

Protecting Health

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15.1 Nutrition, Exercise, and Health

What does the human body need in the way of nutrition and exercise? What can you do to live a healthier life? After all, health is wealth and never to be taken for granted.

Let's start with your diet. You need a certain number of food Calories to support your activities. Recall that a food Calorie is a unit of energy. Technically, one Calorie (spelled in the upper case) is equal to a kilocalorie, which is 1000 calories (spelled in the lower case). A kilocalorie is the heat energy needed to change the temperature of 1 kg of water by 1°C. These food Calories provide the fuel that your cells use to make ATP. Most people need between 1500 and 3000 Calories a day—the exact number depends on your body size and activity level.

You also need certain nutrients that your body can't make on its own. For example, adult humans cannot make 9 of the 20 amino acids needed to build proteins. This is why you need to eat a "complete protein"—one that contains all the amino acids—regularly. Meat is a complete protein, as are beans and rice when eaten together, an important part of many vegetarian diets. Soybeans and quinoa are two other plant-based foods that are complete proteins (Figure 15.1).



FIGURE 15.1

Tofu is made from soybeans, a plant-based food that provides a complete protein.

Humans also require a number of vitamins and minerals in small amounts. **Vitamins** are organic molecules that are essential nonprotein components of certain enzymes. The body needs many different vitamins, but let's look at just a few. Vitamin C, which is found in citrus fruits, dark green leafy vegetables, and certain other foods, helps the body resist infections and repair wounds. Vitamin A, which you get from carrots, eggs, fortified milk, and other foods, is important for proper eye function. Vitamin A enables the eyes to adjust to dim light; insufficient amounts result in night blindness and other problems. The B vitamins are water soluble and found in leafy greens, dairy products, eggs, beef, and many other sources.



The B vitamins help the body's cells to function properly, allowing you to maintain healthy tissues. Vitamin K, which is found in green leafy vegetables and synthesized by bacteria in the intestines, is essential for blood clotting. Insufficient amounts of vitamin K can result in hemorrhaging. Vitamin D is important for bone growth, immune system function, and other activities. Your body produces some vitamin D when ultraviolet light from the Sun strikes your skin. Vitamin D is not found naturally in many foods, however, and recent studies suggest that many people do not get enough vitamin D.

Minerals are inorganic substances required as components of various body tissues. Important minerals include calcium for bones and teeth, phosphorus for ATP, and iron for hemoglobin. Mineral deficiencies can lead to a variety of health issues.

Beyond calories and nutrients, does it matter what you eat? Yes! And, unfortunately, some of the things people like to eat, such as sweets and fats, aren't very good for them when eaten in excess. Why would humans evolve a preference for such foods? It is likely that people's taste for these foods evolved under a different set of circumstances, when these types of food were much less readily available. Their high caloric count made them prized foods to which we became most sensitive.

More than two-thirds of Americans today are either overweight or obese. This has resulted in an increasing number of people affected by metabolic syndrome, a set of characteristics that greatly increases the risk of heart disease, stroke, and type 2 diabetes. *Metabolic syndrome* is associated with two main features: carrying extra weight around the middle and upper parts of the body and insulin resistance, the inability of body tissues to adequately respond to the hormone insulin. Insulin resistance results in higher blood sugar levels as well as increased fat storage. In addition to diet, factors that may also contribute to metabolic syndrome include aging, genetics, and lack of exercise.

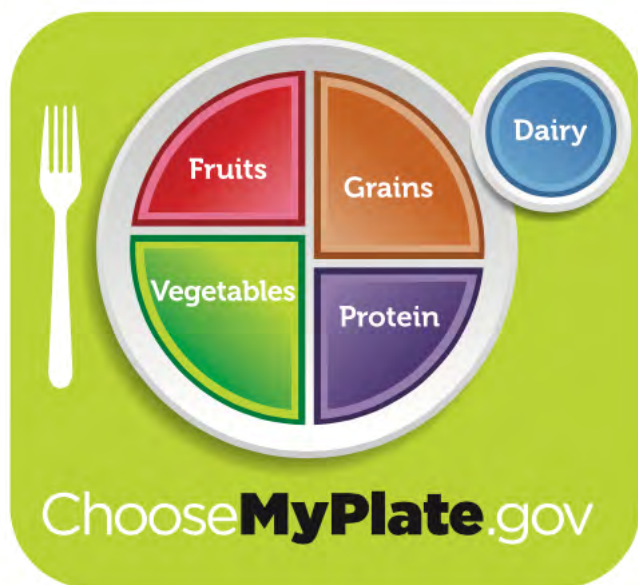


FIGURE 15.2

The USDA's "My Plate" emphasizes fruits and vegetables, whole grains, and healthy sources of protein.

So, what makes up a healthy diet? The U.S. Department of Agriculture's "MyPlate" offers some guidelines (Figure 15.2). The plate itself emphasizes the importance of sitting down to a well-planned meal. Half the plate is covered with fruits and vegetables, and another large segment is taken up by whole grains. Other recommendations include obtaining some protein from healthy sources, such as beans and seafood; cutting back on salt, sugar, and solid fats; eating an appropriate number of calories; and exercising.

Exercise is a crucial part of any healthy lifestyle (Figure 15.3). For most of human history, daily life provided people with plenty of physical activity. This was true when most people belonged to hunting and gathering societies and when most people worked on farms. It is still true for a large fraction of the world's population, but not all of it. Desk jobs, cars, television, and the Internet have brought many people too close to a sedentary, couch-potato lifestyle. Many people now have to go out of their way to get the physical activity they need to stay healthy.



What are the benefits of exercise? Regular exercise reduces the risk of heart disease, high blood pressure, colon cancer, breast cancer, osteoporosis, diabetes, obesity, and many other health issues. Exercise improves the performance of the heart and lungs, maintains joints and tendons, and increases muscle mass and bone density. All of this contributes to strength and balance and helps people stay flexible as they age. Exercise is good for mental health too: It helps reduce depression, stress, and anxiety, and even helps you sleep better. There's no doubt that exercise is a good thing.

What Are the Odds? Current Major Health Risks

Heart disease is the leading cause of death in the United States, followed by cancer. The 10 leading causes of death in the United States are listed below, along with worldwide data for comparison. This is data from 2019. For some perspective, in 2020 about 400,000 deaths in the United States were from Covid-19, making it the third leading cause of death for that year.

Leading Causes of Death in the United States

(2019 Data from the U.S. Centers for Disease Control and Prevention)

1. Heart disease: 659,041
2. Cancer: 599,601
3. Accidents (unintentional injuries): 173,040
4. Chronic lower respiratory diseases: 156,979
5. Stroke (cerebrovascular diseases): 150,005
6. Alzheimer's disease: 121,499
7. Diabetes: 87,647
8. Nephritis, nephrotic syndrome, and nephrosis: 51,565
9. Influenza and pneumonia: 49,783
10. Intentional self-harm (suicide): 47,511



FIGURE 15.3

Even people with busy lives should make time for exercise, which provides many benefits to the body.

READING CHECK

What are some guidelines for eating a healthy diet?

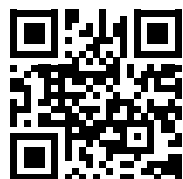
CHECK YOUR ANSWER

Eat a lot of fruits and vegetables, choose whole grains, obtain some of your protein from healthy sources such as beans and seafood, and cut back on things like salt, sugar, and solid fats.



To learn more about nutrition, check out the U.S. Department of Agriculture's Nutrition website here:

<https://www.nutrition.gov>



For more on the benefits of exercise, go to the U.S. Centers for Disease Control and Prevention article on physical activity here:

<https://www.cdc.gov/physicalactivity/basics/pa-health/index.html>

