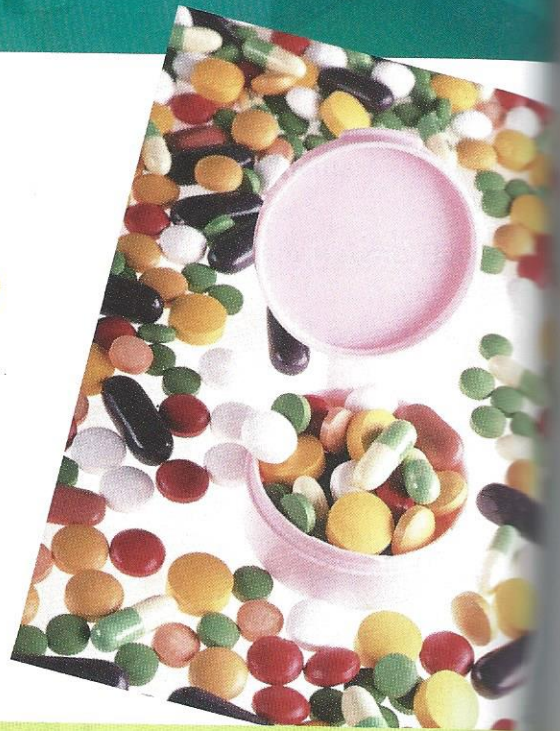


CHAPTER 9

Dietary Supplements and Performance Enhancers



KEY TERMS

anabolic steroids
anabolic-androgenic steroids
androstenedione
athletic code of ethics
caffeine
chondroitin
creatine monohydrate
dietary supplement
doping
ephedra
ergogenic aid
glucosamine
growth hormone
medicinal herbs

OBJECTIVES

Upon completion of this chapter, the reader should be able to:

- Explain what dietary supplements are and what effect they have on the body
- Give at least four examples of popular dietary supplements on the market today
- Explain what performance enhancers are and why many athletes take them
- State what athletic organizations monitor drug use by athletes
- Discuss how education is important to the understanding of supplements and performance enhancers
- Explain the athletic code of ethics

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POPULAR NUTRITIONAL SUPPLEMENTS

The Dietary Supplement Health and Education Act defines a **dietary supplement** as a product (other than tobacco) intended to enhance the diet that bears or contains one or more of the following dietary ingredients: vitamins, minerals, amino acids, herbs, and/or other botanical substances. Dietary supplements are available widely through many commercial sources, including health food stores, grocery stores, pharmacies, and by mail. Dietary supplements may be in the form of tablets, capsules, powders, gels, extracts, or liquids, as well as in other formulations.

Historically in the United States, the most prevalent type of dietary supplement was a multivitamin/mineral tablet or capsule that was available in pharmacies, whether by prescription or over the counter. Supplements containing strictly herbal preparations were less widely available. Today, a wide array of supplement products is available. They include vitamins, minerals, other nutrients, and botanical supplements, as well as ingredients and extracts of animal and plant origin.

Vitamins

Recall from Chapter 8 that vitamins are organic (carbon-containing) compounds that are essential in small amounts for body processes. Vitamins themselves do not provide energy. They enable the body to use the energy provided by fats, carbohydrates, and proteins. Vitamins should not be overused; more is not necessarily better (Figure 9-1). In fact, megadoses can be toxic (poisonous). Normally, a healthy person who eats a balanced diet will obtain all the nutrients needed, including vitamins.

Vitamins taken in addition to those received through the diet are called *vitamin supplements*. These are available in concentrated forms in tablets, capsules, and drops. Vitamin concentrates sometimes distinguish natural or synthetic (manufactured). Some people believe that a meaningful difference exists between the two types and that the natural are far superior in quality to the synthetic. However, according to the United States Food and Drug Administration (FDA), the body cannot distinguish between a vitamin of plant or animal origin and one manufactured in a laboratory. Once they have been dismantled by the digestive system, the two types of the same vitamin are chemically identical.

dietary supplement A product, other than tobacco, intended to enhance the diet that bears or contains one or more of the following dietary ingredients: vitamins, minerals, amino acids, herbs, and/or other botanicals.

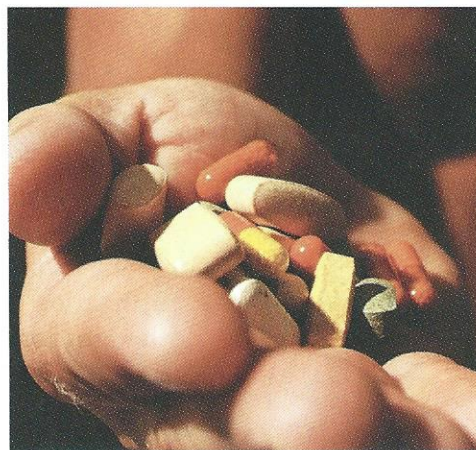


Figure 9-1 Vitamins come in many forms and are usually not necessary for good health. Megadoses can be toxic. (Courtesy of Photodisc)

Healthy athletes who eat a variety of foods using the Food Guide Pyramid should be able to obtain all the vitamins needed to maintain good health. However, some people take supplements because they believe that:

- food no longer contains the right nutrients in adequate quantities
- supplements can “bulk up” muscles and enhance athletic performance
- vitamins provide needed energy
- vitamins and minerals can cure anything, including heart trouble, the common cold, and cancer.

The fact is that a balanced diet does meet all the nutritional needs of athletes. No amount of vitamins will help to build muscles; only weight training can accomplish that. Vitamins do not provide energy themselves; rather, they help the body access and use the energy within the carbohydrates, proteins, and fats ingested. Only certain diseases caused by vitamin deficiencies (such as beriberi, scurvy, rickets) can be cured with the help of vitamin supplements. Heart disease, cancer, and the common cold cannot.

Almost anyone can take a daily multivitamin and mineral supplement without fear of toxicity. A megadose, which is 10 or more times the Recommended Dietary Allowance (RDA) Dietary Reference Intake (DRI), to correct a deficiency or to help prevent disease should be prescribed by a physician. If a multivitamin-mineral is taken as a supplement, it is best not to

exceed 100% of the RDA/DRI for each vitamin and mineral. An excess of one vitamin or one mineral can negatively affect the absorption or utilization of other vitamins and minerals. If vitamin supplements are thought to be necessary, it is essential that a physician or registered dietitian be consulted first.

Minerals

A mineral is an inorganic (non-carbon-containing) element that is necessary for the body to build tissues, regulate body fluids, and assist in various other body functions. Minerals are found in all body tissues. They cannot provide energy by themselves, but in their role as body regulators, they contribute to the production of energy within the body.

Minerals are found in water and in natural (unprocessed) foods, together with proteins, carbohydrates, fats, and vitamins. Minerals in the soil are absorbed by growing plants. Humans obtain minerals by eating plants grown in mineral-rich soil or by eating animals that have eaten such plants.

Fun Facts

Three thousand years ago, the ancient Greeks ate “substances” to improve athletic performance.

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Because it is known that minerals are essential to good health, some would-be nutritionists claim that more is better. Ironically, more can be hazardous to health when it comes to minerals. A healthy individual who eats a balanced diet will normally lose some minerals through perspiration and saliva, and will excrete amounts in excess of body needs in urine and feces. However, when concentrated forms of minerals are taken on a regular basis, over a period of time they build up to more than the body can handle, and toxicity develops. An excessive amount of one mineral can sometimes cause a deficiency of another mineral. In addition, excessive amounts of minerals can cause hair loss and changes in the blood, hormones, bones, muscles, blood vessels, and nearly all tissues. Concentrated forms of minerals should be used only on the advice of a physician.

Herbal Supplements

Medicinal herbs are some of the oldest medicines. Increased use of herbs in recent years is evidence of a public interest in having alternatives to conventional medicine (Figure 9-2). Nearly half of all Americans take herbal supplements as a form of medication. This amounts to approximately \$15 billion a year in out-of-pocket expense. According to the New England Journal of Medicine, research shows that many do not see the need to inform their physicians of their use of alternative medicines, including herbal supplements (Haller & Benowitz, 2000).

A national survey by National Public Radio, the Kaiser Family Foundation, and Harvard's Kennedy School of Government found that 50% of all Americans believe that dietary supplements other than standard minerals and vitamins are generally good for their health and well-being. About 400 herbs are currently used widely and distributed as capsules, extracts, tablets, and teas. Many of these dietary supplements are safe, but many are not.

Approximately 1,500 botanicals are sold as dietary supplements or ethnic traditional medicines. Herbal products are considered dietary supplements by the FDA. Therefore, they are not regulated by the FDA as traditional drugs. The manufacturers of these products are not required to demonstrate the safety and effectiveness of their products before they are put on the market. In addition, the manufacturers do not have to adhere to any of the standard quality controls mandated for drugs. As a result, the composition of herbal products may vary greatly from manufacturer to manufacturer and even from one batch to another. Under its

medicinal herbs Plant matter, used in the form of powders, extracts, teas, and/or tablets, believed to have therapeutic benefits.

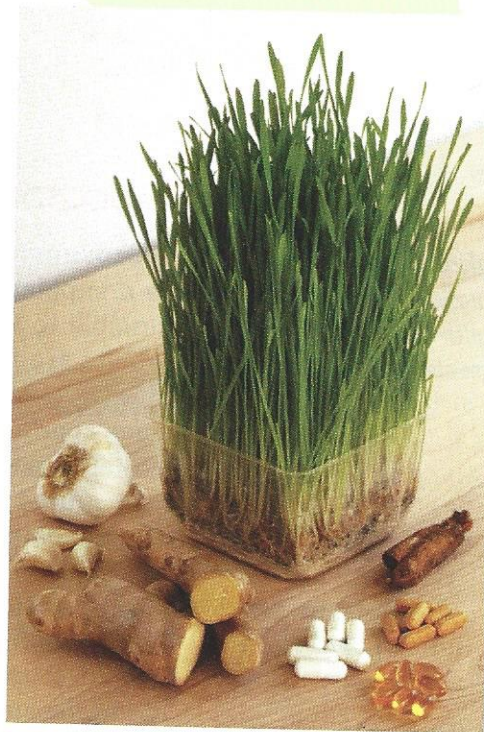


Figure 9-2 Herbal products are considered dietary supplements by the Food and Drug Administration. (Courtesy of Photodisc)