

Testosterone Shields Against COVID-19, Study Shows

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STORY AT-A-GLANCE

- › CYP19A1, a gene encoding aromatase that converts testosterone to estradiol, has also been linked to COVID-19 severity. A mutation in this gene, which increases aromatase activity, is found in 68.7% of men hospitalized with COVID-19
- › Short pinky fingers are associated with lower testosterone levels. A July 2024 study published in *Andrology* confirmed that COVID-19 patients who had shorter pinky fingers – indicative of lower testosterone levels – experienced more severe outcomes
- › Testosterone production declines with age, starting around age 30. Other factors like chronic diseases, stress, poor diet and environmental factors also contribute to reduced testosterone levels. Symptoms of low testosterone include fatigue, irritability, reduced libido, infertility and changes in body composition
- › Niacinamide naturally increases your testosterone levels by raising NAD+. Studies show it's helpful for addressing age-related testosterone decline in both males and females
- › Additional strategies to boost your testosterone include regular exercise, adequate sun exposure to optimize vitamin D levels and herbal remedies like fenugreek and ashwagandha

Testosterone, also known as the male sex hormone, is important for the health of both genders. This steroid hormone is primarily produced in men's testicles and, to a lesser extent, in women's ovaries. It's responsible for the development of male secondary sexual characteristics, muscle mass and strength, bone density and the production of red blood cells.¹

It also influences mood, energy levels and cognitive function in both sexes.² However, testosterone levels in men naturally decline with age. Previous research^{3,4} suggested that this decline in testosterone affects elderly men's risk of severe COVID-19.

To further investigate the link between testosterone levels and COVID-19 severity, a study published in July 2024 in the journal *Andrology*⁵ examined testosterone-dependent finger length patterns in hospitalized COVID-19 patients compared to a control group. Their findings uncovered important insights about testosterone's protective role against severe COVID-19 outcomes.

Further Proof of Testosterone's Role in COVID Severity

The featured study,⁶ conducted at the Medical University of Lodz in Poland, examined two competing theories regarding testosterone's impact on COVID-19 prognosis. The first, known as the high-androgen-driven theory, suggests that elevated testosterone levels cause the virus to infect cells more effectively.

Conversely, the second theory purports that lower testosterone levels, particularly common in elderly men, heighten their immune response to COVID-19, resulting in worse outcomes. To investigate these theories, the researchers analyzed finger length ratios – specifically comparing the index and little fingers – in hospitalized COVID-19 patients versus healthy controls.

This approach is based on the theory that digit ratios are influenced by exposure to testosterone and estrogen during fetal development and puberty. Longer index fingers are associated with low testosterone/high estrogen exposure, while longer little or pinkie fingers indicate high testosterone/low estrogen exposure.

Their findings showed that hospitalized COVID-19 patients consistently had shorter little fingers relative to their other fingers when compared to the control group, a "feminized" pattern indicative of lower testosterone levels. This supports the low-androgen-driven theory, which suggests that reduced testosterone contributes to more severe COVID-19 outcomes.

The lead researcher, Professor John Manning from Swansea University's Applied Sports, Technology, Exercise and Medicine (A-STEM) research team, explained:⁷

"The patients had digit ratios that indicated low testosterone before and after birth. The pattern was present at the beginning of the pandemic and after widespread vaccination. This means we can conclude that testosterone is protective against severe COVID-19. The effect may arise because the hormone reduces inflammation in the lungs and other organs. The findings have public health and treatment implications."

A Key Gene in Testosterone Metabolism Affects COVID Severity

In an earlier study published in *Cell Reports Medicine*,⁸ researchers uncovered another testosterone-related factor affecting COVID-19 severity in men – a gene called CYP19A1. The study, led by Gülsah Gabriel from the Leibniz Institute of Virology, builds on a decade of work investigating similar patterns in avian influenza.

CYP19A1 encodes aromatase, an enzyme that converts testosterone to estradiol. The researchers found that a specific mutation in this gene is present in 68.7% of men hospitalized with COVID-19, despite being rare in the general population. This mutation is known to increase aromatase activity, leading to lower testosterone and higher estradiol levels.

Moreover, the researchers found that SARS-CoV-2 infection itself dramatically increases aromatase expression in lung cells, far more than other respiratory viruses. These findings were corroborated through various methods, including analysis of human COVID-19 patients, examination of lung tissue from deceased patients, and experiments with golden hamsters.

In infected male hamsters, CYP19A1 expression increased significantly in the lungs, resulting in decreased testosterone and elevated estradiol levels in their plasma. This hormonal imbalance appears to contribute to more severe COVID-19 outcomes in males.

Interestingly, the researchers found that treating infected male hamsters with letrozole, an aromatase inhibitor, partially restored hormonal balance and improved lung health. These findings not only offer insights into why men face higher risks from COVID-19 but also highlight the often-overlooked role of hormones in respiratory infections.

As Gabriel notes, "It is one of the first studies [showing] that the lung, which is not a classical or typical endocrine organ, suddenly can become an endocrine organ upon infection. It seems that [respiratory viruses] can have long-lasting effects if they dysregulate the enzymes."⁹

What Causes Testosterone Production to Decrease?

Testosterone production in men is regulated by signals from the brain to the pituitary gland. The pituitary gland then signals the testes to produce testosterone, and a "feedback loop" continuously monitors levels of this hormone in the blood. Any disruption to this system leads to declining testosterone levels.¹⁰

In healthy adult males, testosterone levels usually range from 300 to 1,000 nanograms per deciliter (ng/dL).¹¹ Age-related decrease in testosterone production, also known as andropause, begins around age 30, with testosterone decreasing by about 1% per year on average.¹² By the time men reach their 70s, many have testosterone levels 30% less than what they had in their peak years.¹³

Aside from aging, genetic conditions and other illnesses also contribute to a decrease in testosterone levels. These include:^{14,15}

Chronic diseases like diabetes, obesity, and liver or kidney disease

Lifestyle factors such as stress, poor diet and lack of exercise

Medications that interfere with hormonal balance

Congenital disorders like Klinefelter syndrome and Turner syndrome

Sleep apnea

Exposure to endocrine-disrupting chemicals (EDCs)

High polyunsaturated fat (PUFA) and phytoestrogen intake

Environmental pollutants

Symptoms of Low Testosterone Levels

Low levels of circulating testosterone cause symptoms of androgen deficiency. Androgens are a group of sex hormones, which include testosterone. The clinical symptoms of low testosterone vary widely, depending on the onset of androgen deficiency, whether the issue lies in sperm production or testosterone synthesis, is associated with an underlying genetic factor, or whether there's a history of androgen therapy.¹⁶ Symptoms of androgen deficiency include:¹⁷

Fatigue

Irritability

Infertility

Poor feeling of well-being

Decreased libido

Reduced frequency and quality of erections

Men may also experience gynecomastia (enlarged breast tissue), hot flashes, sweating, fatigue, reduced muscle mass and increased body fat.¹⁸ In some cases, unrelated issues like a history of Type 2 diabetes, obesity, metabolic syndrome or other systemic diseases that affect testosterone physiology are present.¹⁹ A study in the journal *Molecular Psychiatry*²⁰ also links testosterone deficiency to anxiety disorders.

Niacinamide Naturally Increases Testosterone Levels

One way to increase your testosterone levels naturally is by taking niacinamide (aka, nicotinamide, a form of vitamin B3 or niacin), which is also crucial for healthy

mitochondrial function and cellular energy production. A February 2022 study published in the journal *Nature Aging*²¹ demonstrated that niacinamide treats problems associated with declining testosterone levels due to aging.

They found that by raising NAD⁺, niacinamide improves local testosterone distribution, which is essential for supporting the tissues and organs affected by reduced testosterone levels. These findings confirm that niacinamide is a necessary cofactor to address the nearly universal decline in testosterone in both men and women. As explained by bioenergetic medicine expert Georgi Dinkov:²²

"[T]he findings that androgen (in this case, testosterone) deficiency seen almost universally with advancing age is due primarily to deficiency of the co-factor NAD⁺, which can be remediated by supplementing NAD⁺ precursors such as niacinamide.

It appears that the rate-limiting step for androgen (testosterone) synthesis is the enzyme 3b-HSD, for which NAD⁺ is the main cofactor. Thus, a decline in NAD⁺ seen in aging (and disease) leads to decline in 3b-HSD activity and thus reduced androgen (testosterone) levels."

To address declining testosterone, I recommend taking:

- 50 mg of niacinamide three times a day
- 5 mg to 10 mg of DHEA orally once a day
- 50 mg of oral pregnenolone once a day

Ideally, take the hormone supplements DHEA and pregnenolone with a saturated fat, like a teaspoon of butter, to make sure they bypass metabolism in the liver, which will radically decrease their effectiveness.

Additional Ways to Optimize Your Testosterone Production

In addition to taking niacinamide, here are some additional strategies to naturally increase testosterone:

- **Exercise regularly** — A comprehensive meta-analysis published in the Journal of Endocrinological Investigation²³ showed that moderate and high-intensity exercises led to significant increases in testosterone in men, with an average increase of 0.74 nmol/L (21.3 ng/dL). The testosterone boost was most evident immediately after exercise and within the first 30 minutes post-exercise, typically returning to baseline after 30 minutes.

I recommend doing moderate exercises such as [walking](#), as they cannot be overdone. A study in the Endocrine journal²⁴ found that men who took fewer than 4,000 steps per day had a higher likelihood of having low testosterone levels. Conversely, men who took 4,000 to 8,000 steps per day had a significantly lower risk of being deficient.

The study also noted that for each additional 1,000 steps taken daily, testosterone levels increased by an average of 7 ng/dL.²⁵ Further supporting the benefits of exercise, a Turkish study²⁶ showed that both continuous and intermittent [blood flow restriction \(BFR\) training](#), also known as KAATSU in Japan, combined with resistance exercise led to increased testosterone levels in young males.

- **Get adequate sun exposure** — If you get enough sun exposure, you'll have a surplus of cellular energy, which increases your testosterone production. It also optimizes your vitamin D level, which supports healthy testosterone production.

A study in the Asian Journal of Andrology showed that lower serum vitamin D levels were associated with reduced total testosterone levels in men. Additionally, higher serum vitamin D levels were positively associated with better seminal parameters, including sperm concentration, motility and morphology.

"[These findings] clearly demonstrate a direct and positive relationship between serum vitamin D level and overall semen quality, male reproductive potential, and testosterone levels," the authors noted.

However, keep in mind that if your diet is high in seed oils (rich in linoleic acid), you should approach sun exposure with caution. These oils oxidize in sunlight, causing inflammation and DNA damage. This is why you suffer rapid sunburn when your diet is high in seed oils. I recommend avoiding high-intensity sun exposure until you've been off these oils for about six months.

At that point, you can gradually increase your sun exposure. Eventually, you will be able to enjoy an hour or more of peak sunlight hours without getting burned.

- **Consider herbal remedies** – One of the herbs that has gained attention for its ability to boost testosterone levels is fenugreek. A study published in the *Journal of Personalized Medicine*²⁷ found that fenugreek boosts serum testosterone levels by inhibiting enzymes such as aromatase and 5-alpha-reductase, which are involved in testosterone metabolism. Fenugreek also contains saponins and saponins, which have anabolic and androgenic activities.

Another herb that I recommend you consider is ashwagandha. Known for its adaptogenic properties, ashwagandha has been shown to support overall hormonal balance and reduce stress. Research suggests that it increases testosterone levels by decreasing cortisol, a hormone that negatively impacts testosterone production when elevated.²⁸

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