

Low Testosterone - The Unsuspected Epidemic by Rick Cohen MD

There are more than forty million men in the U.S. suffering from low levels of testosterone. But the vast majority of them don't even know it. As the tremendous popularity of Viagra suggests, many of these men are experiencing symptoms of male sexual dysfunction. Others find themselves fighting more subtle battles against obesity, fatigue, depression and insomnia-common symptoms of low testosterone that most doctors overlook or attribute to the natural process of aging or stress. (1-2)

Why is modern medicine missing the low testosterone mark?

Standard laboratory tests have failed to pinpoint the problem. While medical science has determined that while a man's total (protein-bound) testosterone levels remain relatively stable over time, his bio-available (free) levels gradually decline at an alarming rate of two percent each year beginning at age thirty. This means that a man in his sixties is functioning with only about forty percent of the testosterone he had in his twenties. However, when standard laboratory tests are performed, most men typically have only their total levels of testosterone evaluated. Their more important bio-available levels go unchecked. (3-4)

To make matters worse, most physicians require a diagnosis of hypogonadism (a medical term used to classify total testosterone levels that fall below a specified laboratory limit) prior to prescribing any testosterone replacement medication. As a result, millions of American men who are suffering from symptoms of low testosterone are walking around undiagnosed and untreated. (5)

Detection: A Necessary First Step.

When it comes to treating and eliminating the symptoms of low testosterone, detecting the problem is a fundamental first step. Are your testosterone levels low? Take the 10-point quiz below to and find out.

1. Are you over the age of 35?
2. Do you have poor muscle tone?
3. Are you prone to weight gain, particularly around the midsection?
4. Do you frequently feel weak and tired without any apparent reason?
5. Is your recovery from exercise slow?
6. Do you have a low sex drive or symptoms of sexual dysfunction?
7. Do you feel depressed, irritable or unmotivated?
8. Do you have difficulty coping with stress?
9. Do you have trouble getting a good night's sleep?
10. Do you smoke cigarettes, drink alcohol regularly or take prescription medicines?

If you answered "yes" to any two of these ten questions, chances are your testosterone levels are less than optimal. How can you know?

The answer is simple: Test yourself in the comfort and privacy of your very own home.

In addition to being more convenient and less costly than standard laboratory serum tests, recent medical research has proven salivary hormone testing to be far more accurate when it comes to measuring bio-available testosterone and a number of other key, male hormones. (6)

Prohormones - A Better Option for Men with Reduced or Borderline Levels of Testosterone.

While the soon-to-be-released topical testosterone medication, AndroGel (7), will eliminate the need for painful injections and irritating patches for the few men who have been diagnosed with hypogonadism, but there is a kinder (and smarter) alternative for men who do not need or do not qualify for testosterone replacement therapy. That alternative is ProMale. Based on innovative European technology, ProMale is an all-natural, non-prescription product developed several years ago by an U.S. physician for use in his own medical practice.

What does ProMale do? It provides for the effective application of prohormones (steroid hormone precursors)-the basic, raw materials a man's body needs to produce testosterone.

While ProMale is not intended as a treatment for hypogonadism, it offers a safe, effective and accessible treatment option to the millions of men who are interested in maximizing their physical, mental and sexual potential. The more specific benefits associated with the use of ProMale and high levels of testosterone include: (8-13)

- o Improved mood and overall sense of well-being.
- o Increased muscle mass and strength.
- o An enhanced sex drive and function.
- o Better memory, concentration and visual acuity.
- o Improved cardiac health through the natural reduction of cholesterol, blood pressure and blood sugar.
- o Increased tolerance to stress.
- o Stronger bones.

As an all-natural topical prohormone formula, ProMale differs from testosterone replacement medications in several important ways. First, it does not replace testosterone directly. As a result, ProMale does not suppress the body's own ability to produce testosterone and is far less likely to promote the onset of testicular atrophy (a common side effect linked to the use of prescription testosterone medications).

Second, prohormone formulas like ProMale can never push a man's testosterone levels too high because the important 17 and 3 beta hydroxysteroid enzymes that are used to convert prohormones into testosterone are "rate limited." This means that regardless of the quantity of prohormones delivered to the body, only a fixed amount of these will ever be converted to testosterone.

In addition, prohormones can always be synergistically used in conjunction with any other natural or pharmaceutical therapies to stimulate the body's own ability to produce

testosterone. And last, but certainly not least, prohormones cross the blood/brain barrier more quickly than testosterone does. As a result, they may be more effective in enhancing cognitive and sexual functions than testosterone itself. (14-19)

A Prohormone Primer:

Produced in the testes, testosterone is the end result of a series of biochemical steps that all start and fundamentally depend on cholesterol (the primary material from which all steroid hormones are created). Before it can become testosterone, however cholesterol must be chemically converted into several different prohormones in the following order- progesterone, DHEA, androstenedione and androstenediol. (20)

Progesterone

Like estrogen, progesterone is also considered a female hormone. Still, the male body requires it to create a variety of important stress hormones such as cortisol and DHEA.

Like testosterone, progesterone levels decline with age and as a result of stress. In addition, laboratory studies and clinical evidence show that progesterone plays an important role in buffering the hormonal effects of high estrogen by opposing the activity of estrogens on a cellular level. This particular prohormone may also inhibit the abnormal growth of prostate cells by interfering with the 5-alpha reductase enzyme, which converts testosterone to DHT. (21)

DHEA

Produced in the adrenal glands, DHEA plays an important role in male hormone production. Like testosterone and progesterone, DHEA levels significantly decline over time- and in response to chronic stress.

This particular prohormone has many well-documented benefits, the most notable of which is to boost immune function, mood and libido. In clinical practice, DHEA has proven to be very effective in supporting and restoring healthy adrenal function, improving energy and enhancing overall health and well being. (22)

Androstenedione and 4-Androstenediol

The testosterone prohormones, androstenedione (AD) and 4-androstenediol (4AD), are effective in enhancing testosterone production because they are only one, small biochemical step away from testosterone. And it is for this reason that AD and 4-AD can have such a strong and positive effect on male health and well-being. While the hormones progesterone and DHEA are necessary in the testosterone production cycle, they cannot be used reliably to support testosterone production. (23-24)

AD (andro-4-ene,3,17 dione) and (4AD) (4-androstene-3beta, 17 beta-diol) are naturally-occurring steroid hormones found in some plants and in all animals. In mammals, they are produced in the gonads and adrenal glands and can be directly measured in the blood stream. Based on the most recent research, 4AD is considered the preferred andro prohormone for use by men. 4AD is not only more readily converted to testosterone than AD, it is not directly converted to estrogen, which in high amounts can adversely effect male health. [Widely-recognized as a female hormone, most men are surprised to learn

that estrogen is also present in their bodies. Produced in very small amounts as a by-product of the testosterone conversion process, normal levels of male estrogen encourage a strong libido and healthy brain function. High estrogen levels, on the other hand, can lead to the suppression of testosterone production and a reduced testosterone supply. High estrogen levels can also contribute to fatty weight gain, prostate enlargement and a higher incidence of heart disease.] (25-28)

Prohormones in Olympic History - The Birth of a "Secret Weapon"

First synthesized in the 1930's, androstenedione was first studied by Dr. Charles Kochian (a world-renowned expert in steroid hormones) who discovered its anabolic and androgenic properties. Dr. Kochian's findings remained relatively unrecognized, however, until the Berlin Wall fell and many of East Germany's highly-advanced athletic training and nutrition secrets were revealed.

What was determined? That during the 1970's and 1980's, the country's most victorious Olympians were using an AD nasal spray to boost their testosterone levels and, as a result, their athletic performance. The effects of this nasal spray included large, fleeting-and virtually undetectable-elevations in testosterone. And it was these significant and sudden increases in serum testosterone that served to enhance the athlete's muscle strength prior to a competitive event. (29)

Because it plays a key role in determining energy, mood, libido, muscular and sexual development, testosterone is the most important hormone in the male body. But as part of the natural metabolic process, testosterone can be readily converted into the end hormones estrogen and DHT. The production of these two hormone by-products can sometimes cause side effects (such as increased body fat, an enlarged prostate or increased hair loss.)

Chemically very similar to AD and 4-AD, norandrostenedione and norandrostenediol convert to nortestosterone. While the range of nortestosterone's benefits are somewhat more limited than those of testosterone, this hormone does not convert to DHT or estrogen and is therefore a better option for androgen-sensitive men. Nortestosterone is also a better choice for men who specifically seek the anabolic effects of testosterone such as increased muscle size, strength, quicker recovery from training and injury.

Prohormones - Making the Right Choices

When it comes to deciding on which kind of prohormone product you should be using, there are a few basic rules to follow:

If you choose to use an oral product avoid the use of Androstenedione opting instead for Androstenediol.

A study published in the February 9, 2000 issue of The Journal of the American Medical Association provided interesting data on the effectiveness of oral androstenedione. Study results showed no increase in testosterone levels and a moderate increase in estrogen levels among subjects taking 100mg dose of androstenedione. After being given a relatively large (300mg) dose of androstenedione, a short (two-hour) but measurable

(34%) increase in testosterone resulted (30). Unfortunately, this increase was accompanied by an even more significant rise in estrogen. As previously mentioned, sustained high levels of estrogen can increase a man's risk of obesity, prostate disorders and cardiovascular disease.

Because the use of oral androstenedione appears to promote increased levels of estrogen and has only short-term effects on testosterone, it is a less than optimal choice for restoring healthy testosterone balance. In comparison, research studies have shown that androstenediol is much more effectively converted to testosterone and does not elevate estrogen. (31)

The Oral Dosing of Prohormones is Costly, Inefficient and Potentially Unhealthy.
Before any oral prohormone can enter into the blood stream, it must first be metabolized in the liver where enzymes such as aromatase (which converts androstenedione and testosterone to estrogen) destroy a full 95% of the prohormone dose. For this reason, large doses of androstenedione are needed to elevate testosterone. And even small doses cause significant estrogen increases. (32)

High doses of oral prohormones can also reduce levels of good (HDL) cholesterol. And the extremely high amounts of steroid metabolites found in the urine after a small (50mg) oral dose of androstenedione, suggest that oral prohormones may be damaging to the liver. (33)

Finally, because oral prohormones are so rapidly metabolized, they offer only small and fleeting (two to three hour) increases in testosterone-even when large doses are taken. In order to achieve the desired effects, repetitive (three to four times daily) high dosing is required.

The Advantages of Sublingual Delivery

New delivery systems such as cyclodextrin tablets and liposomal sprays enhance the transport of prohormones through the mucus membranes of the mouth. This sublingual approach to prohormone delivery by-passes liver metabolism, allowing for their rapid absorption, directly into the blood stream. Consequently, prohormones delivered sublingually are safer and more effective than those taken orally. Recent studies have shown that at a 25mg dose cyclodextrin-based androstenediol raises testosterone 300% more effectively than a 300mg dose of oral androstenedione. In addition, the low dose cyclodextrins have no effect on estrogen levels. (34-37)

Unfortunately, the rapid and short-acting effects (two-three hours) of sublingual prohormones make them an impractical choice for long-term testosterone restoration. (Ed.- See section after references called IAS notes).

Transdermal Prohormones: For Optimum Absorption and Results.

Using the skin as a natural reservoir for delivering a continuous flow of prohormones to the body, a next generation of topical products have quickly become the delivery system of choice. In addition to maintaining their original potency, by-passing entirely the destructive effects of the liver, transdermal prohormones are absorbed evenly and quickly

(within forty-five minutes of application) into the skin. Perhaps more importantly, their effects are not fast or fleeting, transdermal prohormones enter the bloodstream slowly and consistently. In addition, transdermal delivery offers several other significant advantages over both oral and sublingual products.

These advantages include: (38-40)

Once-a-Day Application

A single, morning application is simply all that is required.

Improved Utilization

Because they are applied to the skin and not swallowed, transdermal prohormones do not pass through the liver; they therefore provide for higher potency at a lower (and ultimately more economical) dose.

Continuous Support of Healthy Testosterone

Because transdermal prohormones are absorbed evenly over time, topical delivery provides continuous support for the testosterone production process. It is this "steady-state" approach to testosterone enhancement has been shown most clinically effective in maximizing the overall benefits of prohormone use. Transdermal delivery does not create the unnatural hormone "spikes" that typically accompany the use of oral and sublingual products.

Safely Restoring Testosterone

As well as negatively influencing a man's overall health and well-being, low testosterone has also been linked to the onset of diabetes, osteoporosis, prostate disorders, Alzheimer's and cardiovascular disease. As a result, millions of men around the world have been safely undergoing testosterone-related treatment for more than fifty years. And with the vast amount of scientific data that has been compiled over the past decade alone, the benefits of testosterone restoration can no longer be scientifically questioned. (41-42)

While there is virtually no scientific evidence to suggest that testosterone restoration causes prostate cancer, testosterone and prohormone therapies remain controversial due to their possible role in worsening an undiagnosed prostate cancer. (43-47) Some controversy has also been created by a few members of the media, medical profession and government who question the ethics and safety of prohormone use. Unfortunately, the vast majority of these individuals do not know-or understand-the significant differences between prohormones and anabolic steroids. (Ed. We recommend reading Dr. Wright's article in this Bulletin regarding lowering hormone related cancer risk).

Anabolic steroids are synthetically derived, frequently-abused and used with great health risks to artificially enhance athletic performance and strength. Prohormones are naturally present in the body, abuse-proof and can be safely used to restore healthy levels of testosterone. (48-50)

ProMale: A Transdermal, Multi-Prohormone Formula for Men.

ProMale™ is a rejuvenative topical prohormone formula specifically designed for the aging male. Formulated according to the same standards of purity and quality found in prescription medications, ProMale uses a percutaneous (through the skin) gel matrix to deliver these important male prohormones:

- o Androstenediol-to enhance the androgenic effects of testosterone (increased libido, sexual function and improved mood)
- o Norandrostenediol and norandrostenedione-to enhance the anabolic effects of nortestosterone (increased strength and lean mass)
- o DHEA-as a buffer against stress
- o Progesterone-for its estrogen and prostate protecting effects.

ProMale is most effective when used by [men who suffer from symptoms related to reduced or borderline levels of testosterone]. The product is for [those who want to restore their youthful vigor and vitality] as well as those who simply have an [interest in building lean mass and enhancing their overall athletic performance]. ProMale should not be used by men with pre-existing, hormone-dependent cancers (such as prostate), those with unstable blood pressure or those under the age of twenty-five. Any man over fifty years of age should have a baseline prostate exam and PSA measurement prior to using ProMale for the first time.

Enhancing the Effects of ProMale

In order to maximize the effects of ProMale-or any other testosterone-enhancing product-it is important to follow a hormonally-balancing dietary plan and to adhere to an appropriate fitness program. For additional information on diet and exercise, please read the Anti-Aging Zone by Dr. Barry Sears (51) and refer to the Spring 2000 issue of the IAS Anti-Aging Bulletin. Outlined below are a few fundamental suggestions that can help you restore and maintain healthy levels of testosterone: (52-60)

- o Take steps to buffer and release mental stress
- o Get at least one hour of exposure to sunlight daily (especially during winter). Sunlight plays an important role in regulating testosterone release in the brain.
- o Support your body's natural, hormonal circadian rhythms by going to bed and waking up early.
- o Limit your alcohol intake to one glass of red wine daily.
- o Reduce or eliminate your use of testosterone-reducing medications, especially diuretics, anti-fungals and cholesterol lowering drugs.
- o Slim down. Excess body fat raises estrogen and inhibits testosterone production.

A Basic Dietary Strategy:

As the saying goes, "You are what you eat!" If you want to maintain high level of testosterone, don't forget to pay attention to these important dietary rules:

Eat moderate amounts of protein.

"Protein" in Latin means "above all else." Know that adequate protein is a dietary necessity as it stimulates testosterone release. And it's the fundamental building block for muscle repair and growth.

Eat more vegetables.

Especially green, leafy and cruciferous vegetables such as broccoli, cauliflower, kale, Swiss chard, Brussels sprouts and cabbage. These vegetables contain phytochemicals essential for healthy metabolism of estrogen (Ed.- For further information see Jonathan Wright MD's article in this same issue).

Limit your intake of refined, high-carbohydrate foods.

These include simple sugars such as cookies, candy and ice cream; and starches such as breads, potatoes and pasta. Excess intake of these carbohydrates raise blood sugar rapidly, creating chronically elevated levels of the hormones insulin and cortisol. These two hormones oppose the action of testosterone and diminish its production.

Eat healthy fats.

Essential fats such as (the Omega 3 fatty acids found in fish and flaxseed) and saturated fats are essential for normal testosterone production. All steroid hormones are produced from cholesterol and when fats are deficient in the diet, this process will be inhibited. Studies clearly indicate that low fat diets result in lower testosterone levels. Those higher in protein, lower in carbohydrate, and moderate in fat cause the greatest sustained levels of testosterone. (Ed.- An interesting tip was given to me recently, how can you tell if a fat will be good or bad for you? Well- it'll probably be bad if it congeals at room temperature).

Take a high-quality, multi-vitamin mineral supplement.

Vitamins A, E, C and B6 and zinc are all used by the body in converting prohormones to testosterone. In fact, of all the minerals found in the body, zinc is the most crucial for testosterone production. Zinc deficiency is very common in the U.S. population, especially among athletes and the aged. Not only is zinc absent in most commercially-processed foods, it can be depleted from the body by alcohol and many prescription medications including diuretics.

Notes on Exercise:

Adequate exercise helps keep men feeling and looking fit by naturally stimulating testosterone release-and by preventing its' breakdown. The duration, intensity and frequency of exercise all determine a man's levels of testosterone. Be aware that testosterone levels increase most with short, periodic, more intense activity. They decrease with prolonged, frequent activity. Studies show testosterone levels increase with forty-five to sixty minutes of exercise. After this time, however, testosterone levels begin to decline. (61-65). Healthy levels of testosterone are necessary for muscle growth and repair. Since frequent, extended training doesn't allow sufficient time for testosterone levels to recover, symptoms of over-training may develop. These symptoms include muscle soreness, diminished performance, fatigue, immune suppression and poor mood.

Guidelines for Increasing Muscle and Maximizing the Effects of Exercise on Testosterone:

- o Focus on low-volume, high-intensity strength training.
- o Limit your exercise sessions to sixty minutes or less.
- o Exercise at high-intensity no more than two-three times weekly.
- o Do all aerobic exercise (except for warm-ups and cool-downs) on separate days (or at least separate times during the day) from strength training.
- o For optimum fitness, change your exercise regimen every eight to twelve weeks.

In Summary:

Testosterone levels reach a peak during a man's early twenties. Aging and lifestyle factors such as stress, improper diet, physical inactivity, smoking, drinking and the use of prescription medications can significantly reduce these levels. While most physicians have not yet recognized the wide spread incidence of low testosterone, millions of men are suffering from a variety of debilitating symptoms which range from sexual dysfunction to depression and fatigue. Currently, the more subtle symptoms of low testosterone are commonly attributed to stress or the natural process of aging.

As a result, many symptomatic men are walking around undiagnosed and untreated. However, thanks to recent innovation in hormone testing and prohormone delivery techniques, the incidence of low testosterone can now be significantly reduced- without the use of prescription medications.

Notes

We thank Dr. Cohen for his first article in the IAS Anti-Aging Bulletin, maintaining "healthy" levels of testosterone may be the single most important factor an aging man can do (it's also important for women too!).

IAS's introduction of ProMale cream allows for transdermal use and provides an excellent base for regular delivery of the prohormones mentioned in Dr. Cohen's article. Doses for ProMale cream are 2ml daily for a maximum period of 8-weeks, after that period an equal period of discontinued use should be applied. This allows each bottle of ProMale to supply 72-days of Prohormone delivery. Occasional use of AndroSpray, the sublingual spray that provides androstenedione and androstenediol can be considered as a way of boosting energy levels through short bursts of testosterone levels, this could be in addition to the regular base use of ProMale.

Be aware that certain countries have made DHEA, androstenedione and androstenediol controlled substances, and even though they exist in small quantities in the ProMale cream this could be problematic. The usual IAS terms and conditions apply and IAS will always inform you if it knows of any countries that have taken these steps. To the best of our knowledge DHEA is a controlled substance in Australia, Canada, EU, New Zealand and Norway. Androstenediol and Androstenedione is a controlled substance in Norway, and may be a controlled substance in Australia and Canada.

We look forward to further transdermal prohormone delivery systems and indeed further articles from Dr. Cohen.

Testing Facilities

IAS is going to expand the possibility of both saliva and blood testing laboratory services to its members. This not only can allow for accurate and regular examinations for "complete" anti-aging packages but at a simple level can provide you with a reference point. I.E. Are my testosterone levels increasing, declining or stabilized?

Currently, an "at-home" saliva test kit is available that can test for testosterone levels. This can also test for estradiol, cortisol or DHEA. (Please see back page for further details). Basically, you buy a kit, follow the simple instructions and send the saliva stick off to the laboratory (there is nothing else to pay!). The lab will then analyze your sample and send you a report of your hormone level. Such results should be kept and over a period of time you can see the changes for yourself!

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