



# PATIENT GUIDE

## Diagnosis and Treatment of Male Hypogonadism

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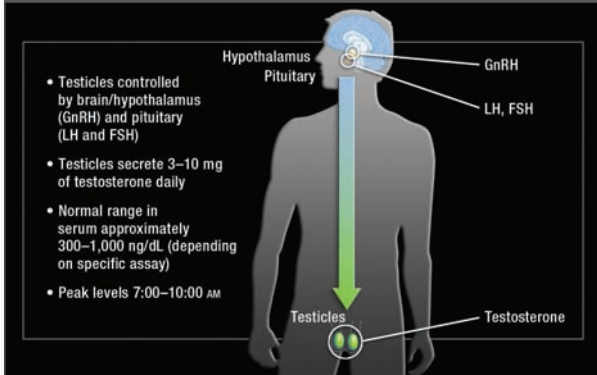
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## Hypothalamic-Pituitary-Testicular Axis

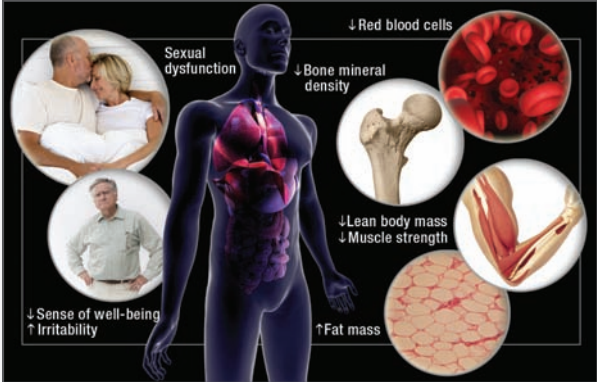


GnRH, gonadotropin-releasing hormone; LH, luteinizing hormone; FSH, follicle-stimulating hormone

### What is the role of testosterone in men's health?

- Testosterone is the most important sex hormone in men
- It is responsible for typical male characteristics and helps maintain sex drive, sperm production, muscle, bone, and pubic and body hair
- Testosterone is produced by the testicles under the control of hormones produced by the hypothalamus (in the brain) and the pituitary gland (a small gland at the bottom of the brain)
- Low testosterone levels (also called hypogonadism) can cause:
  - A drop in sex drive
  - Poor erections (erectile dysfunction [ED])
  - Low sperm count
  - Enlarged breasts and/or breast tenderness
- Over time, low testosterone may cause a man to lose muscle bulk, strength, and body hair; accumulate body fat; and have weaker bones (osteoporosis), mood changes, less energy, and smaller testicles
- Symptoms vary from person to person and according to length and severity of hypogonadism

## Effects of Low Testosterone



### What causes low testosterone?

- Low testosterone can be caused by testicular injury (trauma, castration, radiation, or chemotherapy) or infection, pituitary disorders (pituitary tumors or diseases), or other diseases that affect the whole body (HIV/AIDS, chronic liver and kidney disease, obesity, and type 2 diabetes)
- Some medications (including strong pain killers such as methadone or morphine and anti-inflammatory drugs such as prednisone) and genetic conditions (for example, Klinefelter syndrome, hemochromatosis) also can cause low testosterone
- Many older men have low testosterone levels

## How is low testosterone diagnosed?

- A diagnosis should be made only when there are (a) symptoms and signs that could be caused by low testosterone and (b) consistently low blood levels of testosterone (measured on two or more occasions between 7:00 and 10:00 AM, when levels are highest)
- Diagnosis involves a medical history, in which your doctor may ask about:
  - Puberty (sexual development)
  - Past or present major illnesses and nutritional deficiency
  - All prescription and nonprescription drugs currently being taken
  - Relationship problems, such as sexual problems
  - Recent major illnesses and depression
  - Family history of low testosterone
  - Recent changes in body characteristics (for example, breast enlargement)
  - Problems with your testicles
- Diagnosis involves a physical examination, in which your doctor may assess:
  - Amount of body hair
  - Presence of breast enlargement/tenderness
  - Size and consistency of the testicles; size of the penis
  - Changes in peripheral vision and visual acuity (which could indicate a pituitary tumor, a rare cause of low testosterone)
- Diagnosis involves measurement of testosterone
  - Normal range of blood total testosterone is generally 300 to 1,000 ng/dL (depending on the laboratory that conducts the test)
  - Illness, malnutrition, and certain medications (as noted previously) can reduce testosterone temporarily, so your doctor may need to wait until after you recover or stop taking such a medication before he or she can take the measurement
  - Your doctor may order a test to measure “free” testosterone, a test that many experts think is better than total testosterone in certain instances
  - Measurement of testosterone is recommended in the morning; more than one blood test and possibly other tests of pituitary gland hormones may be needed



## Therapeutic Goals of Testosterone Therapy

- Improve and maintain masculine characteristics
- Improve sex drive (libido) and erections
- Increase energy and well-being
- Improve muscle mass and strength
- Improve bone mineral density

Bhasin S, Matsumoto AM, eds. *The Hormone Foundation's Patient Guide to Androgen Deficiency Syndromes in Adult Men*. 2nd ed. Chevy Chase, MD: The Hormone Foundation; 2010. Reproduced with permission.

## How is low testosterone treated?

- Testosterone replacement therapy can improve sexual interest, erectile function, mood and energy, body hair growth, bone density, and muscle mass
- There are several ways to replace testosterone:
  - Injections
  - Patches
  - Gels
  - Tablets (stick to the gums)
  - Pellets
  - Pills (in some countries outside the United States)
- The best method depends on your preference and tolerance, as well as cost
- The overall goal of testosterone therapy is to increase testosterone levels up to the middle of the normal range
- To achieve your treatment goals, take your recommended medication as prescribed, keep regular appointments with your doctor, and adopt a healthy lifestyle that includes regular exercise and good nutrition

## Possible Risks of Testosterone Treatment

- High red blood cell count
- Acne
- Breast enlargement
- Increase in prostate enlargement or difficulty with urination
- Increase in prostate cancer detection
- Occasional temporary stopping of breathing during sleep, called *sleep apnea* (rarely)
- Fluid build-up in ankles, feet and legs, called *edema* (rarely)

Cunningham GR, Matsumoto AM, Swedloff R, eds. *Low Testosterone and Men's Health*. 4th ed. Chevy Chase, MD: The Hormone Foundation; March 2010.

## Are there any risks associated with testosterone treatment?

- Groups at higher risk of prostate cancer (including African American men, men over 40 who have close relatives with prostate cancer, and all men over 50) should be offered testing for prostate cancer during testosterone treatment
- Men with breast cancer or known or suspected prostate cancer should not receive testosterone therapy
- Tests your doctor will perform before and during testosterone therapy include:
  - Blood tests to determine your hematocrit (the percentage of red blood cells in your blood) and your testosterone levels
  - Most doctors will also recommend tests to check for prostate cancer, including:
    - Digital rectal exam (DRE), in which the doctor inserts a finger into the rectum to feel for abnormalities of the prostate gland that might indicate cancer
    - Blood prostate-specific antigen (PSA) test, which might indicate an abnormality of the prostate
- You should see your doctor 3 to 6 months after you start treatment to evaluate whether you are improving and if you are having any problems or side effects; a DRE, PSA test, and blood count should be done at that time; after this appointment, similar annual check-ups are recommended
- Men with osteoporosis or past bone fracture with little trauma should receive a bone mineral density test of the spine and hip area before starting testosterone treatment and then 1 or 2 years afterward



### **What should you do with this information?**

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- Discuss any symptoms of low testosterone with your doctor
- Your doctor may refer you to an endocrinologist, a doctor that specializes in hormone disorders
- Be open with your doctor about your medical history, sexual problems, and any major changes in your life
- Bring all prescription and nonprescription drugs you are now taking to each doctor visit
- You should tell your doctor how well treatment is helping your symptoms and any side effects you are having