



DONATE

En Español



PROSTATE CANCER

TREATING PROSTATE CANCER

Hormone Therapy for Prostate Cancer

Hormone therapy is also called **androgen deprivation therapy** (ADT) or **androgen suppression therapy**. The goal is to reduce levels of male hormones, called androgens, in the body, or to stop them from affecting prostate cancer cells.

Androgens stimulate prostate cancer cells to grow. The main androgens in the body are testosterone and dihydrotestosterone (DHT). Most of the androgens are made by the testicles, but the adrenal glands (glands that sit above your kidneys) also make a small amount. Lowering androgen levels or stopping them from getting into prostate cancer cells often makes prostate cancers shrink or grow more slowly for a time. But hormone therapy alone does not cure prostate cancer.

When is hormone therapy used?

Hormone therapy may be used:

- If the cancer has spread too far to be cured by [surgery](#) or [radiation](#), or if you can't have these treatments for some other reason
- If the cancer remains or comes back after treatment with surgery or radiation therapy
- Along with radiation therapy as initial treatment if you are at higher risk of the cancer coming back after treatment (based on a high [Gleason score](#), high [PSA level](#), and/or growth of the cancer outside the prostate)
- Before radiation to try to shrink the cancer to make treatment more effective

Types of hormone therapy

Treatments to lower androgen levels

Orchiectomy (surgical castration)

Even though this is a type of surgery, its main effect is as a form of hormone therapy. In this operation, the surgeon removes the testicles, where most of the androgens (testosterone and DHT) are made. This causes most prostate cancers to stop growing or shrink for a time.

This is done as an outpatient procedure. It is probably the least expensive and simplest form of hormone therapy. But unlike some of the other treatments, it is permanent, and many men have trouble accepting the removal of their testicles.

Some men having this surgery are concerned about how it will look afterward. If wanted, artificial testicles that look much like normal ones can be inserted into the scrotum.

LHRH agonists

Luteinizing hormone-releasing hormone (LHRH) agonists (also called *LHRH analogs* or *GnRH agonists*) are drugs that lower the amount of testosterone made by the testicles. Treatment with these drugs is sometimes called *chemical castration* or *medical castration* because they lower androgen levels just as well as orchiectomy.

Even though LHRH agonists cost more than orchiectomy and require more frequent doctor visits, most men choose this method. With these drugs, the testicles remain in place, but they will shrink over time, and they may even become too small to feel.

LHRH agonists are injected or placed as small implants under the skin. Depending on the drug used, they are given anywhere from once a month up to once a year. The LHRH agonists available in the United States include:

- Leuprolide (Lupron, Eligard)
- Goserelin (Zoladex)
- Triptorelin (Trelstar)
- Histrelin (Vantas)

When LHRH agonists are first given, testosterone levels go up briefly before falling to very low levels. This effect is called *flare* and results from the complex way in which these drugs work. Men whose cancer has spread to the bones may have bone pain. If the cancer has spread to the spine, even a short-term increase in tumor growth as a result of the flare could press on the spinal cord and cause pain or paralysis. Flare can be avoided by giving drugs called *anti-androgens* (discussed below) for a few weeks when starting treatment with LHRH agonists.

LHRH antagonist

Degarelix (Firmagon) is an LHRH antagonist. It works like the LHRH agonists, but it lowers testosterone levels more quickly and doesn't cause tumor flare like the LHRH agonists do.

Treatment with this drug can also be considered a form of *medical castration*.

This drug is used to treat advanced prostate cancer. It is given as a monthly injection under the skin. The most common side effects are problems at the injection site (pain, redness, and swelling) and increased levels of liver enzymes on lab tests. Other side effects are discussed in detail below.

CYP17 inhibitor

LHRH agonists and antagonists can stop the testicles from making androgens, but other cells in the body, including prostate cancer cells themselves, can still make small amounts, which can fuel cancer growth. **Abiraterone (Zytiga)** blocks an enzyme called CYP17, which helps stop these cells from making androgens.

Abiraterone can be used in men with advanced castrate-resistant prostate cancer (cancer that is still growing despite low testosterone levels from an LHRH agonist, LHRH antagonist, or orchiectomy).

This drug is taken as pills every day. It doesn't stop the testicles from making testosterone, so men who haven't had an orchiectomy need to continue treatment with an LHRH agonist or antagonist. Because abiraterone also lowers the level of some other hormones in the body, prednisone (a cortisone-like drug) needs to be taken during treatment as well to avoid certain side effects.

Drugs that stop androgens from working

Androgens have to bind to a protein in the prostate cell called an *androgen receptor* to work. Anti-androgens are drugs that bind to these receptors so the androgens can't.

Drugs of this type include:

- Flutamide (Eulexin)
- Bicalutamide (Casodex)
- Nilutamide (Nilandron)

They are taken daily as pills.

Anti-androgens are not often used by themselves in the United States. An anti-androgen may be added to treatment if orchiectomy or an LHRH agonist or antagonist is no longer working by itself. An anti-androgen is also sometimes given for a few weeks when an LHRH agonist is first started to prevent a tumor flare.

An anti-androgen can also be combined with orchiectomy or an LHRH agonist as first-line hormone therapy. This is called *combined androgen blockade* (CAB). There is still some debate as to whether CAB is more effective in this setting than using orchiectomy or an LHRH agonist alone. If there is a benefit, it appears to be small.

In some men, if an anti-androgen is no longer working, simply stopping the anti-androgen can cause the cancer to stop growing for a short time. Doctors call this the *anti-androgen withdrawal* effect, although they are not sure why it happens.

Enzalutamide (Xtandi) is a newer type of anti-androgen. Normally when androgens bind to their receptor, the receptor sends a signal to the cell's control center, telling it to grow and divide. Enzalutamide blocks this signal. It is taken as pills each day.

Enzalutamide can often be helpful in men with castrate-resistant prostate cancer. In most studies of this drug, men were also treated with an LHRH agonist, so it isn't clear how helpful this drug would be in men with non-castrate levels of testosterone.

Other androgen-suppressing drugs

Estrogens (female hormones) were once the main alternative to orchiectomy for men with advanced prostate cancer. Because of their possible side effects (including blood clots and breast enlargement), estrogens have been replaced by other types of hormone therapy. Still, estrogens may be tried if other hormone treatments are no longer working.

Ketoconazole (Nizoral), first used for treating fungal infections, blocks production of certain hormones, including androgens, much like abiraterone. It's most often used to treat men just diagnosed with advanced prostate cancer who have a lot of cancer in the body, as it offers a quick way to lower testosterone levels. It can also be tried if other forms of hormone therapy are no longer working.

Ketoconazole also can block the production of cortisol, an important steroid hormone in the body, so men treated with this drug often need to take a corticosteroid (such as prednisone or hydrocortisone).

Possible side effects of hormone therapy

Orchiectomy and LHRH agonists and antagonists can all cause similar side effects from lower levels of hormones such as testosterone. These side effects can include:

- Reduced or absent sexual desire
- Erectile dysfunction (impotence)
- Shrinkage of testicles and penis
- Hot flashes, which may get better or go away with time
- Breast tenderness and growth of breast tissue
- Osteoporosis (bone thinning), which can lead to broken bones
- Anemia (low red blood cell counts)
- Decreased mental sharpness
- Loss of muscle mass
- Weight gain
- Fatigue
- Increased cholesterol levels
- Depression

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