TESTOSTERONE

& ITS DERIVATIVES FOR PERFORMANCE ENHANCEMENT

DR. JUDSON BRANDEIS' GUIDE TO TESTOSTERONE AND ITS DERIVATIVES FOR MEN OF ALL AGES

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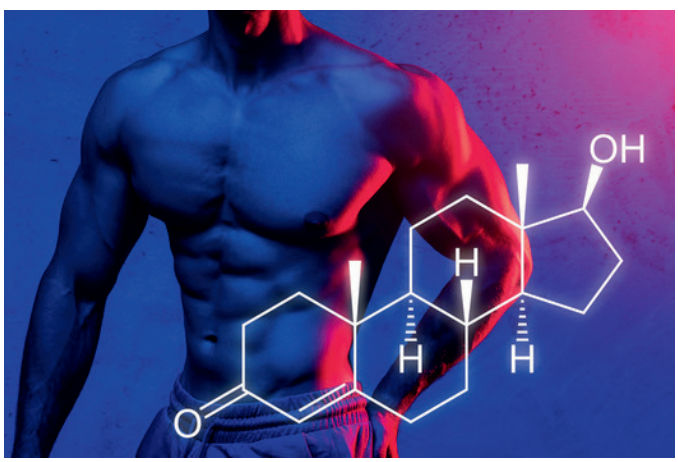
JUDSON BRANDEIS, MD

INTRODUCTION

Testosterone and its derivatives are essential to a man's physical, mental, emotional, and sexual wellbeing. This vital hormone peaks in a man's early 20s and steadily declines after that. If replaced later in life, it can serve as a temporary Fountain of youth. Boosting earlier in life can build extra muscle. However, the use and abuse of this critical hormone have side effects and worse.

This ebook, written by Dr. Judson Brandeis, aims to educate men who are considering raising their testosterone levels, especially to supraphysiologic levels, for bodybuilding, powerlifting, or competitive athletics. It is essential that you read the entire eBook. I consider every aspect of this ebook necessary to understand the proper use and potential misuse of steroid hormones. Please read the whole eBook.

I was a competitive runner and triathlete in my younger days but never used any performance-enhancing substances, so I have not experienced them firsthand. I never performed at a level where additional Testosterone would have brought fame and fortune athletically. I guess that is why I became a urologist.



I do not necessarily condone the use of performance-enhancing substances at supraphysiologic levels. However, I know that men, especially younger men, will use and abuse these substances. Because of the legality of using steroid hormones in younger men, many physicians are reluctant to prescribe these medications. As a result, many men get their steroids from questionable sources, achieve dangerous levels, and have unfortunate side effects. My goal is to help men who want to use these substances, get them from reputable sources, give them access to accurate information, and test kidney, liver, blood, hormone, fertility, and other levels to ensure that they are not causing themselves harm.

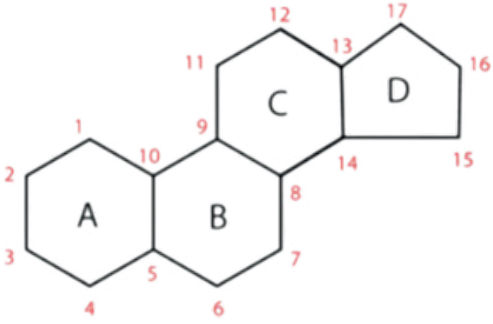
I will not help any athlete competing in a league where performance-enhancing drugs are banned. That is unethical and provides an unfair advantage. That is against my morals and principles. Please do not contact me about obtaining performance-enhancing drugs if you are in that position. I will disclose to any sports governing body that you made this request. Do not pretend to be 'natural' when you are not. I will not cover for you.

With that said, welcome to the world of performance enhancement. Thanks to Rhoades and Bell Medical Physiology, muscleandfitness.com and moreplatesmoredates.com for much of the information in this eBook.

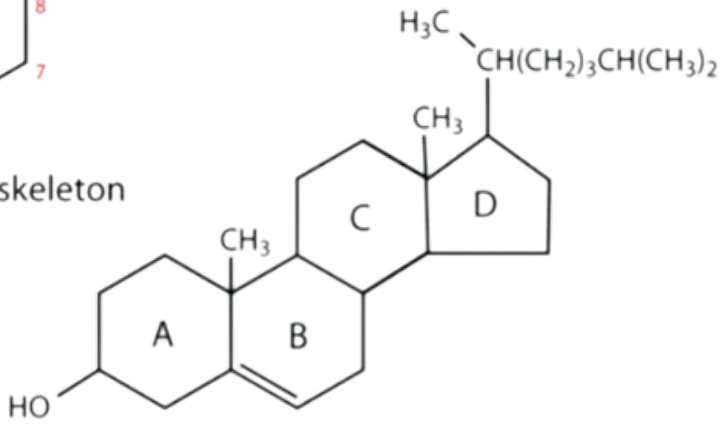
STEROID HORMONES

Hormones are your body's chemical messengers that travel to tissues or organs in your bloodstream. They work slowly, over time, and affect many different processes, including growth and development. A steroid is a biologically active organic compound with four carbon rings arranged in a specific molecular configuration.

The adrenal cortex, ovaries, testes, and placenta produce steroid hormones from cholesterol. Cholesterol, a 27-carbon steroid, can be obtained from the diet or synthesized within the body.



(a) Steroid skeleton



(b) Cholesterol

Steroids have two principal biological functions. They are essential components of cell membranes and function as signaling molecules.

A steroid hormone is a steroid that acts as a hormone. Steroid hormones are grouped into two classes: corticosteroids and sex steroids. Within those two classes are five types according to the receptors to which they bind: glucocorticoids, mineralocorticoids, androgens, estrogens, and progestogens.

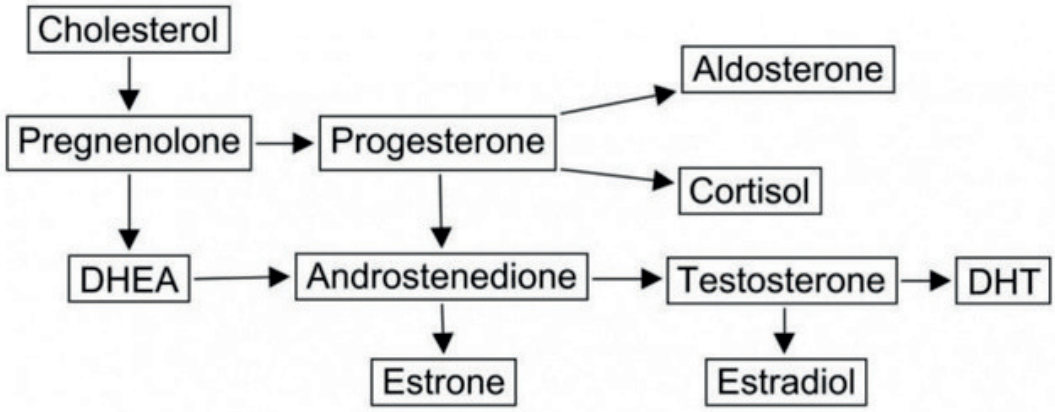
Glucocorticoids are potent hormones that regulate inflammation and work with your immune system to treat a wide range of health problems. These hormones have many jobs, such as controlling how your cells use sugar and fat and curbing inflammation.

Mineralocorticoids are a class of steroid hormones that regulate salt and water balances. Aldosterone is the primary mineralocorticoid. Mineralocorticoids promote sodium and potassium transport, usually followed by changes in water balance. This function is essential to life.

Androgens are hormones that contribute to growth and reproduction in both men and women. Androgens are usually thought of as male hormones, but the female body naturally produces a small amount of androgens.

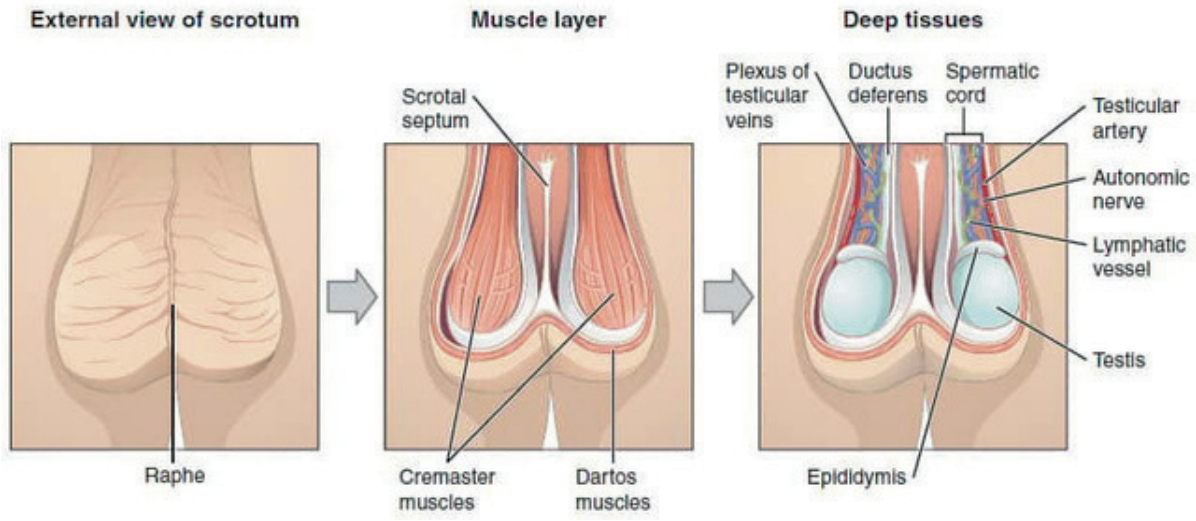
Estrogens are a group of hormones that play a key role in women's normal sexual and reproductive development. They are also sex hormones. The woman's ovaries make most estrogen hormones, although the adrenal glands and fat cells also produce small amounts of the hormones. Three major endogenous estrogens have estrogenic hormonal activity: estrone E1, estradiol E2, and estriol E3.

In women, **progesterone** plays a crucial role in the menstrual cycle and maintaining the early stages of pregnancy. The corpus luteum secretes progesterone in the ovary during the second half of the menstrual cycle. In males, the adrenal gland produces progesterone which then influences sperm development.



The Testes and Anabolic Steroids:

The testicles have two purposes. The most important is the production of sperm which is essential to the survival of the species. Sperm production takes up 90% of the testis volume. The other function is testosterone production which occupies 10% of the testis volume. Testosterone and Estrogen are anabolic steroid hormones.



What Are Anabolic Steroids?

Anabolic means building up complex molecules like proteins, and anabolic steroids are synthetic substances that mimic Testosterone which is a man's primary anabolic hormone. Testosterone is the male sex hormone important for healthy libido levels (aka sex drive), the development of male secondary sex characteristics (facial and body hair, deeper voice), and most relevant to a bodybuilder, the development of lean muscle mass. The addition of anabolic steroids to already normal testosterone levels can increase muscle size and strength but can have adverse and sometimes unpredictable effects on other organs.

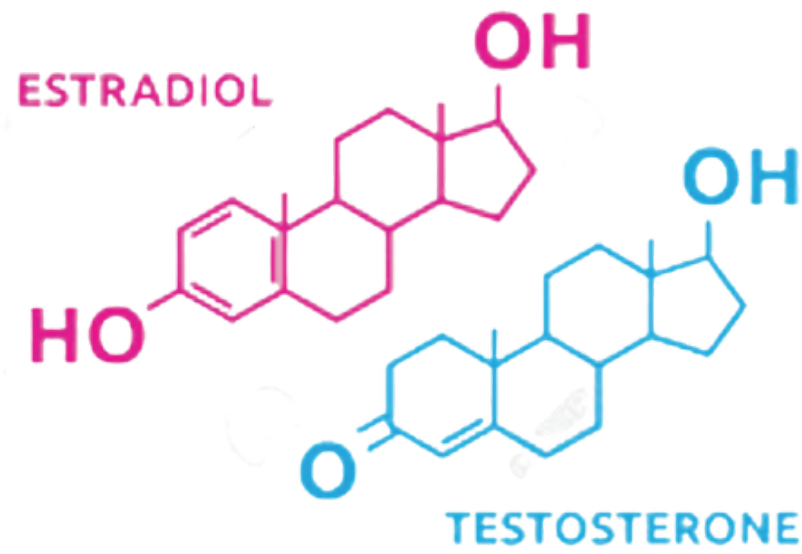
What Are the Dangers?

When a person with normal testosterone levels takes anabolic steroids, they can incur both short-term and long-term side effects, including:

Table 2. Potential Risks Associated with Testosterone-Replacement Therapy.

Potential Risk	Comments
Cardiovascular disease	Existing evidence suggests a neutral or possible beneficial effect
Lipid alterations	Most studies show no change with physiologic replacement doses
Erythrocytosis	Wide range of risk, depending on mode of administration: 3–18% with transdermal administration, up to 44% with injection; requires monitoring
Fluid retention	Rarely of clinical significance
Benign prostatic hyperplasia	Rarely of clinical significance
Prostate cancer	Controversial; unknown level of risk; requires long-term monitoring
Hepatotoxicity	Limited to oral agents, which are infrequently used in the United States
Sleep apnea	Infrequent
Gynecomastia	Rare, usually reversible
Skin reactions	High incidence with patch (up to 66%), low incidence with gel (5%), rare with injections
Acne or oily skin	Infrequent
Testicular atrophy or infertility	Common, especially in young men; usually reversible with cessation of treatment

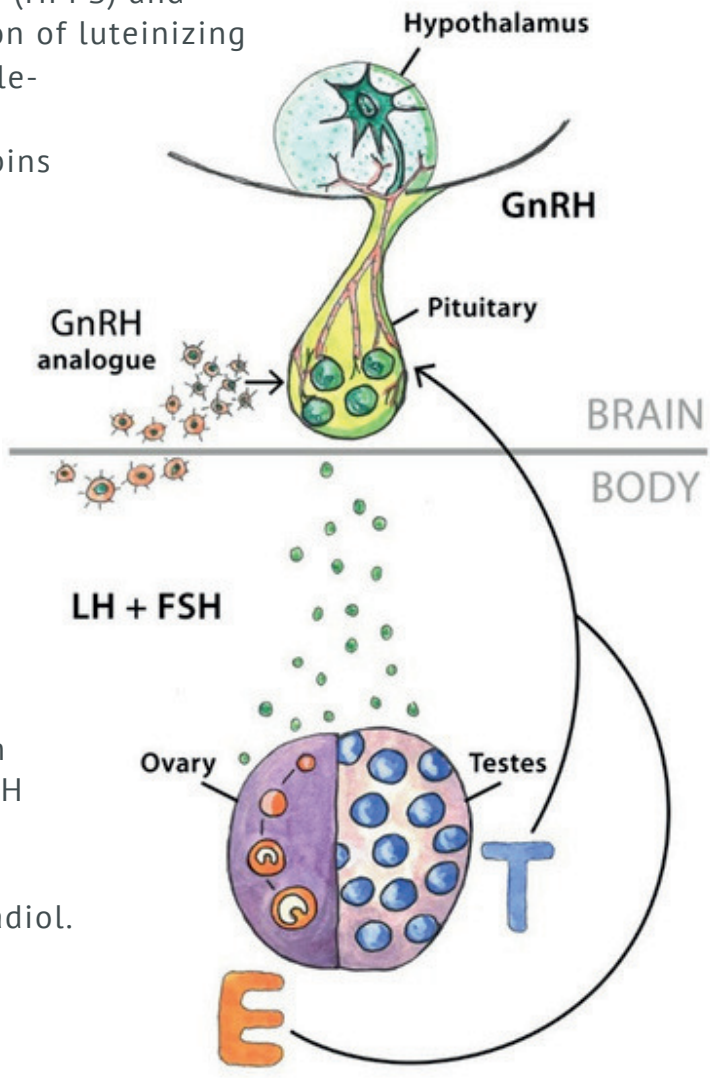
Both men and women have both Testosterone and Estrogen. However, the ratios of these hormones are different between the sexes. A 30-year-old male might have a Testosterone level of 800 and an Estradiol level of 30, whereas a woman might have a Testosterone level of 40 and an Estrogen level that varies between 20 to 200. Men may be from Mars and Women may be from Venus, but Testosterone and Estrogen are almost identical chemical structures. The only difference between the two is a single Hydrogen atom, the smallest atom that exists, which is why your body can convert Testosterone into
Estrogen.



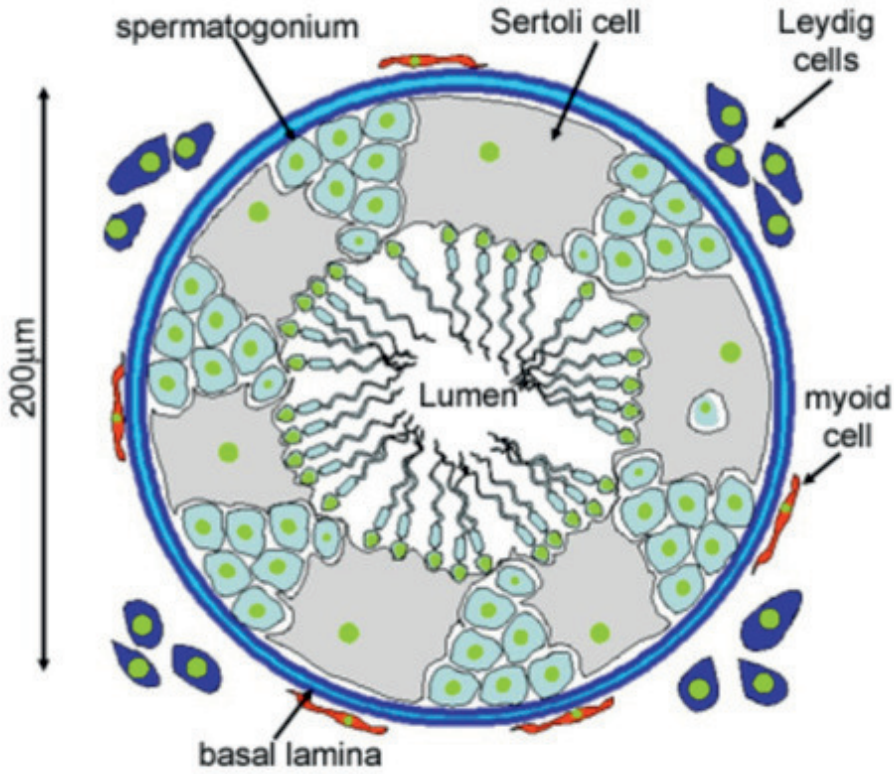
Testosterone is the predominant sex hormone in men. Testosterone declines 1-2% per year in men after the age of twenty, so boosting Testosterone in men as they age can have tremendous benefits if done the right way in properly selected men, but harmful side effects if done poorly. The same can be said for younger men using high Testosterone levels to build muscle rapidly. The purpose of this eBook is to help men looking to build muscle rapidly and have decided to boost Testosterone artificially, understand the risks, and if they still want to boost Testosterone, to do so in a safe way that is informed.

The reproductive system (gonads, reproductive tract and accessory glands) is designed solely for the survival of the species. The male reproductive system's endocrine (hormone-producing) glands include the hypothalamus, anterior pituitary, and testes. The hypothalamus is the part of the brain that processes information obtained from the external and internal environment. It releases neurotransmitters (nerve chemicals) that regulate the secretion of Gonadotropin releasing hormone GnRH.

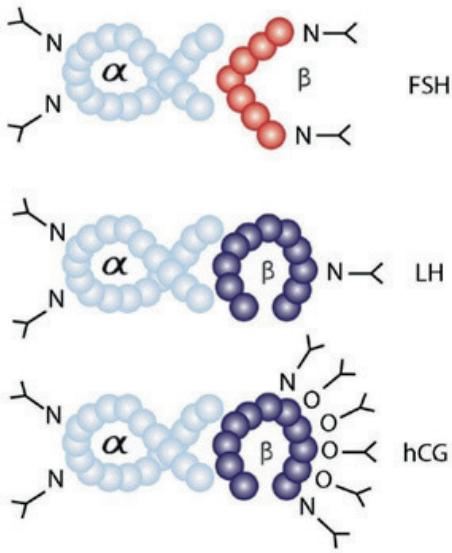
GnRH moves down the hypothalamic–pituitary portal system (HPPS) and stimulates the secretion of luteinizing hormone LH and follicle-stimulating hormone FSH by the gonadotropins of the anterior pituitary. In the testes, LH binds to receptors on the Leydig cells and FSH binds to receptors on the Sertoli cells. Leydig cells produce Testosterone. Sertoli cells are located within the seminiferous tubules, support sperm production, contain FSH and Testosterone receptors and make small amounts of estradiol.



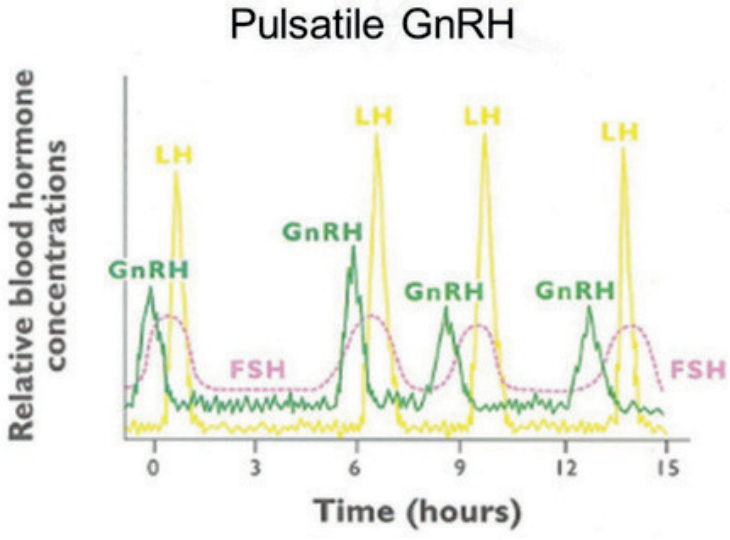
LH and FSH regulate testicular function. LH regulates the secretion of Testosterone by the Leydig cells and FSH in synergy with Testosterone, stimulates the production of spermatozoa. HCG is a similar molecule to LH and FSH that in men acts as an analog of LH, therefore stimulating the testicles to produce more Testosterone. LH also stimulates production of sperm within the seminiferous tubules and therefore maintains fertility in men.



Hypothalamic neurons (nerve cells) produce GnRH (also called LH releasing hormone LHRH), which regulates the secretion of LH and FSH. GnRH enters the hypothalamic pituitary portal system and binds to receptors on pituitary cells, resulting in the synthesis and release of LH and FSH. Many external cues like age, environment and stress levels influence the secretion of GnRH, LH and FSH.



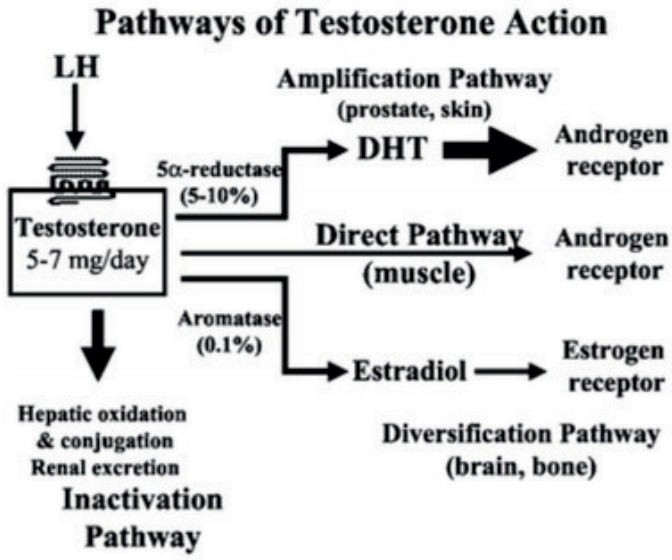
GnRH and consequently LH and FSH are released in a pulsatile manner. The pulsatile release of GnRH is necessary for proper functioning of the testis because it regulates the secretion of FSH and LH, which are also released in a pulsatile fashion. Continuous exposure of gonadotropins to GnRH results in desensitization of GnRH receptors, leading to a decrease in LH and FSH release. Therefore, the pulsatile pattern of GnRH release serves a critical physiologic function. The administration of GnRH at an improper frequency results in a decrease in circulating concentrations of LH and FSH!



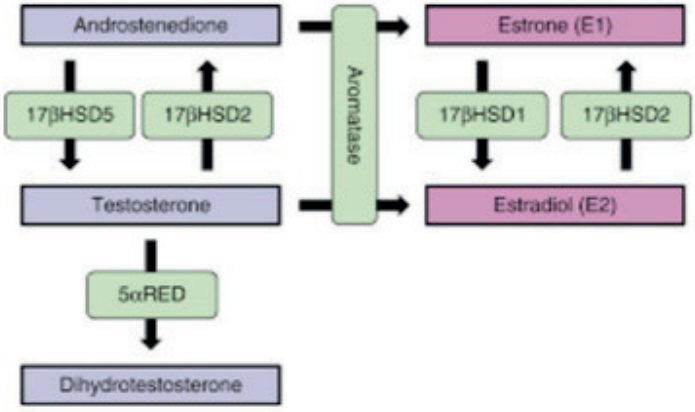
Testosterone and estradiol (a form of Estrogen) are major testicular hormones that regulate the release of LH and FSH. Testosterone inhibits LH release by decreasing the secretion of GnRH. Estradiol is formed from Testosterone by aromatase also has an inhibitory effect on GnRH secretion.

Short-term testosterone treatment does not change pituitary responsiveness to GnRH but prolonged exposure significantly reduces the secretory response to GnRH, affecting a man's ability to produce Testosterone.

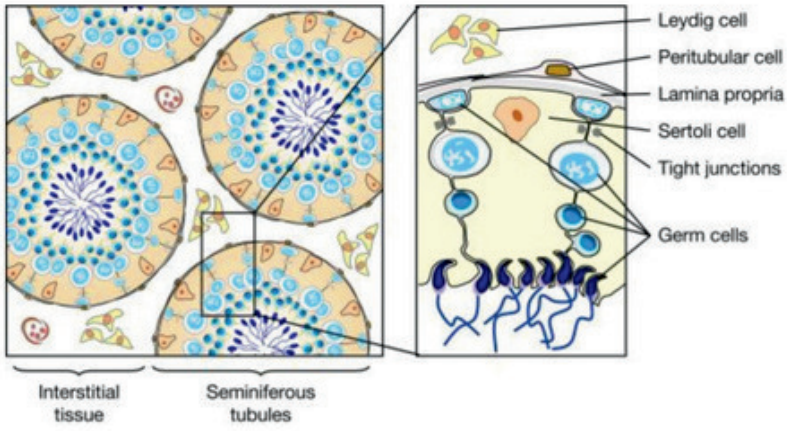
In males, testosterone production is about 10 times greater than that in females and plays a key role in developing the testes and prostate and promoting secondary sex characteristics, such as increased hair growth and muscle and bone mass. It is also essential for health and well-being as well as the prevention of osteoporosis (loss of bone density). Testosterone is also converted to dihydrotestosterone, the most biologically active androgen.



Although estrogens are only minor products of testicular steroidogenesis, they are generally found in low concentrations in men. The actions of the enzyme aromatase convert androgens to estrogens. The products of aromatization of Testosterone and androstenedione are estradiol and estrone, respectively. In the testis, the Sertoli cell is the main site of aromatization, which is stimulated by FSH. However, aromatization may also occur in peripheral tissues that lack FSH receptors like adipose (fat) tissue.



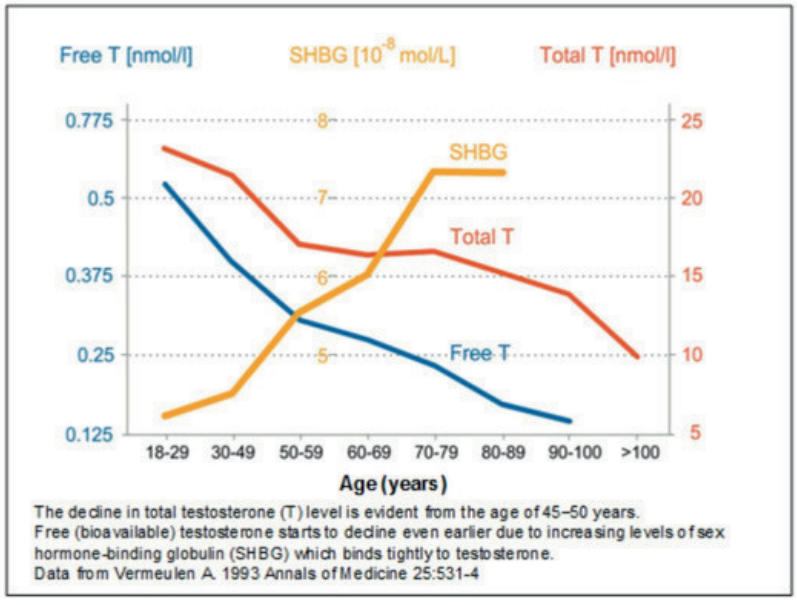
DHT enhances the development of the male reproductive tract, male sex characteristics, and behavior. A lack of DHT secretion or action causes feminization.



Testosterone diffuses into the blood immediately after being synthesized by Leydig cells. There is no hormone storage in the testis. An adult male produces 6 to 7 mg of Testosterone per day. This amount slowly declines after age 50 and reaches about 4 mg/dL in the seventh decade of life.

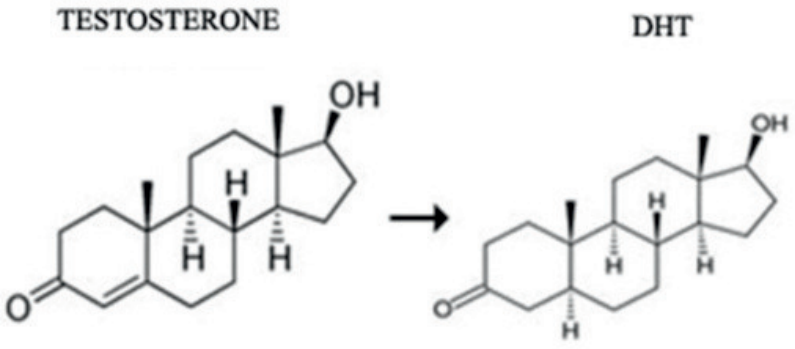
Testosterone circulates bound to plasma proteins, with only 1 to 3% of Testosterone unbound or free hormone. About 20 to 40% of Testosterone is bound to albumin, and the remaining 58 to 78% to SHBG, which binds both estradiol and Testosterone.

Because its production is increased by estrogens and decreased by androgens, plasma SHBG concentration is higher in women than in men. SHBG serves as a reservoir for Testosterone and therefore, a sudden decline in newly formed Testosterone may not be evident because of the large pool bound to proteins SHBG prolongs the half-life of circulating Testosterone because Testosterone is cleared from the circulation much more slowly if attached to a protein. Any type of liver damage or disease will reduce SHBG production which can upset the hormonal balance between LH and Testosterone.



The decline in total testosterone (T) level is evident from the age of 45–50 years. Free (bioavailable) testosterone starts to decline even earlier due to increasing levels of sex hormone-binding globulin (SHBG) which binds tightly to testosterone.
Data from Vermeulen A. 1993 Annals of Medicine 25:531-4

Once Testosterone is released into the circulation, its fate is variable. In most target tissues, testosterone functions as a prohormone and is converted to the biologically active derivative DHT by 5-alpha-reductase or estradiol by aromatase. Skin, hair follicles and most of the male reproductive tract contain an active 5-alpha-reductase. DHT has a high binding affinity (attaches more tightly) for the androgen receptor and is 2-3 times more potent than Testosterone.



Testosterone is converted to DHT by 5 alpha reductase

Drugs that inhibit 5-alpha-reductase reduce prostate size because DHT induces hyperplasia (growth) of prostatic epithelial cells.

Aromatization of some androgens to estrogens occurs in fat, liver, skin, and brain cells. Circulating levels of total estrogens in men can approach those in women in their early follicular phase. Men are protected from feminization if the production of and tissue responsiveness to androgens are normal. However, gynecomastia (breast enlargement in men) can occur in: older men given high doses of Testosterone, athletes using anabolic steroids, abnormal reductions in testosterone secretion, testis tumors producing Estrogen and tissue insensitivity to androgens. These conditions are characterized by a decrease in the Testosterone to estradiol ratio.

Table 2. Etiology of gynecomastia

Causes	
Physiological factors	Puberty or aging
Endocrine tumors	Testicular, adrenocortical or pituitary tumors, or ectopic hCG-secretion
Endocrine dysfunctions	Hypogonadism, hyperthyroidism, obesity or refeeding
Non-endocrine diseases	Cirrhosis, renal failure or HIV
Drug-induced factors	Medications, anabolic steroids or illicit drugs
Idiopathic factors	

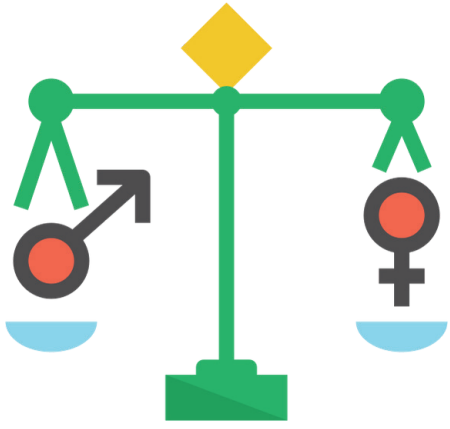
Androgens and development:

An androgen is a substance that stimulates the growth of the male reproductive tract and the development of secondary sex characteristics. Androgens affect almost every tissue, including alteration of the primary sex structures, stimulation of the secondary sex structures, and development of secondary sex characteristics responsible for masculine phenotypic expression (facial hair, chest hair etc.). Androgens also affect both sexual and nonsexual behavior. The action of sex steroid hormones on bodily tissue, such as muscle, is referred to as anabolic because it increases muscle size.

Between 8 and 18 weeks of fetal life, androgens mediate differentiation of the male genitalia. Toward the end of fetal life, Testosterone and insulin-like hormones promote the descent of the testes into the scrotum.

A marked increase in androgenic activity marks the onset of puberty. Androgens promote the growth of the penis and scrotum, stimulate the growth and secretory activity of the epididymis and accessory glands, and increase the pigmentation of the genitalia. Enlargement of the testes occurs under the influence of LH and FSH. Sperm production depends on an adequate amount of Testosterone.

Androgens affect changes in hair distribution, skin texture, the pitch of the voice, bone growth, and muscle development. The growth and secretory activity of the sebaceous glands of the face, upper back, and chest are stimulated by androgens, primarily DHT, and inhibited by estrogens.



A complex interplay between androgens, growth hormone, nutrition, and genetic factors influences the growth spurt of adolescent males. Because 5-alpha-reductase activity in muscle is low, the androgenic action results from Testosterone rather than DHT. However, adding DHT artificially has a significant androgenic effect. Testosterone stimulates muscle hypertrophy, increasing muscle mass. In synergy with growth hormone, Testosterone causes an increase in muscle protein, which builds new muscle. Androgens increase red blood cell mass by stimulating erythropoietin production by increasing stem cell production in the bone marrow.

Definitions:

Androgen: Any hormone that promotes male sex characteristics, such as Testosterone. Steroids that bodybuilders use are generally referred to in academic texts as "anabolic-androgenic steroids."

Aromatize: The process that converts Testosterone into Estrogen. Aromatizing above and beyond normal male estrogen levels when taking steroids can lead to increased fat around the waist, gynecomastia or other feminine characteristics, and other more serious health issues.

Blending: Combining steroids with other drugs.

Cutting: an increasingly popular workout technique. It's a fat-loss phase that bodybuilders and fitness enthusiasts use to get as lean as possible. Typically started a few months before a major workout regimen, it involves a weight loss diet that's meant to maintain as much muscle as possible.

Cycle: The time during which a particular steroid is taken, usually followed by a similar amount of time off the cycle.

Gear: A slang term for steroids, syringes, and any other steroid-related equipment.

Gynecomastia: Increase in breast tissue. It's usually brought on by a hormonal imbalance from taking steroids, though it can also occur naturally.

Juice: A slang term for injectable steroids.

Post-cycle therapy: The use of various compounds to attempt to normalize the body from a hormonal perspective after a steroid cycle.

Pyramiding: Slowly escalating your steroid use until you reach a peak mid-cycle, and then tapering down after that.

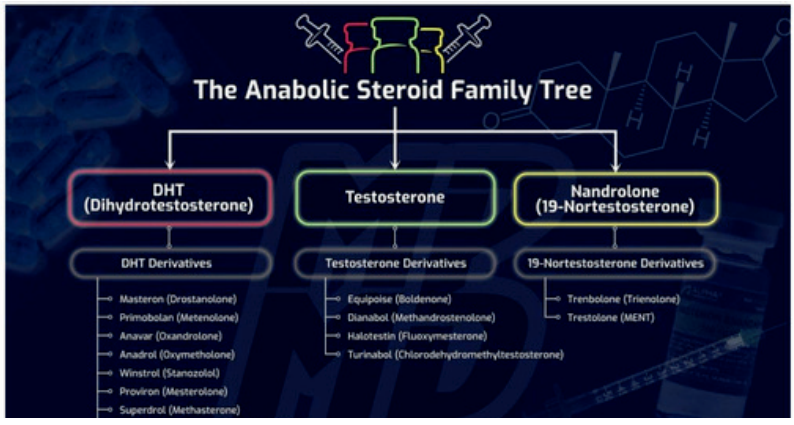
Shotgunning/"Blast and cruise": Taking steroids inconsistently, or "blasting" on low-dose steroids and then "cruising" into a cycle.

Stacking: Using multiple steroids at once, often in conjunction with other drugs.

The Three Categories of Anabolic Steroids

The most commonly used anabolic steroids fall into one of three different families/categories: Testosterone and its derivatives, Dihydrotestosterone (DHT) and its derivatives, and Nandrolone (19-Nortestosterone) and its derivatives.

Expectedly, many of the anabolic steroids in each family have similar attributes.



TESTOSTERONE DERIVATIVES

Testosterone

WHAT BODYBUILDERS SAY: "Test" is considered "the base of each steroid cycle," whether you're cutting or bulking. There are three major types: cypionate, enanthate, and propionate, all of which can be used for cutting. Additionally, enanthate can be used to add lean muscle mass.

WHAT EXPERTS SAY: "Everyone uses Testosterone. The problem with it is that you're going to crash. That's why people wind up doing post-cycle therapy."

HOW IT'S CYCLED: 10 to 12 weeks for a newbie user.

HOW IT'S DOSED: 500 to 600mg per week for a middleweight person (165 to 198 pounds).

Dianabol

WHAT BODYBUILDERS SAY: One of the oldest and most popular performance enhancers increases testosterone levels and promotes muscle growth. It also has numerous—and often serious—side effects—so some bodybuilders have begun experimenting with alternate versions. When you think of bodybuilders of the '70s, this is the one.

WHAT EXPERTS SAY: Originally used for muscle wasting and anemia. Cheap and mass building. Very toxic to the liver.

SIDE EFFECTS: Water retention, gynecomastia, acne, hair loss, liver damage, infertility, depression, sleeplessness, testicular shrinkage, potential serious heart issues.

HOW IT'S CYCLED: 4 to 6 weeks.

HOW IT'S DOSED: 30 to 50mg daily.

Equipoise

WHAT BODYBUILDERS SAY: An old-school injectable bulking steroid that "increases appetite and stamina." Usually stacked with Testosterone.

WHAT EXPERTS SAY: A testosterone derivative originally tested on humans, equipoise (EQ) is used in veterinary medicine, particularly on horses. When you buy it underground, it will often say "not for human consumption."

SIDE EFFECTS: Lowered HDL cholesterol, muscle tears from overuse, impaired sexual function, acne, gynecomastia, hair loss, oily skin, aggression, elevated blood pressure, and increased appetite.

HOW IT'S CYCLED: 10 to 12 weeks for a newbie user.

HOW IT'S DOSED: 500 to 600mg per week for a middleweight person (165 to 198 pounds).

DHT DERIVATIVES

Anadrol

WHAT BODYBUILDERS SAY: "A cheap bulking [oral] steroid but with many serious downsides." Gains are often due to water retention, and "you'll lose more than half your gains after ceasing."

WHAT EXPERTS SAY: An "old-school" steroid originally prescribed to help with weight gain after surgery or infection and occasionally to treat osteoporosis or hormonal conditions.

SIDE EFFECTS: Puffiness and water retention, gynecomastia, acne, rapid weight gain, stomach pain, and many others, including high cholesterol and stroke.

HOW IT'S CYCLED: No longer than eight weeks.

HOW IT'S DOSED: 50 to 100 milligrams (mg) daily.

Anavar

WHAT BODYBUILDERS SAY: "One of the best anabolic steroids for cutting overall." An oral steroid often stacked with Winstrol or Testosterone. The consensus among bodybuilders is that women better tolerate it than they do some other steroids.

WHAT EXPERTS SAY: Originally prescribed for weight gain, recovery from burns, and osteoporosis. "It's known to be one of the weaker and less toxic steroids with minimal side effects, depending upon dosage," but it's also one of the more expensive ones.

SIDE EFFECTS: High blood pressure and lower HDL (or good) cholesterol, acne, hair loss, depression.

HOW IT'S CYCLED: Eight weeks, often stacked with Testosterone.

HOW IT'S DOSED: 10 to 50mg daily, sometimes up to 80mg.

Proviron

WHAT BODYBUILDERS SAY: Generally not cycled on its own, it's an orally active form of DHT (dihydrotestosterone), and DHT is "what makes muscle hard," It's also believed to prevent Estrogen from forming.

WHAT EXPERTS SAY: An antiestrogen steroid used for post-cycle therapy or added to a cycle to prevent estrogen conversion. Bodybuilders (most of whom don't consider it a steroid) believe it can mitigate the sexual side effects of other steroids.

SIDE EFFECTS: Generally mild but include headaches, fluid retention, sexual issues, depression, and irritability.

HOW IT'S DOSED: 25 to 50mg daily.

Winstrol

WHAT BODYBUILDERS SAY: An oral and injectable steroid that works for cutting, but it "can also be included during bulking cycles, as it increases muscle mass and hardens the appearance of your body." Often stacked with Anavar and Testosterone propionate, this is the drug that Canadian sprinter Ben Johnson tested positive for during the 1998 Olympics, sparking the prohibition on steroids in the United States.

WHAT EXPERTS SAY: "This is a big cutting drug, It devastates the lipid [cholesterol] panel, and I see tons of muscle tears."

SIDE EFFECTS: Dry joints and acne are common side effects among bodybuilders. Others can include hair loss, liver damage, cholesterol issues, mood swings, sexual dysfunction, and testicular atrophy.

HOW IT'S CYCLED: 6 to 8 weeks.

HOW IT'S DOSED: 10 to 50mg daily.

Nandrolone Deca-Durabolin

WHAT BODYBUILDERS SAY: An injectable steroid that originated back in the '70s, usually taken with Testosterone. Used for building mass.

WHAT EXPERTS SAY: Used clinically—though not frequently—for serious conditions like cancer, anemia, and AIDS. "It's a pretty bulky drug. It's not a cutting drug."

SIDE EFFECTS: "Deca-dick" (erectile dysfunction, particularly if taken without adequate Testosterone), gynecomastia, acne, liver problems, water retention, enlarged prostate, loss of appetite, depression, low sperm count, as well as life-threatening conditions like liver cancer, stroke, and heart failure.

HOW IT'S CYCLED: Up to 12 weeks.

HOW IT'S DOSED: 200 to 600mg per week.

Purchase and read Dr. Brandeis' comprehensive men's health guide at thetwentyfirstcenturyman.com. Read more at brandeismd.com and affirmscience.com. To make an appointment to see Dr. Brandeis in San Ramon, call 925- 255-7867 or email appointments@brandeismd.com

Trenbolone

WHAT BODYBUILDERS SAY: Considered one of the most effective steroids by bodybuilders, "tren" (an injectable) is divided into two types—acetate and enanthate. "It helps you lose big amounts of body fat and gain big amounts of muscle mass. It will give you some aggression, too."

WHAT EXPERTS SAY: Another drug used on animals, it's "the strongest one on this list. It causes a very hard, grainy, nonbloated effect. It's a steroid on steroids. Also, it's massively toxic and debilitating to sex."

SIDE EFFECTS: "Tren cough," a severe cough that usually comes on immediately after injection, "tren dick," or low sex drive, high blood pressure, night sweats, gynecomastia, acne, hair loss, insomnia, anxiety, rapid heart rate, aggression, decreased cardiovascular endurance, kidney and liver issues.

HOW IT'S CYCLED: 10 weeks maximum.

HOW IT'S DOSED: 300 to 600mg per week.

OTHER PERFORMANCE ENHANCING DRUGS

Arimidex

WHAT BODYBUILDERS SAY: Not a steroid but viewed as an ancillary drug meant more "to combat or mitigate various estrogen-related side effects" like gynecomastia and bloating and is occasionally used during post-cycle therapy as well.

WHAT EXPERTS SAY: One of a family of oral anti-estrogen drugs, it's most often used as a treatment for certain forms of breast cancer. These drugs are massively dangerous because they deplete your HDL cholesterol profile.

SIDE EFFECTS: Heart issues, fatigue, headaches, high blood pressure, hot flashes, joint pain or osteoporosis, depression.

HOW IT'S CYCLED: 2 to 6 weeks.

HOW IT'S DOSED: 0.5 to 1mg daily.

Table 2.
Drugs that are frequently abused alongside androgenic anabolic steroids

Human growth hormone **Insulin**	Usually used in combination with AAS in the belief that their combination is more potent than any individual effects
Tamoxifen Oestrogen receptor antagonist **Clomifene (Clomid)** Selective oestrogen receptor inhibitor	Oestrogen receptor antagonists. Used 'on-cycle' in the belief that they reduce the risk of gynaecomastia. Used post cycle to promote normalization of luteinising hormone production
Arimidex Aromatase inhibitor	Inhibits the effect of aromatase enzymes that convert testosterone into oestrogen. Used 'on-cycle' in the belief that this reduces the risk of gynaecomastia
Human chorionic gonadatropin (HCG)	Acts on the hypothalamic-pituitary-gonadal axis to restore normal testosterone. Used 'off-cycle'
Finesteride	Inhibits the conversion of testosterone to dihydrotestosterone (DHT). Used in the belief that it minimizes some side effects of AAS use including hair loss, acne and prostate growth
Clenbuterol	Beta 2 agonist. Used as thermogenic agent to aid reductions in body fat
2,4-dinitrophenol (DNP)	Uncouples energy metabolism and reduced efficient ATP production. Used to aid reductions in body fat

HGH (Human Growth Hormone)

WHAT BODYBUILDERS SAY: "May stimulate the body to break down fat," and can have a "synergistic effect" with steroids to promote leanness.

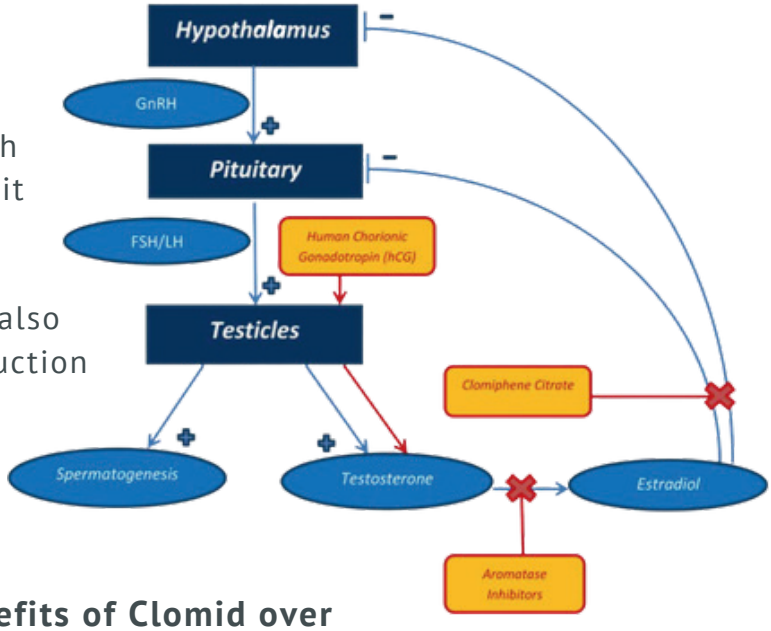
WHAT EXPERTS SAY: Not actually a steroid, HGH is an injectable protein that is approved for use In children as well as adults. This is the number 1 drug used at anti-aging facilities. Extremely expensive, but doesn't cause male sexual side effects.Questions about both its long-term safety and its effect on athletic performance and anti-aging have yet to be resolved.

SIDE EFFECTS: Nerve, muscle, and joint pain, swelling, high cholesterol, tingling or numb skin, carpal tunnel syndrome. It may also increase the risk of diabetes by "blocking the effects on insulin," and may contribute to the growth of tumors.

HOW IT'S DOSED: 2 to 4 international units (IU) daily is the most common amount for anti-aging, and up 10 IU for bodybuilding purposes.

CLOMID

Clomid is an alternative to testosterone replacement therapy that preserves fertility and maintains testicular size in a man on Testosterone replacement. TRT reduces sperm production and impacts fertility. The pituitary gland in the brain directs testicular function by producing LH to stimulate testosterone production from the testicle and FSH to stimulate sperm production. If the pituitary sees a high testosterone level, it stops telling the testes to produce Testosterone. This also affects sperm production and explains why testes shrink a bit on TRT.



What are the benefits of Clomid over traditional Testosterone Injections or pellet TRT?

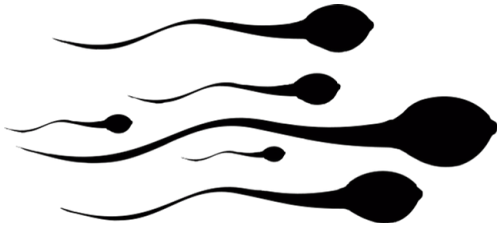
Clomid for men stimulates the body's production of Testosterone. Clomid is a pill taken daily. It is generic and cheap. No shots. It does not interfere with the body's checks and balances of Testosterone. Fertility is preserved with no testicular shrinkage. It has few, if any, side effects and this is usually dose-related. Clomid, by increasing T levels, can produce the same/similar effects as traditional TRT. Each patient is different and the response will vary depending on current testosterone level.

Is there any downside to Clomid therapy?

At lower levels of testosterone, it takes longer to see the benefits of Clomid than with injection therapy. It may also not work, especially in patients over 60 and those with compound medical issues. Some patients may not see a boost in libido as Clomid does have some mild estrogenic properties. Of course, we follow the labs, just like in TRT, and would correct for an elevated estradiol level if needed (anastrozole). There have been rare reports of vision changes. If this happens, the patient should note very specifically what occurred, how long it lasted, etc., and then stop the Clomid until you speak with your doctor.

Who should use Clomid?

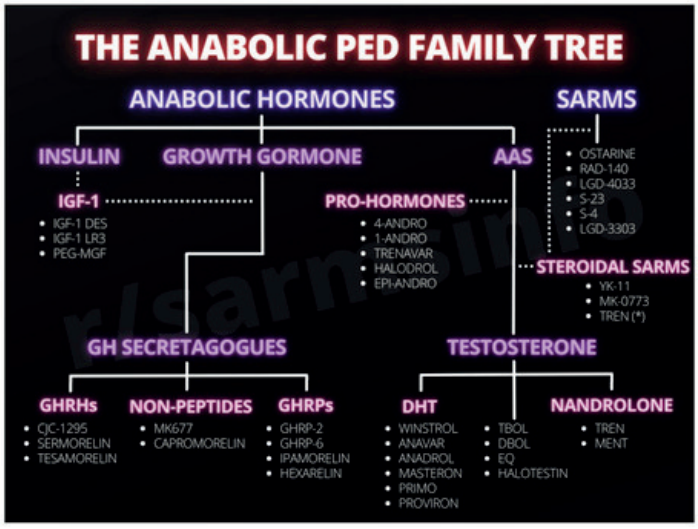
A typical candidate for Clomid is younger and planning on having children soon or in the future. Patients who just do not want to deal with an injection or pellet therapy are willing to accept a lower T level. Patients who have been on TRT and have decided to have children but want to maintain some increase in testosterone levels. Men who have known low sperm counts.



Clomid for men - Dosage

The dosage range is 12.5mg – 50mg per day. I prefer to start at 25mg every other day for a short trial period and then increase to daily dosing. Dosage can be adjusted based on any side effects, lab results, and an overall improvement in the “T-effect”. You will read any number of protocols that involve more complicated patterns of dosing. I prefer to keep it simple.

HORMONES & STEROIDS



How Anabolic Steroids Enhance Muscle Building & Performance When choosing which anabolic agents are most conducive to an athlete's goals, select wisely based on the performance requirements of different sports. For example, an optimized protocol for a bodybuilder will likely be completely different than an optimized protocol for an MMA fighter.

Things to consider include:

- Anabolic activity via androgen receptor activation, aromatization, 5α-reduction, or the downstream conversion into metabolites that facilitate increases in muscle size and strength
- Antagonism of glucocorticoid receptors leading to the inhibition of protein breakdown and a net increase in muscle size and strength via muscle-sparing
- Psychoactive effects in the brain leading to stronger training and subsequent increases in muscle size
- Stimulation of Erythropoietin (EPO) production leading to improved aerobic performance

Testosterone and Testosterone Derivatives

Testosterone is the parent hormone of this part of the family tree. It is also technically the parent hormone of the entire anabolic steroid family tree because DHT and Nandrolone are both derived from Testosterone.

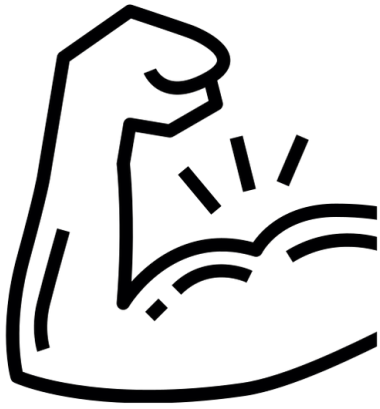
Among Testosterone, the most notable Testosterone derivatives used for performance enhancement in this family are as follows:

- Testosterone
- Equipoise (Boldenone)
- Dianabol (Methandrostenolone)
- Halotestin (Fluoxymesterone)
- Turinabol (Chlorodehydromethyltestosterone)

The three compounds from this family most commonly used in a bodybuilding context are Testosterone, Boldenone (Equipoise) and Dianabol.

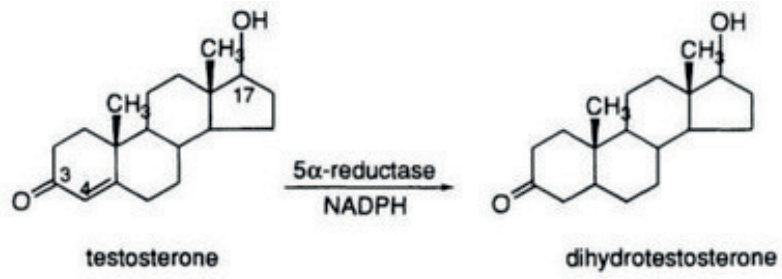
These three compounds are characterized mainly by their broad-spectrum effects on anabolic and androgenic dependent functions, as well as their interaction with aromatase.

They all have strong influences on red blood cell count and energy systems. They are anabolic, but not wildly so. In general, this class of compounds facilitates a middle-ground level of muscle growth, neurological effects, and enhancement of aerobic mechanisms. Testosterone and Dianabol can be enzymatically metabolized into potent estrogens. Halotestin and Turinabol are not substrates for aromatase so Testosterone, Dianabol and Boldenone are the only compounds in this section of the anabolic steroid family tree that can fill the role of a “Test base” and be used as the foundation of a steroid cycle.



Dihydrotestosterone (DHT) and DHT Derivatives

The next family in the anabolic steroid family tree is Dihydrotestosterone (DHT) and DHT derivatives. DHT is the 5α-reduced metabolite of Testosterone that facilitates sexual differentiation of the male genitalia during embryogenesis and drives the maturation of boys into men during puberty. DHT binds more tightly to the androgen receptor than Testosterone and so is more androgenic than Testosterone.



The DHT derivatives most commonly used for performance enhancement include the following:

- Masteron (Drostanolone)
- Primobolan
- (Metenolone) Anavar
- (Oxandrolone)
  DHB (Dihydroboldenone, 1-Testosterone)
- Anadrol (Oxymetholone)
- Winstrol (Stanozolol)
- Proviron (Mesterolone)
- Superdrol (Methasterone)

DHT derivatives are often perceived to be poor choices for a mass building phase/offseason because they don't seem to produce as much hypertrophy as the Testosterone and 19-Nor families. This is a misconception, as DHT derivatives simply have more targeted action in the body. They are not substrates for aromatase like Testosterone derivatives, they don't act as potent agonists of a myriad of different receptors in the body like 19-Nors, and they don't 5α-reduce into more androgenic metabolites.

DHT derivatives weed out a lot of the less predictable activity associated with the other two families and skew more towards pure protein expression and increased force production.
There is no water retention, there are no progestogenic side effects, and all you get is pure muscle growth and proportionally higher amounts of strength gains relative to Testosterone Derivatives and 19-Nors.

DHT derivatives more or less exhibit targeted action on contractile tissue, which is why they're commonly perceived to be “weak” anabolics when in reality, it is the lack of perceived side effects being misinterpreted as “weak.” In general, DHT derivatives are dry strength builders with reliable and predictable levels of anabolic activity. An example of a sport where DHT derivatives are especially useful is MMA. Fighters need to fight at as low of a weight class as possible without compromising their performance, they need to have a favorable ratio of force production relative to their body weight, and they also benefit significantly from increased aggression and neurological enhancement. That is a specific scenario where using something that is skewed more towards the accrual of mass and less androgenic activity would be the worst choice.

While that might be a compound ideal for someone seeking maximum hypertrophy with a relative lack of androgenic side effects like hair loss, in this scenario the opposite is what we would be shooting for. For a MMA fighter we want high force production and aggression with a relative lack of weight gain. This is an example of a scenario where a DHT derivative would be wise to plugin.

Nandrolone (19-Nortestosterone) And 19- Nortestosterone Derivatives

The last family in the anabolic steroid family tree is Nandrolone (19-Nortestosterone) and 19-Nortestosterone derivatives. The parent hormone of this family is Nandrolone (19-Nortestosterone), and all of the anabolic steroids in this category are Nandrolone derivatives. Nandrolone derivatives are most commonly referred to simply as “19-Nors” in the bodybuilding community.

There are quite a few 19-Nors that have been synthesized and documented over the years, most of which are traditionally used at low dosages in women's birth control.

The 19-Nors most commonly used for performance enhancement include the following:

Nandrolone (19-Nortestosterone)

- Trenbolone (Trienolone)
- Trestolone (MENT)

19-Nors are generally characterized by their anabolism and progestogenic activity. They are very anabolic, but they also exhibit significant amounts of satellite interaction with other receptors in the body including the Progesterone receptor. 19-Nor derived progestins are agonists of the Progesterone receptor, which means that they can bind to the Progesterone receptor and activate it.

The 19-Nors are the most suppressive family of the anabolic steroid family tree and will keep your HPTA suppressed even at minuscule trace amounts. Considering this, it would be prudent to reserve your use of them until you have decided if you will be blasting and cruising for the majority of your life. Even one injection of Nandrolone can keep your HPTA suppressed for months, regardless of what you do.

How To Determine Which Anabolics Are Optimal For Your Personal Goals

Understanding optimal applications of anabolics and side effect management can get very complicated, especially when you get into the weeds of sport-specific applications, drug testing, lack of access to certain drugs, and budget limitations.

To simplify things, I highly recommend that you start your education on anabolic steroids by splitting them into the three families and working your way from the ground up.

Start in the Testosterone family and learn why a majority of enhancement protocols use a Testosterone base. Delve into the mechanisms of Testosterone in the body, and how its aromatization into Estrogen and 5α-reduction into DHT facilitates a balancing act of anabolic and androgenic activity in the body, while simultaneously providing neuro and cardioprotection.

Testosterone is the bioidentical anabolic androgen we endogenously produce and rely on, and is more often than not the most intelligent hormone to use for a first cycle.

Only once you have fully leveraged the Testosterone family should you then move on to adding DHT derivatives in subsequent cycles.

If you have goals that cannot be met via Testosterone and DHT derivatives, or you experience undesirable side effects from Testosterone and/or DHT derivatives, then looking to the Nandrolone family would be warranted.

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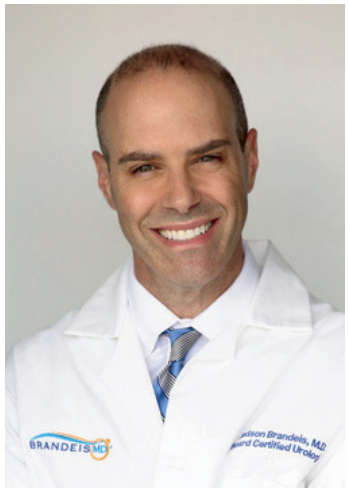
I hope that this the book helps you understand steroid hormones and the different type of anabolic steroids and the variety of other performance-enhancing drugs that are used in the athletic and bodybuilding communities. I hope you also understand the risks of using these in supraphysiologic doses. I will continue to provide information to my patients in the general public. Please follow my YouTube channel, my website brandeismd.com, book website thetwentyfirstcenturyman.com and support my supplement company www.affirmscience.com.

MEET DR. BRANDEIS



Judson Brandeis, MD, is a board-certified urologist who currently practices men's health and sexual medicine in Northern California. His book, The 21st Century Man, is the most comprehensive guide to men's health and has won multiple awards.

At BrandeisMD, he performs clinical research using shockwave therapy, platelet-rich plasma, high-intensity focused electromagnetic waves, microvascular ultrasound, and nutritional supplements for conditions such as sexual dysfunction and Peyronie's disease. Dr. Brandeis is on the Board of Advisors for BioTE,

GAINSWave,
and BTL. He is the CEO of AFFIRM Science, which creates nutritional supplements based on current scientific data, formulating products like AFFIRM, PreLONG, SupporT, and SPUNK. He has been voted Top Urologist in the Bay Area by San Francisco Magazine from 2014 to 2026, and has appeared on The Doctors TV show and numerous podcasts, including Ben Greenfield Fitness and Dr. Drew.

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