

KEY CONCEPT

Dietary supplements are products that are believed to enhance the diet. They come in a variety of forms. The effects of dietary supplements on the body will vary based on the supplement used and the amount used. Megadoses of dietary supplements can be harmful and lead to toxicity.

current regulatory authority, the FDA can remove an herbal supplement from the market only after it has been shown to be unsafe.

In May 2000, researchers at the University of Arkansas published a study concerning ephedra supplements sold as decongestants, energy boosters, or diet aids. They found significant differences between what the labels said and the actual contents in half of the samples examined. The discrepancy between label and contents in some cases was as much as 20%. One product contained no ephedra alkaloids, whereas at least one sample contained potentially dangerous amounts of ephedra, with 154% of what the label listed. Dr. William J. Gurley, the lead researcher, said that poor quality may contribute to the problems associated with safety and efficacy of herbal supplements. Ephedra, for example, has been linked to hundreds of adverse reactions and several deaths (Gurley, Gardiner, & Hubbard, 2000).

The National Institute of Health's National Center for Complementary and Alternative Medicine (NCCAM) is currently studying the safety and effectiveness of a number of herbal remedies. The results of these studies should help clarify who can benefit from these products.

Glucosamine

glucosamine A substance produced naturally in the body; often used as a supplement to maintain cartilage in the joints.

Glucosamine is naturally produced by the human body and is used as a supplement to maintain cartilage in the joints. It is not usually possible to ingest extra glucosamine through food; most glucosamine tablets are made from shellfish shells. Glucosamine has proven to be effective as a treatment for osteoarthritis, and aids in the recovery of some sports injuries.

There are three different types of glucosamine: glucosamine sulfate, glucosamine hydrochloride, and N-acetyl-glucosamine. There is some debate as to which type is the most effective.

Side effects may include stomach problems, heartburn, or diarrhea. Labels usually recommended that glucosamine be taken with food. People with histories of heart disease or high blood pressure should consult with their health care providers before starting glucosamine supplements, and glucosamine should not be taken while on heart medications or with insulin.

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Chondroitin

Chondroitin is a naturally occurring substance found in human and animal cartilage. Animal tissues are a good source of chondroitin. It has proven abilities to treat osteoarthritis (bone loss), and has also been used to treat psoriasis and cancers, although tests of its effectiveness in treating the latter problems have proven inconclusive.

Chondroitin appears to be nontoxic, with no contraindications, although anticoagulant users should consult a physician before starting chondroitin supplements. The biggest danger appears to be wasting money on products that claim to contain the substance, but actually contain little or no chondroitin.

chondroitin A naturally occurring substance, found in human and animal cartilage, that is often used as a supplement to treat osteoarthritis.

KEY CONCEPT

There is a vast array of dietary supplements on the market today. They consist of vitamins (for example, vitamin E, vitamin B-complex, and vitamin C); minerals (for example, zinc, iron, and sodium); herbs (for example, St. John's Wort, ginkgo biloba, and ginseng); and other naturally occurring substances (for example, glucosamine and chondroitin).

PERFORMANCE ENHANCERS

The "win at all cost" mentality in athletics creates an unhealthy incentive to do whatever is necessary to succeed. It is estimated that between 1 and 3 million athletes in the United States have used **anabolic steroids**, which are the most common **ergogenic aid**. Thousands of others have experimented with other types of performance enhancers (Figure 9-3). An **ergogenic aid** is any agent that enhances energy utilization, including energy production and efficiency.

anabolic steroids

Substances that are used to enhance metabolism and thus act to build up the body tissues.

ergogenic aid Any agent that enhances energy utilization, including energy production and efficiency.

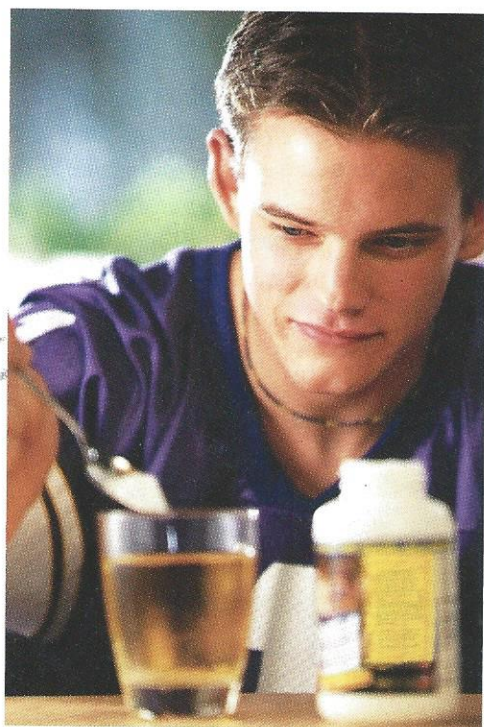


Figure 9-3 Athletes often experiment with performance enhancers in the hope of gaining an edge over their competitors. (Courtesy of Photodisc)

anabolic-androgenic steroids Manmade substances related to male sex hormones that are used to build muscle and enhance masculine characteristics.

Anabolic Steroids

Anabolic-androgenic steroids are manmade substances related to male sex hormones. *Anabolic* refers to muscle-building, and *androgenic* refers to increased masculine characteristics. *Steroids* refers to the class of drugs. These drugs are available legally only by prescription, to treat conditions that occur when the body produces abnormally low amounts of testosterone, such as delayed puberty and some types of impotence. They are also used to treat body wasting in patients with AIDS and other diseases that result in loss of lean muscle mass. Abuse of anabolic steroids, however, can lead to serious health problems, some of which are irreversible.

Today, athletes and others abuse anabolic steroids to enhance performance and also to improve physical appearance. Anabolic steroids are taken orally or injected, typically in cycles of weeks or months (referred to as *cycling*), rather than continuously. Cycling involves taking multiple doses of steroids over a specific period of time, stopping for a period, and starting again. In addition, users often combine several different types of steroids to maximize their effectiveness while minimizing negative effects (referred to as *stacking*).

The major side effects of anabolic steroid abuse include liver tumors and cancer, jaundice (yellowish pigmentation of skin, tissues, and body fluids), fluid retention, high blood pressure, increases in low-density lipoproteins (LDL, or bad cholesterol), and decreases in high-density lipoproteins (HDL, or good cholesterol). Other side effects may include kidney tumors, severe acne, and trembling. Many gender-specific side effects are associated with these drugs. Men many suffer shrinking of the testicles, reduced sperm count, infertility, baldness, development of breasts, and increased risk of prostate cancer. Women may suffer growth of facial hair, male-pattern baldness, changes in or cessation of the menstrual cycle, enlargement of the clitoris, and a deepened voice. Adolescents' growth may be halted prematurely, through premature skeletal maturation and accelerated puberty changes. This means that adolescents risk remaining short for the remainder of their lives if they take anabolic steroids before the typical adolescent growth spurt. In addition, people who inject anabolic steroids run the added risk of contracting or transmitting HIV/AIDS, which is potentially fatal, or hepatitis, which causes serious damage to the liver.