

Congress of the United States
House of Representatives
Committee On Oversight and Government Reform
February 12, 2008

Clinical Realities of Human Growth Hormone (HGH), B 12, and other Substances of Abuse as Related to Committee's Investigation Into Allegations of Abuse in Major League Baseball

Dr. Todd Schlifstein

Department of Rehabilitation Medicine

NYU Medical Center-RUSK Institute of Rehabilitation Medicine

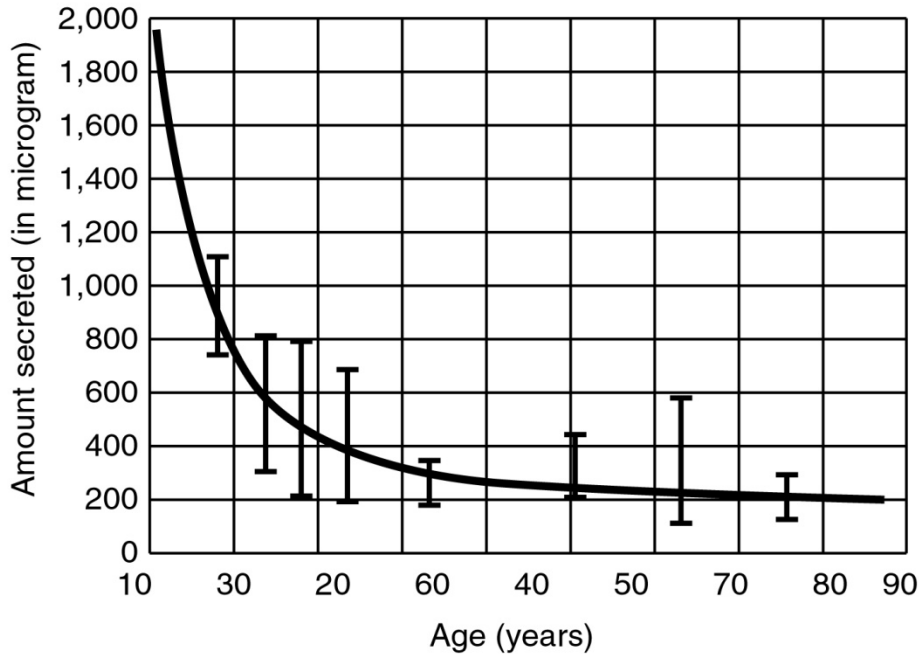
Assistant Professor, NYU School of Medicine

Human Growth Hormone (HGH) use has been increasing over the past several years in professional sports, but also in other populations. When professional athletes and other celebrities use HGH, it has a trickle-down effect to the rest of the population. HGH is used for its potential performance enhancing effects, muscle building effects and as an anti-aging treatment. These uses of HGH are not what these medications were indicated to do. As with any medication, there are side effects.

Human Growth Hormone is normally found in the body and produced by the pituitary gland. It affects many body systems including muscle, bone, and skin. Normally, after the age of 30, the production by the body gradually decreases. It is medically indicated for dwarfism (when the body doesn't produce enough HGH) and in HIV patients to prevent and treat wasting by helping to

increase Lean Body Mass (LBM). From studies from these indications, we also see some of the side effects of HGH.

Growth Hormone Decline



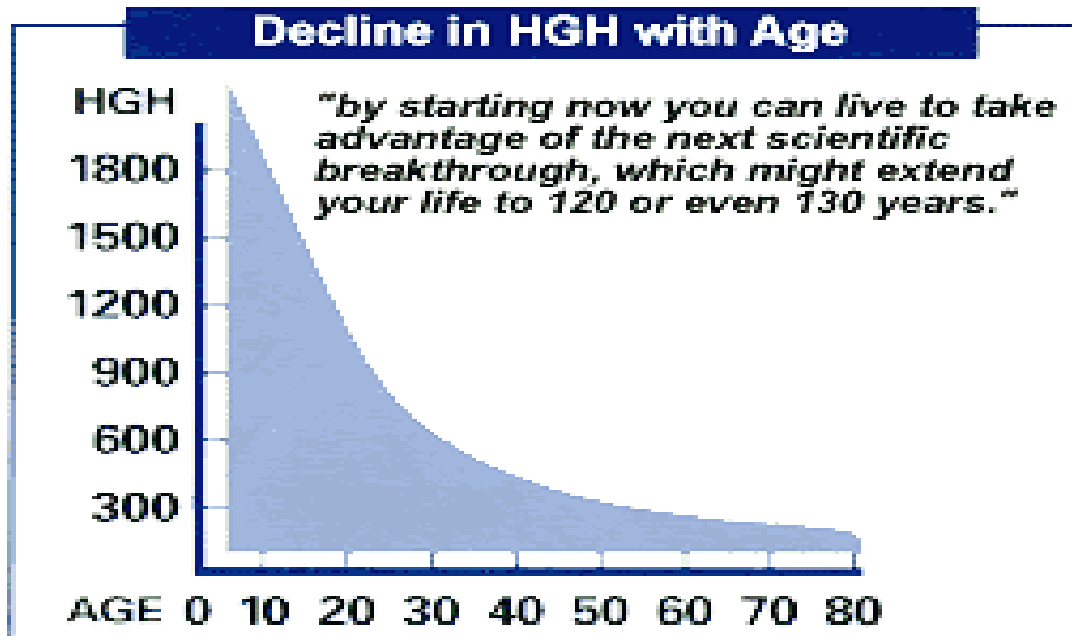
As a performance enhancing drug, HGH is believed to increase energy, increase or maintain lean body mass (muscle to fat ratio), helps muscle recovery and helps to recover from injuries faster. It has been shown to increase Lean Body Mass. Studies showing the benefits of HGH with regards to healing, have not been done. I have seen case evidence of this benefit. When HGH is used in combination with anabolic steroids, the effects are amplified. The combined use increases muscle strength, speed and size. When HGH and anabolic steroid are used together, they did show increased performance. Studies have had mixed results when comparing the performance enhancing benefits of using both HGH and steroids versus using steroids alone. Performance enhancement means an increase in speed or strength in a measureable activity without practice of that activity. For example, the number of reps in a bench press at start and then again at 6 weeks. When studying the performance enhancing effects of HGH by itself, it has failed to improve performance. It has been shown to increase muscle mass.

There are many limitations in the medical research that is available. The studies do not look at HGH use over the long term. The studies do not look at the effects of HGH when cycling on and off steroids. When used in this manner, it is used to help maintain the gains made when on steroids. Need to compare people who cycle on and off steroids with and without HGH to see if performance enhancement better when off steroids but still using HGH. Also, it is difficult to assess if it gives energy to help workout out better or harder. No assessment as to length of recovery time from workout or injury. No assessment as to whether it decreases muscle soreness post workout.

At the present time, there is no urine test for HGH and no reliable blood test for HGH. Recent developments in Australia have found a blood test that was effective in detecting HGH when it is used with anabolic steroids.

Body builders and weightlifters have been using HGH for many years. It is through their trials and errors where we see the benefits of HGH, but we also see the side effects and limitations. HGH has helped body builders and weight lifters gain strength and size as never before.

Anti-aging medicine has also expanded its use into other populations. Trying to slow the aging process and appear younger, people have been prescribed and self prescribed HGH as well as other drugs. HGH will make your skin appear more youthful by increasing blood flow, maintaining Lean Body Mass, and increasing elasticity. It helps keep muscle mass even when decreasing caloric intake. This type of use has also greatly increased the demand for HGH.



Websites have very misleading information. Live to 120 or 130 years old? HGH has not been shown to increase your lifespan. In animal studies, it actually decreased life span as animals died of tumors growing at extremely fast rates.

Side effects of HGH depend on type, dose, and length of use. Side effects also can be amplified by steroid use. Without close medical monitoring, undiagnosed tumors will grow much faster than normal. When too much is used acutely, rapid onset carpal tunnel syndrome is seen with large, swollen, painful, and numb hands. I see patients come to the office with this presentation, and they are surprised that I know what they are doing.

HGH also elevates your blood sugar levels which can make you feel tired, nausea and fatigued. With continued use in this manner, there are cases of causing diabetes.

Growth plates in adults are closed. When using too much for too long a period of time, bones will overgrow at growth plates as they can no longer elongate. In the face, peri-orbital ridges thicken giving a cro-magnum appearance with a square face. Hands and feet get wider with large knuckles. Joints may get stiffer and degenerate faster.

Muscles that grow beyond their normal limits get tears, sprains and strains in atypical locations in atypical ways. The muscle growth is out of proportion to the tendon growth, thus changing your body's natural biomechanics. Often, patients come in with unusual and severe muscle and tendon tears with minimal stress causing the tear.



As with anything injected, there are risks of infection, bruising, scarring, and disease transmission with needle reuse (hepatitis, HIV). I have seen abscess formation, cellulitis, and scar tissue formation. Sometimes these problems need antibiotics and even surgery.

There is also a large market of fraudulent products being sold. Most of these are HcG. It has only a small physical benefit, but it is hard to distinguish real from fake. With such good forgeries out there, the market place is quite large.

With people self treating, the incidence of these side effects is certainly higher. Websites that sell these drugs often give instructions and offer remedies for side effects. These remedies are often other drugs. For example, they sell insulin to inject to help lower their elevated blood sugar from HGH. Diuretics are used to help mask drug testing and lose excess water from retention.

Opioid analgesics are largest growing drugs of abuse in the United States. Abusers of HGH and steroids often use opioids to help control muscle and joint pain. Other medications such as valium and xanax are used to control anxiety and help them sleep. Stimulants help to wake up, increase attention and focus. These

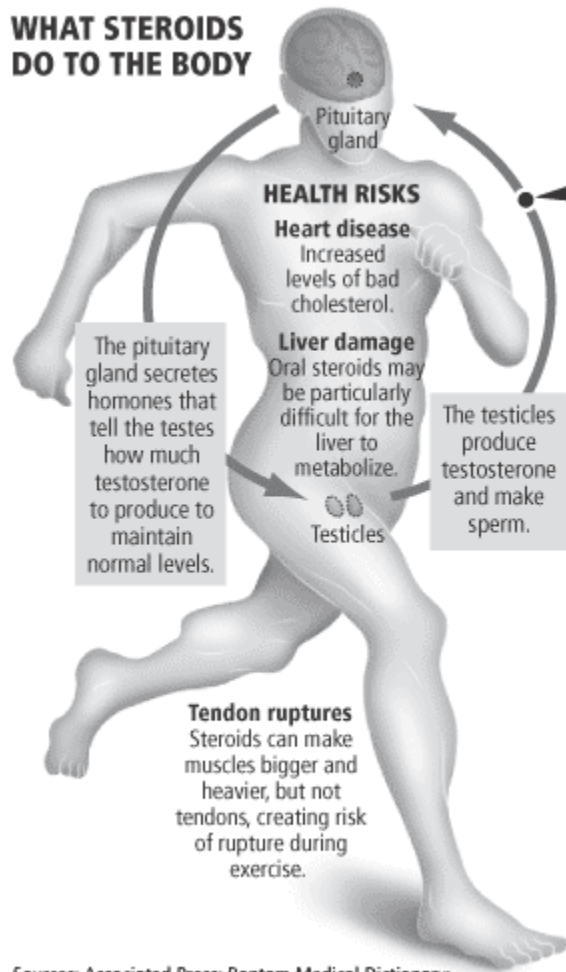
drugs are also part of the polypharmacy of self treatment. Studies of anabolic steroid users show that they often are using multiple drugs.

Anabolic steroids should be mentioned as they are often taken with HGH for performance enhancement.



Oral, topical and injectable forms are available.

WHAT STEROIDS DO TO THE BODY

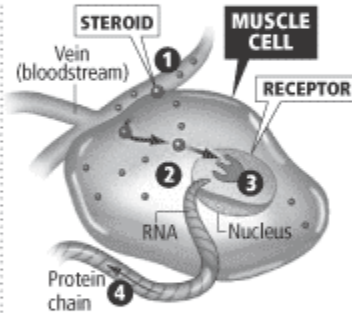


The pituitary gland secretes hormones that tell the testes how much testosterone to produce to maintain normal levels.

The testes produce testosterone and make sperm.

When a male takes steroids, the pituitary gland detects the high quantity of testosterone and sends signals to the testicles to shut down normal testosterone production. This may cause shrinkage of the testicles, infertility and enlarged breasts in men. Women may experience masculinizing effects.

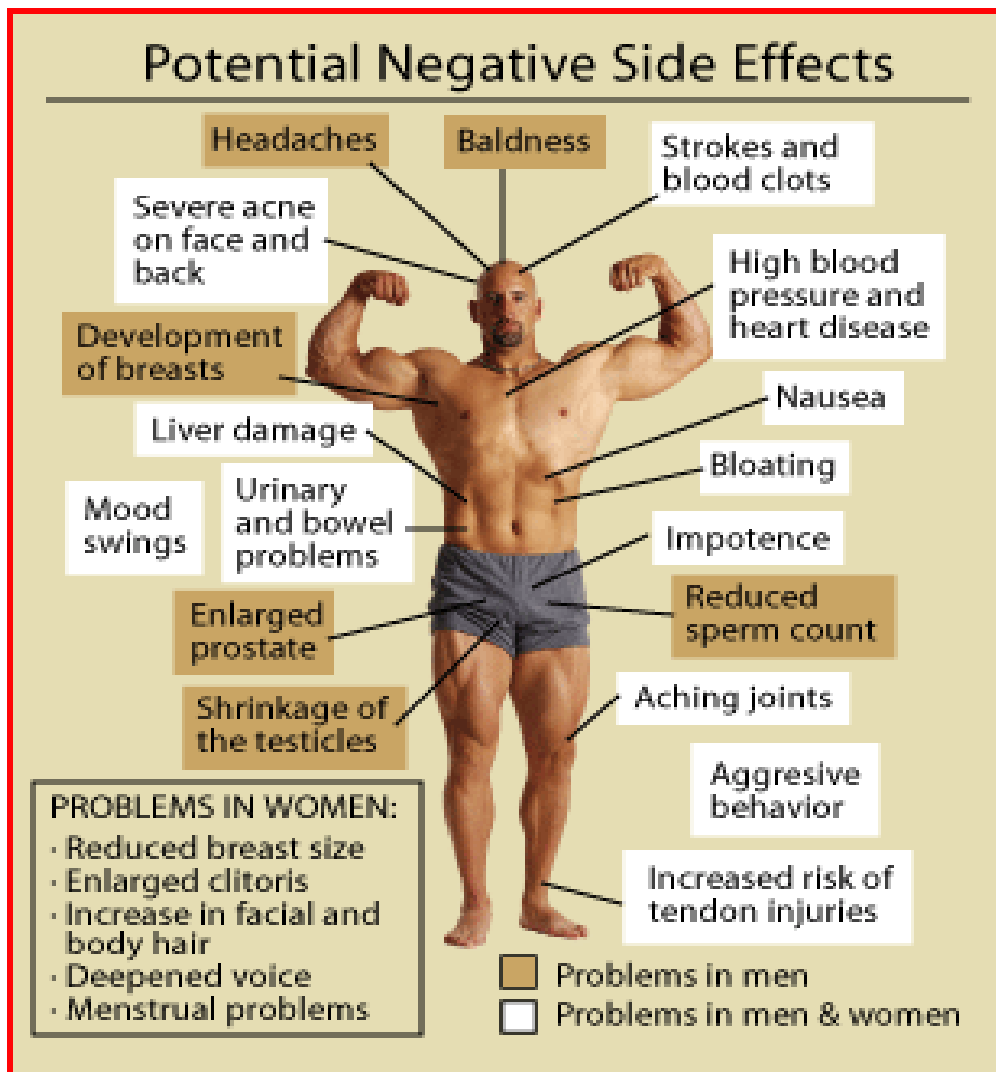
HOW STEROIDS BUILD MUSCLE



- 1 Blood carries steroid to muscle
- 2 Steroid is drawn toward muscle cell's wall and attaches to a receptor
- 3 Steroid enters cell nucleus, interacts with chromosomes
- 4 Nucleus sends out information to increase protein production, which strengthens and increases muscle

Sources: Associated Press; Bantam Medical Dictionary; San Francisco Chronicle research, P-I research

SAN FRANCISCO CHRONICLE / SEATTLE P-I



Newsweek © 2004 Newsweek, Inc. All rights reserved.
 Reprinted with permission.

The benefits from these drugs may be very appealing to some people, and these drugs seem even better when sports stars use them. The use of performance enhancing drugs by professional athletes endorses its use. Athletes get millions of dollars to endorse a soft drink or energy drink, so we shouldn't underestimate their influence on drug use. This increases demand. On line, other countries as well as other sources create a large supply. Lets not take our eye of the ball. Whether a record has an astericks or not makes an interesting sports debate. But the bigger issue is the health and well being of millions of people.