

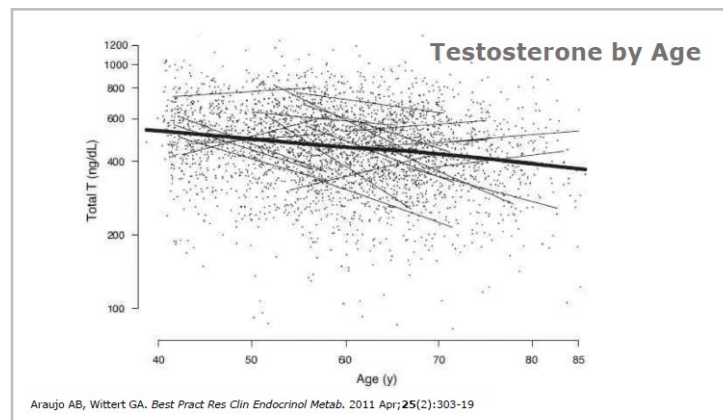
Low T

Grumpy old men telling kids to get off their lawns, beer bellies, falling asleep in the recliner watching TV—these are a sampling of negative images people have of men as they age. And, these are all symptoms that often accompany a decrease in testosterone production. Most men don't want to talk about developing low testosterone because the symptoms can be embarrassing: loss of energy, receding hair lines, erectile dysfunction, decreased libido, and weight gain. But the symptoms can also be life threatening: cardiovascular disease (the number one killer of men), decreased immune function, memory loss, and diabetes. Losing testosterone is more significant than just sexual side effects! In this article we'll explore what leads to a decrease of testosterone in the body, and what can be done to increase it.



How does low testosterone develop?

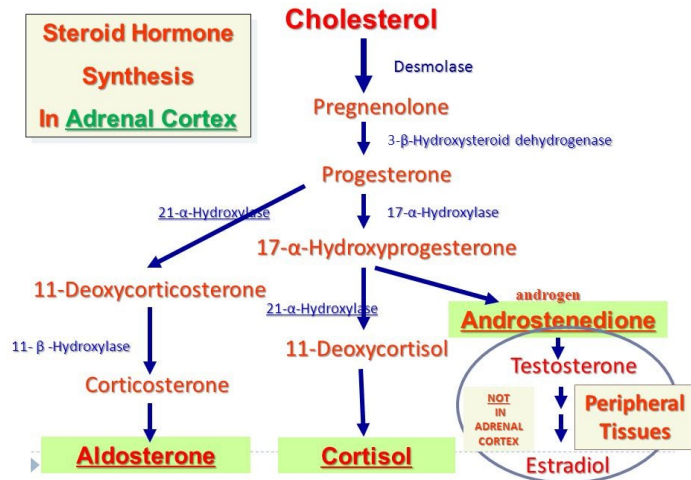
As men age, they naturally have a loss in testosterone production of 1-2% per year. But that is not a large enough decline to cause low T. The rest comes from the way we live. Risk factors for low T include a lack of exercise, insulin resistance, obesity, sleep apnea and poor sleep, alcohol and tobacco use, taking statins, and stress. Not all guys have all of these risk factors and no two men have the same combinations. As a doctor, my job is to thoroughly review your history to discover which factors are impacting you, and to decide how we can best help you to get to the health that you want.



The major thing that low T risk factors have in common is internal *inflammation*. Inflammation can cause testosterone to be converted to estrogen. It can also disrupt the signaling of the brain to the adrenal glands and testes, dysregulate blood sugar, and impact sleep. Inflammation is the underlying cause of most diseases.

Let's take a look at how testosterone is made.

When you look at the pathway, notice that cholesterol is at the top, and through a series of conversions, it is eventually made into testosterone. But, it doesn't stop there! Under the right conditions,



testosterone can also be converted to *estrogen*. This mostly happens in fat cells. That is why many men who complain of low testosterone symptoms often have central adiposity (beer bellies)—because the fat acts like an endocrine gland producing more inflammatory markers and transforming testosterone into estrogen.

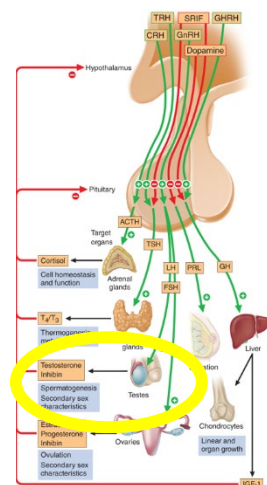
I had a patient who had been previously put on testosterone creams to increase their T levels. But, when the clinician rechecked, the patient's testosterone remained the same, and at one point even went lower! Instead of figuring out why

that was happening, the clinician put my patient on testosterone pellets instead, with the same results.

Why was this hormone replacement therapy not working? Because the patient's fat cells continued to convert the new testosterone into estrogen. A more effective therapy would have been an exercise/healthier eating regimen to reduce the belly fat that was causing testosterone to be converted into estrogen.

But, low T doesn't just happen to guys with beer bellies. It can happen to skinny guys, too. These are typically the grumpy old men like Clint Eastwood's character in Gran Torino. For these guys, low testosterone is affecting their brain. The male brain has a lot of testosterone receptors and if T levels start to decline, memory, mood, and cognitive function are affected. Testosterone isn't just important to the brain; the brain is important for having proper testosterone levels.

If there is inflammation in the brain, whether it is from leaky gut, infection, traumatic brain injuries (like concussions), stress, or any other mechanism, the signaling for testosterone production can become disrupted. In this picture, you can see how the hypothalamus in the brain signals the pituitary gland to secrete hormones which tell the testes and adrenal glands to make testosterone. Inflammation can disrupt this signaling pathway resulting in lowered testosterone production.



Source: D. L. Kasper, A. S. Fauci, S. L. Hauser, D. L. Longo, J. L. Jameson, J. Loscalzo: Harrison's Principles of Internal Medicine, 19th Edition. Copyright © McGraw-Hill Education. All rights reserved.

Another cause of inflammation is toxins. The liver's job is to filter toxins out of the blood, and having too many toxins can overburden the liver. A diet lacking nutrient-rich foods, and a diet high in fructose (sugar) and alcohol can all impair the liver's detox

function. The liver is also supposed to help package hormones for elimination, and if the detox ability of the liver is impaired, it can weaken hormone signaling. In addition, toxin build-up often gets stored in fat cells. More toxins in the blood means a greater need for fat cells. As we learned before, the more fat cells, the greater the conversion of testosterone to estrogen. Many toxins are also estrogen mimickers, like BPA (found in plastics), which can also alter hormone signaling. So, you can see why eliminating toxin exposure is important for normalizing testosterone levels.

Another risk factor for low testosterone is taking statin pharmaceutical drugs. I mentioned earlier that testosterone starts off as cholesterol. To build a house you need wood, nails, and bricks. If you don't have the building material, you can't build a house. Same thing here. If you don't have enough cholesterol from being on a statin, you can't make testosterone. The benefits of statins are very debatable as it is, because while they do lower cholesterol, they do not decrease mortality or the number of heart attacks and strokes. Most men who have low T and are taking a statin usually have the same risk factors we mentioned previously; obesity, diabetes, copious amounts belly fat, etc. So, to throw a statin drug into the mix, just compounds the problem.

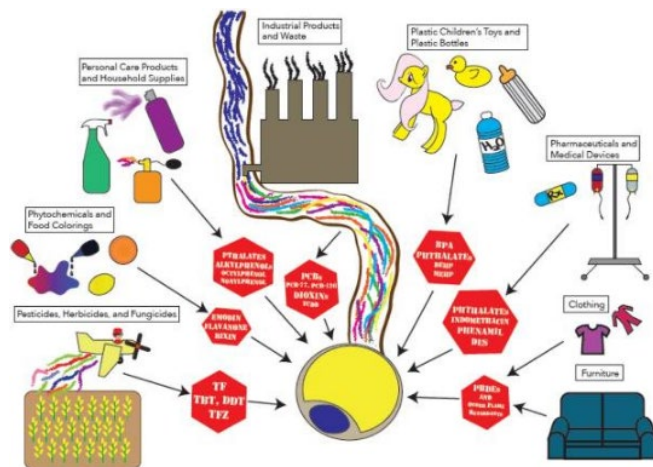
I had a patient with testosterone levels around 60 (we don't want them below 300). He was on a statin drug, and his cholesterol was near 100 (I don't like to see cholesterol below 150, because then you start run into other health risks, like dementia) He talked to his medical doctor, and his testosterone started rising after coming off of the statin drug. We were working with other interventions as well, but a key part of reversing his low T was eliminating the statin.

What can we do to correct low testosterone?

In addition to working with your medical doctor to come off of statins, exercise! Studies have shown that low and slow exercise does not work. In order to raise testosterone, you have to perform *high intensity exercise*. This type of exercise means you are working up a sweat, getting your heart pumping, and are breathing heavily. You should not be able to carry on a conversation while performing this type of exercise. I am a fan of high intensity interval training, also known as HIIT. This involves repeated alternating bursts of high intensity exercise with a rest or a series of less-intense exercise. Not only does HIIT exercise help raise testosterone levels, but it is good for the heart, helps burn calories (decrease that belly fat!), helps increase insulin sensitivity, and can help normalize cortisol rhythms which aid in regular sleep cycles.

In addition to exercise, eliminating foods that internally inflame you is very important. This often includes processed foods which contain dyes, preservatives, white flour, and white sugar. Eating real food is key. If someone always eats foods that are inflammatory, then cortisol levels stay high, and the belly fat stays on (which, if you remember, converts testosterone to estrogen).

Also important to decreasing inflammation is decreasing your chemical exposure: BPA in



plastics, chemicals in personal hygiene products, pesticides and insecticides (this is why organic is important), alcohol, and many others. If you are constantly exposing yourself to these toxins and trying to exercise off your belly fat, it can become very discouraging as your body will want to hold onto that fat to store the toxins. In addition to avoiding these toxins, ensuring that your body's natural detoxification pathways are working is also important. That is one reason we recommend a 21-day purification program at least once a year to help the body eliminate stored toxins and get the detox pathways back to working efficiently.

Decreasing stress is also important. You will never be able to eliminate all stress from your life, and not all stress is bad. But, how you deal with stress and recover from stress is what is important. Getting a good night's sleep, prayer, meditation, spending time in nature, earthing, and spending time with friends—these are all great ways to help the body relax and reboot so that stress hormones don't get out of their normal rhythm.

Supplements can help with decreasing inflammation as well. Turmeric, fish oil, and resveratrol are a few examples. Tribulus is an herb that can help raise testosterone. But, many of these supplements won't work unless you're getting to the root of the problem: decreasing inflammation by eating real food, exercising, decreasing stress, and sleeping well.

With true health there are never really any shortcuts. It takes hard work and perseverance, but it is worth it. You can have money, a nice house, a lot of friends, etc., but without your health, you can't enjoy any of those things. If you are struggling with Low T, call a trusted practitioner who can work through all of factors and help you get back help get you back on the road to good health rather than someone who just wants to mask your symptoms.