinds of magnesium/zinc?

“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, whereas consuming 50 mg of zinc gluconate means consuming 7 mg of elemental zinc.

Product labels display the elemental dosage. On a label, “27 mg of magnesium (as magnesium gluconate)” means 27 mg of elemental magnesium (and 473 mg of gluconic acid), whereas “7 mg of zinc (as zinc gluconate)” means 7 mg of elemental zinc (and 43 mg of gluconic acid).

Since the body can use DHEA to make estrogen, shouldn't men avoid supplementing it?

In addition to being a signalling molecule in and of itself, DHEA is the precursor to androgens *and* estrogens. Therefore, yes, DHEA may increase estrogens levels in men, depending on various factors, such as an individual's overall levels of androgens and estrogens. However, feminizing effects haven't been reported.

Will creatine affect my testosterone levels?

Most studies indicate that creatine has no effect, positive or negative, on testosterone levels. One study did report a minor, transient increase in testosterone post-workout; this spike was probably due, not to creatine directly, but to the increase in training volume made possible by creatine.

Will caffeine affect my testosterone levels?

Caffeine increases cyclic adenosine monophosphate (cAMP) levels in humans. An increase in cAMP levels in the testicles leads to an increase in testosterone synthesis. So it was logical to think that caffeine might increase testosterone levels in humans. Alas, when a study tested this theory, what increases it noted were minor and highly variable between participants.

Will my diet affect my testosterone levels?

Yes, and in too many ways to count! To tackle the big issues, though, you should keep in mind that diets very low in calories or fat are likely to reduce your testosterone over time.

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. Remember, however, that even if a supplement can coax your body into producing more testosterone, it can only do so within your physiological limits; so do not expect steroid-like 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.

An increase in testosterone is usually followed by an increase in dihydrotestosterone (DHT), which can worsen hair loss in men predisposed to male-pattern baldness (receding hairline and hair thinning on the crown). Should this be a concern, consider using topical minoxidil. You could also ask your doctor about finasteride — which inhibits 5-alpha reductase, an enzyme responsible for the conversion of testosterone to DHT — but keep in mind the potential side effects of medications that alter hormone levels.