



PROTEIN

Physiologic roles of protein

Protein supports the structure and function of many body systems. It contributes to tissue maintenance, enzymes, hormones, immune cells, and cellular repair.

General reference range for protein intake

Most adults require about 0.8–1.2 grams of protein per kilogram of body weight daily for general physiological needs. This range serves as a reference, as individual requirements can vary based on age, health, activity level, and personal preferences.

Examples of foods that contain protein



- Poultry (chicken, turkey)
- Beef and pork
- Fish and seafood
- Eggs
- Beans, lentils, chickpeas
- Tofu and tempeh
- Nuts and seeds
- Yogurt, milk, cottage cheese



CARBOHYDRATES

Carbohydrates as an energy source

Carbohydrates serve as the body's primary source of readily available energy. When digested, they are converted into glucose, which cells utilize as their main source of fuel.

Types of carbohydrates

- **Complex Carbohydrates:** These include foods like whole grains, beans, lentils, vegetables, and fruits. They are rich in fiber and are digested more slowly.
- **Simple Carbohydrates:** These include foods like milk, fruits, honey, and table sugar. These are digested more rapidly.

Fiber is also classified as a carbohydrate; however, it is not broken down for energy and influences how nutrients move through the digestive tract.

Examples of foods that contain carbohydrates



- Fruits
- Vegetables
- Whole grains (brown rice, oats, quinoa, whole-grain bread)
- Beans and lentils
- Milk and yogurt
- Potatoes, corn, peas
- Pasta and rice



FIBER

Fiber and digestion

Fiber is a type of carbohydrate that the body is unable to digest. It plays a role in promoting normal digestion and affects the movement of other nutrients throughout the gut.

Types of fiber

- **Soluble fiber:** Dissolves in water and forms a gel-like texture. Found in foods like oats, beans, lentils, apples, oranges, and barley.
- **Insoluble fiber:** Does not dissolve in water and supports regularity. Found in vegetables, whole grains, nuts, and seeds.
- Most plant foods contain a mix of both.

Examples of foods that contain fiber



- Beans and lentils
- Fruits (berries, apples, pears, oranges)
- Vegetables
- Oats and barley
- Whole-grain breads and cereals
- Nuts and seeds



FATS

Physiologic roles of dietary fats

Dietary fats support hormone production, cell structure, nerve insulation, and absorption of vitamins A, D, E, and K. They also provide a source of long-lasting energy.

Types of fats

Most foods contain a mixture of different fat types:

- **Unsaturated fats:** Found in foods like avocados, nuts, seeds, olive oil, and fish.
- **Saturated fats:** Found in foods like dairy, butter, and some meats.
- **Trans fats:** Found in some packaged or highly processed foods.

Examples of foods that contain fats



- Avocados
- Nuts and seeds
- Nut butters
- Olive oil and other plant oils
- Fatty fish (salmon, sardines, trout)
- Cheese and dairy
- Eggs
- Meats



PROCESSED FOODS

Food processing and structure

“Processed” refers to any food changed from its original form. This includes simple steps such as washing, chopping, cooking, freezing, or combining ingredients.

Levels of processing

Minimally processed

- Basic preparation for safety or convenience.
- Examples: pre-cut fruit, frozen vegetables, roasted nuts.

Processed

- Foods with added ingredients such as oils, spices, salt, or preservatives.
- Examples: canned beans, yogurt, cheese, whole-grain bread.

Ultra-processed

- Foods made using refined ingredients and industrial techniques that change texture and flavor.
- Examples: packaged snacks, sweetened beverages, candy, many breakfast cereals, some ready-to-eat meals.



PROCESSED FOODS

How processing affects digestion, appetite, and energy

Digestion speed

Ultra-processed foods tend to break down quickly due to refined carbohydrates, low fiber, or added fats and sugars. Faster digestion is associated with more rapid shifts in glucose and gut hormones.

Appetite signaling

Quickly digested foods are associated with shorter-lasting fullness and faster returns of hunger.

Structural differences

Minimally processed foods tend to create more gradual changes in energy and appetite. Ultra-processed foods are associated with rapid nutrient entry into the bloodstream.