

TESTOSTERONE — ITS NOT JUST FOR MEN ANYMORE!

To most people, testosterone is synonymous with masculinity. Although it is classified as one of the androgens, or “male” hormones, it is vital for **both men and women**. Both produce and use testosterone, and both men’s and women’s testosterone levels peak during youth and decline with age.

In their book, entitled *Natural Hormone Replacement for Women Over 45*, Jonathan V. Wright, MD, and John Morgenthaler recommend that “Replacing inadequate testosterone with natural testosterone can help protect the heart, improve mental alertness, make bones stronger, and revive a sagging sex life.”

The Quest for Testosterone

The field of endocrinology (the study of hormones) stems from the medical and scientific quest for the essence of “maleness” and the answer to the question, what makes a man a man?

According to Dr. Jonathan V. Wright and Lane Lenard, PhD, in the October 1998 issue of *Nutrition & Healing*, testosterone was isolated only about 70 years ago. Their synopsis of this quest helps explain how we came to today’s understanding of this hormone’s important role in our health.

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Decades before hormone replacement therapy became commonplace for women, men were practicing their own forms of testosterone replacement therapy. As early as 1400 BC, men were considering adding animal testicles to their diet to combat impotence. Later, in the mid- to late-1800s, German and French scientists experimented with removing and transplanting testicles on animals to try to isolate and replicate “male” characteristics.

A renowned scientist of that time was Charles-Edouard Brown-Séquard, a French physiologist, who had earlier discovered the significance of the adrenal glands. In his 70s, Brown-Séquard began looking for ways to extend his youth.

He developed a liquid form of ground animal testicles, which he injected under his skin. Soon after, he proclaimed in *The Lancet* that he had experienced a remarkable return of his overall energy and vitality, muscular strength and endurance, and mental agility. Unfortunately, the youthful characteristics did not last, and the scientific community ridiculed him. Subsequently, further research involving testicle extracts went out of favor for nearly 40 years.

Finally, during the 1920s, a University of Chicago organic chemist named Fred C. Koch resurrected Brown-Séquard’s work. Koch’s advantage was a fortunate combination of being close to the Chicago stockyards (an inexpensive source of bull testicles) and having a talented and persistent medical student who spent countless hours extracting the contents of testicles in search of the elusive male hormone. They eventually succeeded and reported that 40 pounds of bull testicles yielded a minute quantity (20 mg) of a substance that would temporarily restore castrated roosters’ “roosterhood” when injected over a period of weeks. Even more remarkably, their testicular extract worked equally well in castrated pigs and rats, too.

Other scientists quickly followed in their footsteps and soon isolated the active hormone, which we now call testosterone. They also discovered that, while the testes produce testosterone, they actually contain very little of it and do not store reserves that can be tapped (as earlier scientists had assumed). As soon as it is produced, testosterone works its way into the bloodstream and disperses to different parts of the body.

Frustrated by the daunting task of extracting minute amounts of the hormone from testicular tissue, researchers began looking for alternative approaches and discovered that they could produce testosterone from a more abundant substance — cholesterol — which is, in fact, basically how the body does it.

As it turns out, the testosterone produced from cholesterol is identical to the testosterone that the body produces naturally. This discovery opened the door to large-scale testosterone research.

But, before we continue, it is important to understand the distinction between “natural” (or bioidentical) and “un-natural” (or synthetic) hormones.

Natural vs. Un-natural Testosterone

Natural hormones have a molecular structure identical to the hormones produced by the body; hence, they are called *bioidentical*. Both “natural” and un-natural hormones can be synthesized in a laboratory. However, only bioidentical hormone molecules are indistinguishable from those the body produces and treated the same way by the body.

Dr. Wright explains that un-natural synthetic drugs are similar in molecular structure, but not exactly the same as the bioidentical molecule. These drugs are typically altered in some way to “improve” on nature by making them more potent, longer lasting, or easier to administer than the natural counterpart. Because these synthetic drug molecules are different from natural molecules, the body treats them differently, which can lead to adverse side effects.

With the promise of better drugs, the pharmaceutical companies continued their pursuit of synthetic alternatives. They eventually released a number of

testosterone-like drugs such as testosterone propionate, testosterone cypionate, testosterone enanthate, testosterone undecanoate, and a whole class of drugs called anabolic steroids, of which methyltestosterone is the most notorious. One reason that methyltestosterone was particularly attractive is that it could be taken by mouth, whereas the others were typically administered by injection.

Research exploded — focused on these new testosterone-like drugs, rather than on bioidentical testosterone. Early results were very promising, but it didn’t take long before the bubble burst again. This time, the reason was toxicity.

Widespread use of these testosterone-like drugs led to an alarming number of cases of liver disease (including jaundice, hepatitis, and cancer), many of which were fatal.

Then, in the 1950s, numerous athletes and body builders suffered ill effects from the abuse of anabolic steroids, which appeared to confirm the dangers of testosterone.

Once again, despite numerous demonstrations of the health benefits of responsible use of testosterone supplements, testosterone research fell on hard times.

Testosterone Today

Although the history of testosterone research still haunts the medical practice today, interest in testosterone replacement therapy for both

Vulvar Lichen Sclerosus

Vulvar lichen sclerosus is a chronic disorder that most commonly affects post-menopausal white women. It is a progressive deterioration and atrophy of primarily the vulva and labia minora. Earlier research indicated that the disorder can be successfully reversed with a topical testosterone treatment. A more recent study demonstrated that the level of dihydrotestosterone (a testosterone metabolite, but not testosterone) was quite low in the subjects who responded to the treatment. This finding suggests that perhaps dihydrotestosterone is somehow related to the healing process.

men and women is currently undergoing a long overdue and welcome renaissance.

Several important trends are contributing to a growing acceptance of testosterone replacement therapy:

- A gradual realization of a hormonally driven male andropause
- Readily available, high-quality, inexpensive bioidentical testosterone (molecularly identical to that produced by the human body)
- Improved testosterone delivery systems such as creams, gels, patches, and sublingual tablets
- Increased recognition that the bioidentical testosterone formulations available today are far better, safer, and more convenient than those used by earlier generations.

Functions of Testosterone in Women

Through ongoing research, the medical community is learning that testosterone serves many purposes, ranging from the commonly understood sexual functions to surprising findings that it may help to control blood sugar and may also have an anticoagulant effect. In addition, testosterone's well-known role in building muscles and bones is especially important for women facing age-related disorders such as osteoporosis and cardiovascular disease.

Sexual

Testosterone's most obvious purpose is sexual, for both men and women. During puberty, it stimulates the physical development of the sexual areas of the body, such as the growth of pubic and underarm hair. Female testosterone receptors are found in the nipples, vagina, clitoris, and brain.

In the *Journal of Sex & Marital Therapy*, Dr. Helen Singer Kaplan and Trude Owett, CSW, state that testosterone levels dictate the desire (or lack thereof) for sexual activity. They report that our reproductive behaviors are stimulated in much the same way as our eating behaviors. Our sex hormones drive our "sexual appetite" similar to the way that blood sugar drives our appetite for food. Simply put, testosterone's effect on the brain is to make women more sexually receptive.

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Many post-menopausal women lose interest in sexual activity, primarily due to diminished testosterone levels. Yet, research over the last 50 years clearly indicates that testosterone supplementation produces a marked increase in libido for women.

Researchers have consistently reported that women who receive testosterone replacement therapy after menopause have an increase in:

- Sexual drive and response
- Frequency of sexual intercourse
- Number of sexual fantasies
- Level of sexual arousal.

But, there's no reason to wait for menopause before investigating the issue. Many women may be able to regain a more joyful and satisfying sex life with testosterone replacement.

Cardiovascular

Medical research has yielded accumulating evidence that testosterone plays an important role in cardiovascular health, especially in protecting us against atherosclerosis and heart disease.

Dr. Wright's summary of Danish research indicates that bioidentical testosterone actually decreases cholesterol levels, improves circulation, and slows the tissue break-

down associated with aging. As a result, bioidentical testosterone supplements can help to restore the body to a more youthful condition.

Dr. Wright also notes that cholesterol-reducing drugs may sometimes do more harm than good, since testosterone and other steroids are derived from cholesterol. By reducing cholesterol, such drugs can actually throw the body's hormones off balance and lead to other disorders, such as chest pain and impaired cardiac function. Bioidentical testosterone supplements may be able to reduce circulating cholesterol more safely than these drugs.

Osteoporosis

It's a well-known fact that athletes and body builders have used testosterone-like drugs for years to strengthen and enhance muscles and bones. While we still don't know how it works, recent research suggests that testosterone may increase the bone's ability to retain calcium. What we do know is that women who experience rapid bone loss are typically deficient in both estrogen and testosterone.

According to Dr. Wright, a recent study indicated that "women with osteoporosis who took a combination of estrogen and testosterone *increased* their bone density, an effect previously only demonstrated with progesterone." In *The Testosterone Syndrome*, Dr. Eugene Shippen and William Fryer

concur that the total hormone picture increasingly shows that both testosterone and estrogen are "independent and additive determinants of bone density."

Muscle Tone (Leaky Bladder)

Testosterone contributes to our overall muscle tone. Well before menopause, some women begin to suffer from the confusion and embarrassment of a leaky bladder. This problem most likely relates to diminished testosterone levels, because the pelvic muscles are particularly dependent on testosterone. Many women find that using a testosterone cream, coupled with Kegel exercises, helps to strengthen and tone those muscles again.

Symptoms & Causes of Testosterone Deficiency in Women

Although the primary symptoms for women are decreased libido and other sexual complaints (*see box on next page*), other signs of testosterone deficiency are a general lack of energy and overall vitality, and a loss of muscle tone.

Most women begin to experience these symptoms after menopause, when their testosterone levels typically decline by approximately 50%. This decline is largely attributed to the fact that menopause causes the ovaries to stop producing testosterone, but it is further compounded by the fact that the adrenal glands also stop producing two other hormones, androstenedione and DHEA, which are con-

verted to testosterone within cells throughout the body. However, a variety of other conditions can cause the decline to begin much before menopause, and some women begin to experience these signs as early as their 30s.

Shippen & Fryer identified some of the conditions that can contribute to a pre-menopausal decrease in women's testosterone levels, including:

- Childbirth
- Endometriosis
- Ovaryectomy
- Birth control pills*
- Medications* that interfere with the bio-availability of testosterone such as:
 - Provera[®] (norlutate) and Tamoxifen[®] (nolvodex)
 - Drugs such as Prozac[®] or Zoloft[®] that alter the brain's serotonin transmitters
 - Some psychoactive drugs or other antidepressant and antipsychotic medications
- Psychological trauma and depression
- Chemotherapy
- Surgery (adrenal stress)
- Chronic abuse of substances such as alcohol, cocaine, or narcotics
- Normal aging.

***NOTE:** With these medications, the level of "free" testosterone is likely to be low, even though lab results may indicate a "normal" testosterone level.

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It is important to understand that symptoms of testosterone deficiency can arise even when lab tests indicate a “normal” level. This is due to the fact that most lab tests fail to address the amount of “free” testosterone available to deliver the desired benefits to the various parts of the body.

As mentioned earlier, testosterone enters the bloodstream almost as soon as it is produced. Most of it immediately latches onto a carrier in the bloodstream, such as sex hormone binding globulin (SHBG) or albumin. “Free” testosterone refers to the amount of circulating testosterone that is not bound to a carrier; in other words, it is that which is most *biologically available*.

In addition, the presence or absence of other hormones can also influence the levels of free testosterone. For example, increased estrogen levels can result in higher levels of SHBG, which preferentially binds to testosterone. So, an increase in estrogen can lower the level of free testosterone.

“As in most other health matters, there is a fingerprint of individuality that marks every person off from every other.”

Characteristics Typically Found in Women with Low Testosterone Levels

- There is a global loss of sexual desire.
- Sexual fantasy is absent or significantly decreased.
- Orgasm is absent or significantly decreased.
- Sexual complaints begin after a physical event that can be associated with impaired androgen production (such as childbirth or menopause).
- The level of free testosterone is low.

Testosterone Supplements

Unfortunately, much of the research on testosterone replacement focuses on supplements for men.

Dr. Kaplan states, “Androgen replacement for women is a neglected area of medicine. None of the standard textbooks of medicine, endocrinology, clinical pathology, or pharmacology, which we reviewed, made any mention of androgen deficiency in women.”

Many physicians may be reluctant to prescribe testosterone replacement therapy for women because of testosterone’s sordid history and its potentially virilizing side effects.

However, neither of those are valid reasons to ignore the potential benefits of bioidentical testosterone replacement therapy.

While excessive doses of testosterone can lead to “masculine” characteristics such as a deeper voice and

growth of facial hair, a typical woman’s dose would be so small that these effects would be extremely rare or nonexistent. This is because a woman’s “normal” amount of testosterone is only a minute fraction of that of a man’s.

As for testosterone’s medical and scientific history, there is no doubt that it is riddled with horror stories of side effects. However, many of today’s practitioners are unaware that those side effects were associated with synthetic testosterone-like drugs, *not bioidentical testosterone*.

Today, several options for testosterone replacement therapy exist. The most commonly prescribed treatment was Estratest[®], a drug that contained both estrogen and methyltestosterone (a synthetic testosterone-like drug). Women who took Estratest, or who are now taking another esterified estrogen product with methyltestosterone, should be closely monitored for signs of endometrial cancer and

fibroids, gall bladder disease, and effects on the liver.

Dr. Wright (and other healthcare practitioners) believe that bioidentical testosterone supplements are generally safer and just as effective.

Bioidentical testosterone supplements are available as custom compounded capsules, tablets, lozenges, injections, creams, gels, suppositories, and pellets that are injected into the body.

No matter what form of supplement is administered, it is important for you and your healthcare practitioner to tailor the treatment to your specific needs.

As Dr. Shippen puts it, "As in most other health matters, there is a fingerprint of individuality that marks every person off from every other." In women, this is a much more complicated task because testosterone replacement therapy typically involves other hormones as well.

For More Information

This newsletter was originally published in September 2000 and updated in November 2010. For more information, please refer to the following resources, which were used in researching this article:

- Jonathan V. Wright, MD, and Lane Lenard, PhD, "Treatment With Testosterone" in *Nutrition & Healing*, October 1998.
- Jonathan V. Wright, MD, and John Morgenthaler, *Natural Hormone Replacement for Women Over 45*, Smart Publications, Petaluma, CA, 1997.
- Eugene Shippen, MD, and William Fryer, *The Testosterone Syndrome: The Critical Factor for Energy, Health & Sexuality — Reversing the Male Menopause*, M. Evans and Company, Inc., New York, 1998.
- Helen Singer Kaplan and Trude Owett, "The Female Androgen Deficiency Syndrome," in the *Journal of Sex & Marital Therapy*, Vol.19, No.1, Spring 1993.

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