

Nutrition



Nutrition is the process of absorption of macronutrients and micronutrients from food to help the body grow and be healthy. Healthy or "balanced" nutrition begins by choosing foods from all of the food groups, which includes proteins, carbohydrates, fats, vitamins and minerals. A more varied diet helps the body meet all of its nutrient needs.

Macronutrients

Macronutrients are defined as proteins, carbohydrates and fats. As a group, they provide the body with energy and help to maintain and regulate normal body functions. The average person should consume approximately 50% to 60% of their total daily calories as carbohydrate, 15% to 20% as protein and 30% as fat.

Proteins

Amino acids are the basic building blocks of protein and provide the raw material for all proteins. Protein is present in every living cell in the body. Our bodies use protein from the foods we eat to help build and maintain bone, muscle and skin. Around the world, millions of people don't eat enough protein. Protein malnutrition leads to a condition known as kwashiorkor. Lack of protein can cause growth failure, loss of muscle mass, decreased immunity, weakening of the heart and respiratory system and death. In the United States and other industrialized countries, eating the minimum daily requirement of protein is not difficult to do.

Protein is present in meat, dairy products, nuts and certain grains and beans. Protein from meat and other animal products are called "complete" proteins. This means that they supply all of the amino acids the body cannot make on its own. Plant proteins are "incomplete," which means the body must ingest many different plant proteins to get all of the amino acids it needs to stay healthy. Because the body doesn't store amino acids, as it does for fat and carbohydrate, it needs a daily supply of amino acids to make new protein.

It is important to eat enough dietary protein for bodily health. Healthy adults need a daily estimate of 0.8 grams of protein for every kilogram of body weight to keep from slowly breaking down organ tissues. That's just over 7 grams of protein for every 20 pounds of body weight, or 50-65 grams of protein each day. This is the amount of protein present in 4 ounces of meat plus a cup of cottage cheese.

Carbohydrates

Carbohydrates come in a variety of forms, but the most common and abundant are sugars, starches and fibers. The basic building block of carbohydrates is the sugar molecule, a simple union of carbon, hydrogen and oxygen molecules. Starches and fibers are essentially chains of sugar molecules. Some of these chains are straight and contain only a few sugars, while others branch wildly and contain hundreds of sugars. Carbohydrates come from a wide variety of foods such as bread, beans, milk, popcorn, potatoes, cookies, spaghetti, corn and fruit. Carbohydrates were once grouped into two main categories as follows:

- **Simple carbohydrates** include sugars such as fruit sugar (fructose), corn or grape sugar (dextrose or glucose) and table sugar (sucrose).
- **Complex carbohydrates** include everything made of three or more linked sugars. Simple sugars were once considered bad and complex carbohydrates good, but the picture is much more complex. The digestive system handles all carbohydrates in much the same way by breaking them down (or trying to break them down) into single sugar molecules small enough to enter the bloodstream. It also converts most digestible carbohydrates into glucose (blood sugar) because body cells are designed to use glucose as a universal energy source. Fiber is a carbohydrate exception. Fiber is put together in such a way that it cannot be broken down into simple sugar molecules, and passes through the body partially undigested.

Fats

Fats are also referred to as lipids and are made up of monounsaturated fats, polyunsaturated fats, saturated fats and cholesterol. Fats are a major source of energy and are important for proper growth and development, especially for infants and toddlers. Fat assists in the taste of food, is important to absorb fat-soluble vitamins (A, D, E and K) and provides satiety or a sense of feeling "full." However, not all fats are the same as there are good and bad dietary fats. What is becoming clear is that bad fats increase the risk for certain diseases while good fats lower the risk.

- **Good Fats** - Some fats, called unsaturated fats, are good or healthy fats. Unsaturated fats are found in plant products such as vegetable oils, nuts and seeds. There are two types of unsaturated fats: **Monounsaturated fats** are found in high concentrations in canola, peanut and olive oils. **Polyunsaturated fats** are found in high concentrations in sunflower, corn and soybean oils. Unsaturated fats are commonly used in the Mediterranean diet. In studies in which polyunsaturated and monounsaturated fats were eaten in place of carbohydrates, these good fats decreased bad (LDL) cholesterol levels and increased good (HDL) cholesterol levels.
- **Bad Fats**. Saturated fats and trans fatty acids are bad fats because they tend to worsen blood cholesterol levels. **Saturated fats** are mainly animal fats. They are found in meat, seafood, high-fat dairy products (cheese, whole milk and ice cream), poultry skin and egg yolks. Some plant foods are also high in saturated fats and include coconut, coconut oil, palm oil and palm kernel oil. Saturated fats raise total blood cholesterol levels more than dietary cholesterol because they increase both HDL and LDL cholesterol. The net effect is negative, meaning it's important to limit saturated fats in the diet. **Trans fatty acids** are fats produced by heating liquid vegetable oils in the presence of hydrogen, a process called hydrogenation. The more hydrogenated an oil is, the harder it will be at room temperature. For example, a tub of spread margarine is less hydrogenated and has fewer trans fats than stick margarine. Most of the trans fats in the American diet are found in commercially prepared baked goods, stick margarines, snack foods and processed foods. Commercially prepared fried foods, like French fries and onion rings, also contain trans fat. It is important to limit dietary intake of saturated fats, but it is very important to eliminate trans fats from the diet. Trans fats are the worst fats for health because they raise LDL and lower HDL levels (compared to saturated fats that raise both LDL and HDL cholesterol). Trans fats have been implicated in the vascular disease of heart attacks, stroke and diabetes.
- **Cholesterol** content of the diet is important, especially if one has diabetes, but it is the cholesterol level in the bloodstream that is most important for health risk. High blood cholesterol levels greatly increase the risk for heart disease. The liver is responsible for 75% of blood cholesterol, while only 25% is absorbed from food. The biggest influence of the diet on the blood cholesterol is the mix of fats that is consumed. The key is to substitute good fats for bad fats in the diet.

DIETARY FATS			
Type of Fat	Food Sources	Form at Room Temperature	Effect on Blood LDL and HDL Cholesterol Levels
Monounsaturated	Olives, olive oil, canola oil, peanut oil, cashews, almonds, peanuts and most other nuts, avocados	Liquid	Lowers LDL Raises HDL
Polyunsaturated	Corn, soybean, safflower, cottonseed oils, fish	Liquid	Lowers LDL Raises HDL
Saturated	Whole milk, butter, solid shortening, lard, fatback, cheese, ice cream, red meat, chocolate, coconuts, coconut milk, coconut oil	Solid	Raises both LDL and HDL
Trans	Most margarines, vegetable shortening, partially hydrogenated vegetable oil, deep-fried chips, many fast foods, most baked goods	Solid or semi-solid	Raises LDL

Micronutrients

Vitamins and minerals are substances the body needs in small but steady amounts for normal growth, function and health. Together, vitamins and minerals are called micronutrients. The body cannot make most micronutrients, so it must get them from foods or dietary supplements.

Vitamins

Vitamins must be absorbed from food because the body cannot make them. The body only needs small amounts of vitamins (that's why they are referred to as micronutrients) and uses them without breaking them down. Vitamins are needed for a variety of body functions to include muscle and skeletal health, food digestion and nerve function. Vitamins are involved in many bodily processes that use carbohydrates, fats and proteins for energy and repair.

There are 13 compounds classified as vitamins. Vitamins A, D, E and K are fat-soluble vitamins. They accumulate in the body and have a long body retention time. Vitamin C and the 8 B vitamins (biotin, folate, niacin, pantothenic acid, riboflavin, thiamin, vitamin B6 and vitamin B12) are water-soluble. They do not accumulate in the body because excess amounts consumed are readily excreted by the kidney. Vitamins are labeled by "letter" or name, and some common vitamins include:

Vitamin A = retinol, retinaldehyde, retinoic acid Vitamin B1 = thiamin Vitamin B2 = riboflavin Vitamin B3 = niacin, nicotinic acid Vitamin B12 = cobalamin Vitamin C = ascorbic acid
Vitamin D = calciferol Vitamin E = tocopherol, tocotrienol Vitamin K = phyloquinone

Minerals

These micronutrients include calcium, magnesium and phosphorus. They are the main components in teeth and bones and also serve as building blocks for all cells, help regulate body fluids, and are involved in nerve impulses and muscle function.

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