Testes to Testy: A Look at Anabolic Steroids

By Christa M. Gutzler

Today, the word, “steroid” connotes ideas of illegal activity, toxic self-destruction, and testosterone-fueled competition. The frenzied power and erupible behavior exercised by people on steroids has not always been the primary focus, nor was this aggressive combination the intention for the first incidents of chemically synthesized testosterone usage. In the 19th century, scientific and biological interests piqued during the investigation into what features were truly demonstrative of male identity. It is speculated that the question posed was, “What really made a man a man?” To find answers, scientists isolated the testes of various male birds and erroneously hypothesized that displacing these organs in their abdomens or other locations throughout the body would affect the male sexual reproductive system.

Their findings suggested that the anabolic functions of testosterone could serve many purposes including prolonged and elevated states of physical and mental prowess. To be anabolic means to take simple substances and make them more complex. Testosterone is not harmful discretely, but when compounded with synthetic matter, the hormones take on a life of their own. These discoveries were invaluable to scientists who undertook the synthesis of testosterone, which later produced an extract that would come to be known as the first anabolic steroid. To trace the history of steroids from the initial intended usages to its modern appeal requires a look at the historical, physiological, and cultural aspects of these controversial hormones.

Today, we know that testosterone is a naturally produced hormone in all humans, activates cell growth and promotes overall muscle and stamina development, but the long-term and side effects of seemingly simple compounds into more complex ones. Testosterone is not harmful directly, but when compounded with synthetic matter, the hormones take on a life of their own. These discoveries were invaluable to scientists who undertook the synthesis of testosterone, which later produced an extract that would come to be known as the first anabolic steroid. To trace the history of steroids from the initial intended usages to its modern appeal requires a look at the historical, physiological, and cultural aspects of these controversial hormones.

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While the isolation of testosterone was initially done in the early twentieth century, the question of whether it was an anabolic hormone was not answered until experiments began to unravel the mysteries of the male sex. More clinical studies at the turn of the twentieth century exposed testosterone as an androgen, the generic term for male hormones. Their findings suggested that the anabolic functions of testosterone could serve many purposes including prolonged and elevated states of physical and mental prowess. To be anabolic means to take simple substances and make them more complex. Testosterone is not harmful discretely, but when compounded with synthetic matter, the hormones take on a life of their own. These discoveries were invaluable to scientists who undertook the synthesis of testosterone, which later produced an extract that would come to be known as the first anabolic steroid. A look at the historical, physiological, and cultural aspects of these controversial hormones.

A choice to engage in illegal steroid use translates to a choice in sabotaging the natural testosterone mechanics in one’s body. Anabolic steroids not only affect growth, baldness, impotence, and susceptibility to disease, but the desired outcomes of usage may derail from hyperactive activity and bone strength to out of control fits of aggression and hostility. Most steroid users do so to maximize body weight regimens and increase muscle development, but the long-term and side effects of habitual use can prove to be addictive and deadly. Steroids have been known to cause erratic behavior that matches sociopathic tendencies as both mind and body are affected by hormone injections of this magnitude. Using steroids in cycles is a common tactic, which throws the state of a person’s mental and physical systems into a chaotic world of highs and lows. Because steroids target the hormone receptors responsible for increased and rapid physical activity, their potency can be alarming and the likelihood of an overdose.

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**Genetics May Affect Testing For Drugs in Athletes**

A genetic peculiarity could help devious athletes beat drug tests and could unfairly ruin players who are honest. The genetic variation affects an enzyme that processes testosterone. Although testosterone is primarily known as a male sex hormone, it is made in the body by both men and women.

To differentiate between naturally present hormone and synthetic testosterone from steroid use, drug tests measure a ratio of two chemicals found in urine. One chemical, epitestosterone glucuronide (EG), is made at a constant level in the body, regardless of testosterone levels. The other chemical, testosterone glucuronide (TG), is a by-product of testosterone. Testosterone abuse is usually assessed by the urinary testosterone/epitesterone (T/E) ratio. Levels above 4.0 are considered suspicious.

The large variation in TG excretion and its strong association with a deletion polymorphism in the uridine diphospho-glucuronosyl transferase (UGT) 2B17 gene challenge the accuracy of the T/E ratio test. The enzyme UGT2B17 adds a chemical to testosterone to prepare it for secretion in the urine. Scientists in Sweden found that some people completely lack the gene that produces UGT2B17, and this difference can affect results of doping tests.

About 15 percent of 145 healthy male volunteers lacked the enzyme entirely; 52 percent of the men had one copy of the gene, and one-third of the men had two copies. Some of the men were selected to get a single injection of testosterone. The researchers monitored production of TG in the men’s urine for 15 days after the injection. About 40 percent of the subjects who lacked the enzyme never secreted enough TG to raise suspicions in the standard test even after their hormone injection. As Anders Rane, M.D., Ph.D., of the Karolinska Institute in Stockholm, explains, there is a chance that many such individuals have escaped detection. On the other hand, 14 percent of people with two copies of the gene made so much TG that the current test would identify them as cheaters even before they received a testosterone injection.

No one actually knows whether there have been false-positive or false-negative results among the winners of various games, but it could have happened, Dr. Rane says.

About two-thirds of the East Asians in the study lacked the enzyme, and fewer than 10 percent of the Swedish participants lacked it. Various ethnic groups may use different enzymes to process testosterone, says Glenn Cunningham, M.D., an endocrinologist at Baylor College of Medicine in Houston, Texas.

There is no apparent athletic advantage or disadvantage associated with lacking the enzyme, Dr. Rane says. He suggests combining genetic testing with periodic urine testing that tracks individual athletes over time. Dr. Cunningham thinks that they have made a strong case for genetic testing in addition to current assessments.

Because of the expense, genetic testing is not feasible for large numbers of people. Such tests will probably be used in elite amateur and professional sports, but it is unclear whether it will be available for college and high school athletes.

(Source: Journal of Clinical Endocrinology and Metabolism, 2008; 93:2500-2506.)

**How Hormones Affect Health**

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Q. What is osteomalacia?
A. Soft bones result from a lack of vitamin D and calcium. The full-blown disorder, which was common before we supplemented cow’s milk with vitamin D, was rickets, vitamin D deficiency at its extreme. Rickets was pretty common in the 19th century, as was scurvy, caused by a lack of vitamin C. Scurvy was a bleeding disorder that affected British sailors at sea. They called themselves “Limeys” because they would take limes to prevent scurvy. The other common disorder was vitamin D-dependent rickets.

Walter Simon Newman, Jr, M.D., has been on the Clinical Faculty at Stanford University since 1982. His has been Director of the Western Occupational and Environmental Medicine Association since January 2006. He is a member of the American College of Occupational and Environmental Medicine, the Santa Clara County Medical Association, and the California Medical Association.

**Do Women Have More Dental Problems?**

The transition from foraging to farming has been associated with a decline in oral health, with women experiencing a more rapid and dramatic decline than men. Historically, anthropologists have attributed this difference to behavioral factors such as sexual division of labor and gender-based dietary preferences.

John R. Lukacs, Ph.D., Professor of Anthropology at the University of Oregon, argues that the effect of dietary changes on women’s oral health was intensified by the increased demands on women’s reproductive systems. These included the increase in fertility that accompanied the rise of agriculture, with these factors thereby contributing to the differences in the prevalence of dental caries (cavities). A comprehensive review of dental records in prehistoric and current human populations reveals that women have more dental problems than men because of reproductive and fertility factors that seem to be linked to female hormones.

(Source: Current Anthropology, 2008; 49:901-914.)

**Topical Corticosteroids Not Effective for Sunburn**

Topical steroids do not help to improve acute sunburn when they are applied after a person has been exposed to short-wave ultraviolet B radiation (UV-B), report Danish researchers.

A sunburn is an intense, delayed, transient inflammatory response caused by acute overexposure to ultraviolet radiation (UVR) in sunlight, primarily UV-B.

Annesofie Faurschou, M.D., Hans C. Wolf, M.D., from Copenhagen conducted a randomized, double-blind trial in 20 healthy volunteers (age range, 23 to 62 years) with Fitzpatrick skin type I to III to evaluate the effect of topical corticosteroids in treating acute sunburn.

A person's skin type is often categorized according to the Fitzpatrick skin type scale and is determined genetically. Eye and hair color are also classified according to these criteria.

Six areas were marked on the back of each study participant. Two of these areas received either a moderate-potency or high-potency corticosteroid 30 minutes prior to UV-B exposure as a control; the remaining four areas were treated with either a moderate-potency or high-potency corticosteroid six hours or 23 hours after UV-B exposure.

The scientists concluded that treatment with topical moderate-potency or high-potency corticosteroids did not provide a useful decrease in acute sunburn reaction when it was applied six or 23 hours after UV exposure.

(Source: Archives of Dermatology, 2008; 144:620-624.)

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be confounding. On the other hand, low levels of legally prescribed steroids administered in moderation and under the guidance of a medical professional can benefit the body.

Organic properties of testosterone have healthful benefits, including the mental alertness and physical maintenance sought by both male adolescents during their maturation and males in adulthood. Lawful prescriptions can help treat everything from minor aches and pains to breast cancer, palmonary fibrosis (a disease characterized by an irreversible scarring of the lungs), and pet ailments. Veterinarians have administered appropriate doses of corticosteroids to animals for years, treating conditions like arthritis, inflammation, and energy deficiencies. As with human beings, how closely monitored the injections are by a licensed professional makes a difference as well as the legal status of the particular drug. Like other forms of psychological and physical treatments, it is vital to the outcome of treatment to be properly assessed and monitored. The truth is: the abuse of steroids and other psychoactive substances impairs the individual’s judgment on proper administration including how much, little, or often to take something. Whether the drug is legal does not matter when it comes to the abusive tendencies of the user.