

# Androgen (testosterone) deficiency

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## What are androgens?

Hormones are chemical messengers made by glands in the body that are carried in the blood to act on other organs in the body. Hormones are needed for growth, reproduction and well-being.

Androgens are male sex hormones that increase at puberty and are needed for a boy to develop into a sexually mature adult who can reproduce. The most important androgen is testosterone.

## What is testosterone?

Testosterone is the most important androgen (male sex hormone) in men and it is needed for normal reproductive and sexual function. Testosterone is important for the physical changes that happen during male puberty, such as development of the penis and testes, and for the features typical of adult men such as facial and body hair. Testosterone also acts on cells in the testes to make sperm.

Testosterone is also important for overall good health. It helps the growth of bones and muscles, and affects mood and libido (sex drive). Some testosterone is changed into oestrogen, the female sex hormone, and this is important for bone health in men.

Testosterone is mainly made in the testes. A small amount of testosterone is also made by the adrenal glands, which are walnut-sized glands that sit on top of the kidneys.

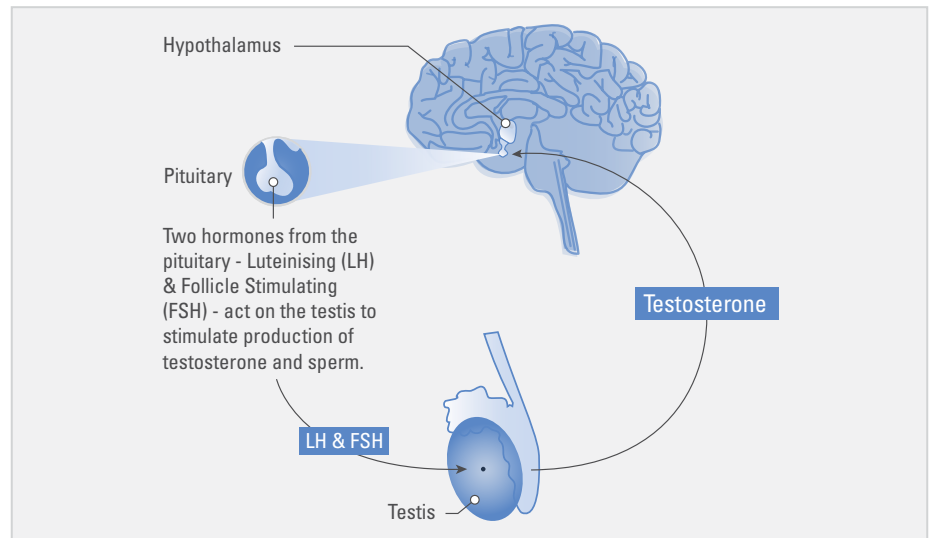
## How do hormones control the testes?

The pituitary gland and the hypothalamus, located at the base of the brain, control the production of male hormones and sperm. Luteinizing hormone (LH) and follicle stimulating hormone (FSH) are the two important messenger hormones made by the pituitary gland that act on the testes.

LH is needed for the Leydig cells in the testes to make testosterone, the male sex hormone. Testosterone and FSH from the pituitary gland then act together on the seminiferous tubules (sperm-producing tubes) in the testes to make sperm.

## What is androgen (or testosterone) deficiency?

Androgen, or testosterone, deficiency is when the body is not able to make enough



testosterone for the body to function normally. Although not a life-threatening problem, androgen deficiency can affect your quality of life.

## How common is androgen deficiency?

Androgen deficiency due to diseases of the testes or hypothalamus-pituitary affects about one in 200 men under 60 years of age. It is likely that androgen deficiency is under-diagnosed and that many men are missing out on the benefits of treatment. About one in 10 older men may have testosterone levels lower than those in young men, but this is usually linked with chronic illness and obesity. The benefits of testosterone treatment for such men are not yet known.

## How does ageing affect testosterone levels?

Testosterone levels in men are highest between the ages of 20 and 30 years. As men age there is a small, gradual drop in testosterone levels; they may drop by up to one third between 30 and 80 years of age.

Some men will have a greater drop in testosterone levels as they age, especially when they are obese or have other chronic (long-term) medical problems. On the other hand, healthy older men with normal body weight may not experience any drop in serum testosterone levels.

There is no such thing as 'male menopause' or 'andropause' that can be compared to menopause in women.

## What are the symptoms of androgen deficiency?

Low energy levels, mood swings, irritability, poor concentration, reduced muscle strength and low sex drive can be symptoms of androgen deficiency (low testosterone). Symptoms often overlap with those of other illnesses. The symptoms of androgen deficiency are different for men of different ages.

## What causes androgen deficiency?

Androgen deficiency can be caused by genetic disorders, medical problems, or damage to the testes or pituitary gland. Androgen deficiency happens when there are problems within the testes or with hormone production in the brain. A common chromosomal disorder that causes androgen deficiency is Klinefelter's syndrome.

## How is androgen deficiency diagnosed?

A diagnosis of androgen deficiency involves having a thorough medical evaluation and at least two blood samples (taken in the morning on different days) to measure hormone levels. Diagnosis should not be simply based on symptoms as these could be caused by other health problems that need different treatment. A diagnosis of androgen deficiency is only confirmed when blood tests show a lower than normal testosterone level.

## What is the 'normal' testosterone reference range?

A reference range is used as a guide by testing laboratories and doctors to decide whether a person's hormone levels are

normal or low, and whether treatment is needed. Testosterone is measured in units called nanomolar. The 'normal' testosterone reference range for healthy, young adult

## SYMPTOMS OF ANDROGEN DEFICIENCY AT DIFFERENT STAGES OF LIFE



### EARLY CHILDHOOD

- Micropenis (penis does not grow to expected size)



### EARLY TEENAGE YEARS (PUBERTY)

- Late puberty or failure to go through full normal puberty
- Small testes and penis
- Poor development of facial, body or pubic hair
- Poor muscle development
- Voice does not deepen (larynx underdeveloped)
- Gynaecomastia (breast development)
- Poor growth (height) surge



### ADULTHOOD

- Mood changes (low mood and irritability)
- Poor concentration
- Low energy (lethargy, low stamina)
- Reduced muscle strength
- Increased body fat
- Decreased libido (low interest in sex)
- Difficulty getting and keeping erections (uncommon)
- Low semen volume
- Reduced beard or body hair growth
- Gynaecomastia (breast development)
- Hot flushes, sweats
- Osteoporosis (thinning of bones)



### LATER LIFE (AFTER 60 YEARS)

- Mood changes (low mood and irritability)
- Poor concentration
- Easily fatigued
- Poor muscle strength
- Increased body fat
- Decreased libido (low interest in sex)
- Difficulty getting and keeping erections
- Gynaecomastia (breast development)
- Osteoporosis (thinning of bones)

men is about 8 to 27 nanomolar but these numbers vary between measurement systems.

## How is androgen deficiency treated?

Androgen deficiency is treated with testosterone therapy; this means giving testosterone in doses that return the testosterone levels in the blood to normal. Testosterone is prescribed for men with androgen deficiency confirmed by blood tests. Once started, testosterone therapy is usually continued for life and the man needs to be checked regularly by a doctor.

## What are the main forms of testosterone therapy?

In Australia testosterone therapy is available in the form of injections, gels, lotions, creams, patches and tablets, and works very well for men with confirmed androgen (testosterone) deficiency. The type of treatment prescribed can depend on patient convenience, familiarity and cost.

Commercial testosterone products contain only the natural testosterone molecule that is chemically produced from plant materials.

## What are the side-effects of testosterone therapy?

Side-effects are not expected because testosterone therapy aims to bring a man's testosterone levels back to normal. However, testosterone therapy can increase the growth of the prostate gland which can make the symptoms of benign prostate enlargement (such as needing to urinate more often) worse. In the case of prostate cancer, testosterone therapy is not used because of concerns that it can make the tumour grow.

Too high a dose of testosterone can lead to acne, weight gain, gynaecomastia (breast development), male-pattern hair loss and changes in mood. Any side-effects should be managed by a doctor and the testosterone dose lowered.

## Can herbal products help androgen deficiency?

There are many herbal products marketed, particularly on the Internet, as treatments

that can act like testosterone and improve muscle strength and libido (sex drive). However, there are no known herbal products that can replace testosterone in the body and be used to treat androgen deficiency.

## Will testosterone therapy affect my fertility?

Testosterone therapy generally stops the production of the pituitary hormones FSH and LH, which reduces the size of the testes and can lower or stop sperm being made. Testosterone treatment should not be given to a man wanting to become a father in the foreseeable future. If sperm production was normal before testosterone therapy, it usually recovers after treatment stops but it can take many months to go back to normal.

## Will testosterone therapy affect sporting performance?

Testosterone therapy in men with androgen deficiency aims to bring testosterone levels back to normal and to return muscle strength and energy levels back to normal. However, the use of androgens (anabolic steroids) by normal men to improve athletic performance is illegal and has important short-term and long-term health risks.

Men who use anabolic steroids will lower or even turn off their own testosterone and sperm production. It may take many months for testosterone levels and sperm counts to return to normal after stopping anabolic steroids.

## Can I do anything to prevent androgen deficiency?

There are no known ways to prevent androgen deficiency caused by damage to the testes or pituitary gland. However, if you live a healthier lifestyle and manage other health problems your testosterone levels may improve, if your low testosterone levels are caused by other illness. Not all men have a drop in testosterone levels with age. A healthy lifestyle may help you to keep testosterone levels normal.

For more information visit [www.andrologyaustralia.org](http://www.andrologyaustralia.org), call 1300 303 878, or speak to your doctor.

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