

## STEROID ABUSE

### JUNE 2008

#### Introduction

Testosterone and other anabolic steroids are essential for the treatment of a variety of serious health disorders, including sexual immaturity, depressed mood, sexual dysfunction, osteoporosis, and fatigue and muscle weakness in men with clinically low testosterone levels due to congenital or acquired disease. These compounds also may be effective in treating certain types of anemia and breast cancer, and a rare genetic disorder that causes angioedema (swelling of tissue).<sup>1</sup>

While anabolic steroids clearly serve an important clinical need, they also are increasingly abused by athletes seeking to enhance physical performance and by others seeking to enhance physical appearance.

The Endocrine Society and its members are deeply concerned about the abuse of these powerful drugs. Anabolic steroids can have serious and potentially life-threatening side effects, and their abuse by athletes and others is evolving into a major health problem in the United States, especially for our nation's youth.

This position statement supports the appropriate clinical use of anabolic steroids and warns of the serious health consequences of their abuse. A clear statement on the ethical use of these drugs is particularly important in light of recent high-profile congressional hearings on steroid abuse. In addition, the upcoming 2008 Summer Olympics will focus international attention on the need to detect and deter performance-enhancing steroid abuse in athletic competition.

As the International Olympic Committee and other sports organizations strive to combat anabolic steroid abuse, it is vital that The Endocrine Society be a leading voice for authoritative information and sound public policy recommendations.

#### Background

Anabolic steroids include testosterone and synthetic substances related to testosterone. Like testosterone, they promote the growth of skeletal muscle and mediate the

development of certain sexual characteristics in both males and females.<sup>2</sup>

Testosterone and synthetic derivatives of testosterone have been used clinically for nearly seven decades to treat androgen (testosterone) deficiency in men.<sup>3</sup> Other medical uses of these compounds include treating delayed puberty and wasting of the body caused by HIV/AIDS infection and other diseases.

During the 1930s, scientists discovered that anabolic steroids promoted the growth of skeletal muscle in laboratory animals, which initially led to their abuse among bodybuilders.<sup>4</sup> Since then, anabolic steroid abuse has become widespread in professional and amateur athletics. Because of their potential to enhance physical performance, anabolic steroids can affect the outcome of sports contests, and their use is banned by most professional and amateur sporting bodies.

Steroid abuse also has been associated with a wide range of adverse and potentially life-threatening side effects.<sup>5</sup>

Anabolic steroid abuse in men can promote breast development, acne, hair loss, and enhanced aggression. In women, anabolic steroids can promote the development of more masculine features such as facial hair and a deeper voice. More alarming, anabolic steroid abuse also has been strongly associated with cardiovascular diseases, including heart attacks and strokes, even in people younger than 30. Pharmacological doses of anabolic steroids, particularly when taken orally, increase the level of low-density lipoprotein (LDL) and decrease the level of high-density lipoprotein (HDL).<sup>6</sup> Oral anabolic steroids also have been linked to liver disease.

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<sup>2</sup> National Institute on Drug Abuse Research Report Series: *Anabolic Steroid Abuse* (2006)

<sup>3</sup> Schulze, Jenny J. et.al., "Doping Test Results Dependent on Genotype of UGT2B17, the Major Enzyme for Testosterone Glucuronidation," *Journal of Clinical Endocrinology & Metabolism* (doi:10.1210/jc.2008-0218), March 11, 2008.

<sup>4</sup> National Institute on Drug Abuse Research Report Series: *Anabolic Steroid Abuse* (2006)

<sup>5</sup> *ibid.*

<sup>6</sup> *ibid.*

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<sup>1</sup> The Hormone Foundation: Hormone Abuse (January 2008)

## Considerations

In the United States, anabolic steroids are illegal without a prescription for an FDA-approved indication; however, these drugs are often imported illegally or created domestically in illegal labs. Athletes and young people also can obtain these drugs over the Internet. This problem of easy access is compounded by the fact that many substances sold over the Internet as energy and muscle-building supplements have been found to contain anabolic steroids. Greater testing by the U.S. Food and Drug Administration (FDA) and regulatory oversight of Internet sales by the U.S. Federal Trade Commission (FTC) are essential to combat the mislabeling of these substances and the availability of controlled anabolic agents.

In addition, certain substances, some marketed as “dietary supplements” under the Dietary Supplement Health and Education Act of 1994 (DSHEA), are converted to potent anabolic steroids in the body. These “precursor” steroids include androstenedione (a testosterone precursor), which appropriately was banned from over-the-counter sale in the United States in 2004. One legally sold and widely available precursor, dehydroepiandrosterone (DHEA), also is converted into androstenedione and testosterone in the body, and may have some of the same effects and carry some of the same health risks as anabolic steroids. A consistent policy and regulatory approach to all hormone precursors, which are in fact drugs, is essential to protect the safety of vulnerable consumers, particularly for substances such as DHEA.

### *Steroid abuse among adolescents and teens*

In 2003, the Centers for Disease Control and Prevention (CDC) found that 6.1 percent of high school students in the United States reported abusing anabolic steroids. During 2005, 4 percent of high school students admitted illegally using anabolic steroids, with the highest level being 10.5 percent among high school males in Alabama and 5.1 percent among high school females in Nevada.

In addition to their other health effects, anabolic steroids can stunt the growth of children by prematurely closing the growth plates of bones. They also can suppress normal gonadal (testes and ovaries) development and function. Although long-term studies are scarce, there may be other harmful effects that will not appear until many years after these drugs are abused.

### *Steroid abuse and athletes*

Some surveys have suggested that up to 6 percent of athletes have abused anabolic steroids, but anecdotal information suggests substantially more widespread abuse. As athletes are esteemed as celebrities and viewed as role models by children, adherence to drug-free policies in

amateur and professional sports sets an important example to discourage anabolic steroid abuse among teenagers and young adults.

According to the December 2007 Mitchell Report, 5 to 7 percent of major league baseball players tested positive for performance enhancing substances, and those figures were most likely a gross underestimation of the scope of the problem, since players were warned of testing earlier in the year. Mandatory testing, which began in 2004, may have reduced the abuse of anabolic steroids, though the available evidence suggests that players switched to human growth hormone, which is not detected in current drug testing procedures. The recommendations from the Mitchell Report may provide an effective template for anti-steroid abuse policies in other professional sports.<sup>7</sup>

Anabolic steroid abuse among Olympic and other amateur competitors is also believed to be widespread. Past anabolic steroid abuse by Olympic athletes has tainted the legitimacy of many sports and resulted in multiple medals being stripped from competitors. Accurate, consistent, and reliable year-round testing for anabolic steroids and other banned substances—with severe and aggressively enforced penalties in all sports—is essential to preserve the integrity of both amateur and professional competition.

This testing program, however, should allow Therapeutic Use Exemption (TUE) for the legitimate therapeutic use of hormones when prescribed for an FDA-approved indication and administered under the supervision of a qualified physician. These procedures should in no way discourage patients from seeking appropriate medical care out of fear of being disqualified from athletic competition.

### *Lack of accurate assays*

Currently, assays that detect the presence of testosterone, dihydrotestosterone, and other anabolic agents do not universally test for all possible forms of doping, making it difficult to detect steroid abuse among athletes.<sup>8</sup> Efforts to thwart steroid abuse in sports are further hindered by the continual development of so-called “designer drugs,” which are anabolic agents that quickly break down in the blood or during testing procedures and are therefore more difficult to detect.

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<sup>7</sup> *Report to the Commissioner of Baseball of an Independent Investigation into the Illegal Use of Steroids and Other Performance Enhancing Substances by Players in Major League Baseball.* (December 7, 2007)

<sup>8</sup> *Testosterone Assays in Practice: Addressing the Problems and Approaching Solutions*, The Endocrine Society

To help prevent the abuse of these substances and to diagnose and evaluate the treatment of patients with hormonal dysfunction, the federal government should invest in the development and implementation of high-quality laboratory methodologies for the measurement of hormones, hormone precursors, hormone analogs, and hormone metabolites in samples from humans.

### Positions

The Endocrine Society advocates for the safe and ethical prescription, distribution, and use of all hormones and hormone precursors, including anabolic steroids and other hormones that could potentially be misused by those seeking to enhance body image and/or athletic performance.

The Society stresses that there is a definitive line between abuse and appropriate clinical use. Androgenic steroids and other hormones have been indelibly stained as illicit drugs and yet there are clearly appropriate clinical uses, such as treatment of the syndromes of hormone deficiency (e.g., growth hormone deficiency due to hypothalamic or pituitary disease or testosterone deficiency due to hypothalamic, pituitary or testicular disease) and HIV/AIDS wasting.

The Society strongly believes that anabolic steroids and all other hormones should be prescribed and administered only when medically necessary, and only by doctors specializing in the diagnosis and treatment of hormonal disorders.

The Society also supports policies that prevent the illegal and non-medical uses of these drugs.

Such as:

- The U.S. Food and Drug Administration (FDA) should regulate the manufacture (quality, content, etc.) and sales of all hormones and hormone precursors, including those currently sold over the counter as “dietary supplements” (e.g., DHEA). This regulation should also include distribution via the Internet.
- The federal government and professional and amateur sports governing bodies should aggressively publicize the dangers of abusing these drugs and support public outreach programs that specifically target at-risk youths.
- The federal government should increase funding for research on the development and implementation of high-quality laboratory methodologies for the measurement of hormones, hormone precursors, hormone analogs, and hormone metabolites in samples from humans to detect the abuse of these substances and to diagnose and monitor the treatment of patients with hormonal dysfunction.
- Professional and amateur sports governing bodies should adopt the most consistent, most advanced, and most accurate assays when testing for anabolic steroids and other banned substances.