

# THE SIDE EFFECTS OF ANABOLIC STEROIDS



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- A variety of side effects can occur when anabolic steroids are misused, ranging from mild effects to ones that are harmful or even life-threatening. Most are reversible if the user stops taking the drugs. However, others may be permanent or semi-permanent.
- Most data on the long-term effects of anabolic steroids in humans come from case reports rather than formal epidemiological studies. Serious and life-threatening adverse effects may be underreported, especially since they may occur many years later. One review found 19 deaths in published case reports related to anabolic steroid use between 1990 and 2012; however, many steroid users also used other drugs, making it difficult to show that the anabolic steroid use caused these deaths. One animal study found that exposing male mice for one fifth of their lifespan to steroid doses comparable to those taken by human athletes caused a high frequency of early deaths.



# Possible Health Consequences of Anabolic Steroid Misuse

- Cardiovascular system
- Hormonal system
- Infection
- Liver
- Musculoskeletal system
- Psychiatric effects
- Skin



# Cardiovascular System

- high blood pressure
- blood clots
- heart attacks
- stroke
- artery damage



# Cardiovascular System

- Steroid use has been associated with high blood pressure; decreased function of the heart's ventricles; and cardiovascular diseases such as heart attacks, artery damage, and strokes, even in athletes younger than 30. Steroids contribute to the development of cardiovascular disease partly by increasing the level of low-density lipoprotein (LDL) and decreasing the level of high-density lipoprotein (HDL). High LDL and low HDL levels increase the risk of atherosclerosis, a condition in which fatty substances are deposited inside arteries and disrupt blood flow. If blood is prevented from reaching the heart or brain, the result can be a heart attack or stroke, respectively. Steroids also increase the risk that blood clots will form in blood vessels, potentially disrupting blood flow and damaging the heart muscle, so that it does not pump blood effectively.

# Hormonal System

## *Men*

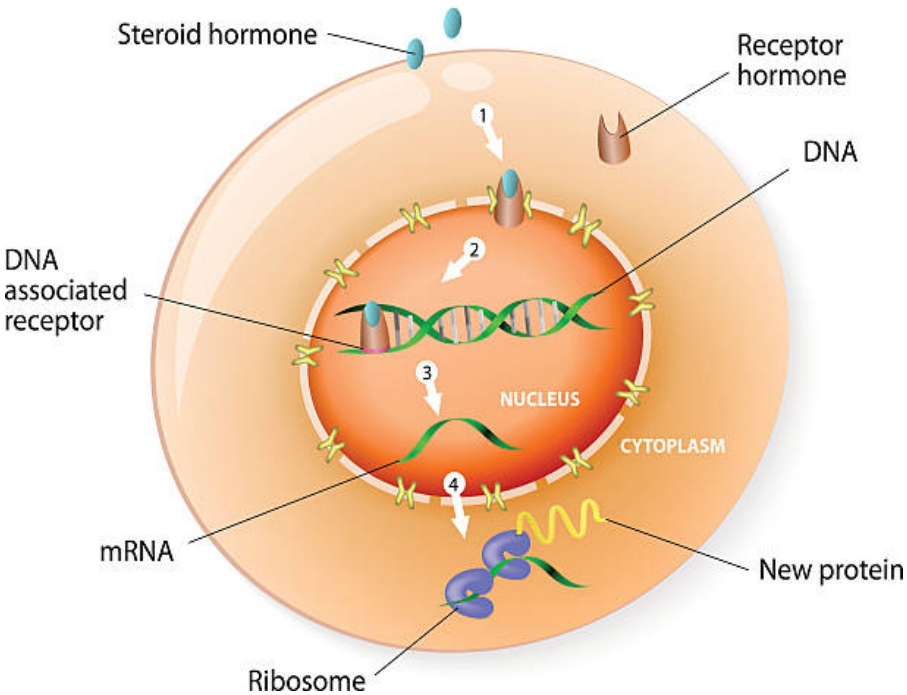
- decreased sperm production
- enlarged breasts
- shrinking of the testicles
- male-pattern baldness
- testicular cancer

## *Women*

- voice deepening
- decreased breast size
- coarse skin
- excessive body hair growth
- male-pattern baldness



# STEROID HORMONES



# Hormonal System

- Steroid use disrupts the normal production of hormones in the body. Changes that can be reversed include decreased sperm production, decreased function of the testes (hypogonadism) that leads to low testosterone levels, and shrinking of the testicles (testicular atrophy). Irreversible changes include male-pattern baldness and breast development (gynecomastia) in men. Anabolic steroids may also act upon the hormone system to increase the risk of testicular cancer, especially when steroids are used in combination with insulin-like growth factor.
- In females, anabolic steroids cause masculinization. Specifically, breast size and body fat decrease, the skin becomes coarse, and the voice deepens. Women may experience excessive growth of body hair but lose scalp hair. With continued administration of steroids, some of these effects become irreversible. It is commonly believed that anabolic steroids will produce irreversible enlargement of the clitoris in females, although there are no studies on this.

# Infections

- HIV/AIDS
- Hepatitis



# Infections

- Many people who inject anabolic steroids may use nonsterile injection techniques or share contaminated needles with other users. This puts these steroid users at risk for acquiring life threatening viral infections, such as HIV and hepatitis B and C. In addition, animal models indicate that anabolic steroids suppress the immune system, which could worsen infections.

# Liver

- peliosis hepatitis
- tumors



# Liver

- Steroid misuse has been associated with liver damage, tumors, and a rare condition called peliosis hepatis, in which blood-filled cysts form in the liver. The cysts can rupture, causing internal bleeding and even death in rare cases.

# Musculoskeletal System

- short stature (if taken by adolescents)
- tendon injury



# Musculoskeletal System

- Rising levels of testosterone and other sex hormones normally trigger the growth spurt that occurs during puberty and adolescence. These rising levels of testosterone also provide the signals to stop growth. When a child or adolescent takes anabolic steroids, the resulting artificially high sex hormone levels can prematurely signal the bones to stop growing.
- Evidence suggests that weightlifters who misuse anabolic steroids have stiffer tendons, which could lead to an increased risk for tendon injury.



# Psychiatric Effects

- aggression
- mania
- delusions



# Skin

- severe acne and cysts
- oily scalp and skin
- abscess at injection site
- jaundice



# Skin

- Steroid misuse can cause acne, hair loss on the head, cysts, and oily hair and skin. Users who inject steroids may also develop pain and abscess formation at injection sites.
- Anabolic steroids can also produce jaundice, or yellowing of the skin or eyes, as a result of damage to the liver.

