

Feeding and Diet

What is feeding?

All living organisms need to take nutrients from their surrounding environment. Animals do so by eating, and the majority of their daily activity involves looking for food. For human beings, feeding is equally necessary, as food gives their bodies all sorts of nutrients necessary to carry out the life processes. Feeding and nutrition are not synonyms as they refer to different concepts.

Nutrition includes a number of processes that allow organisms to transform nutrients to keep them alive.

Feeding is the process by which those nutrients are obtained from the environment.

Our health depends on the kind of food that we eat, as not including necessary nutrients, or not having them in the right quantity, may result in the body functioning incorrectly which may lead to illnesses developing.

Human beings follow an omnivorous diet, including both animal and vegetable sources of food.

The majority of foods have several types of nutrients, but some such as white sugar or table salt only have one.

Nutrients are basically biomolecules that make up our body and are called **essential nutrients**.

These include carbohydrates, lipids, proteins, vitamins, water and minerals.



Variety of food including carbohydrates, lipids, proteins, vitamins and salts.¹



Variety of carbohydrates, representative of our diet.²

Carbohydrates

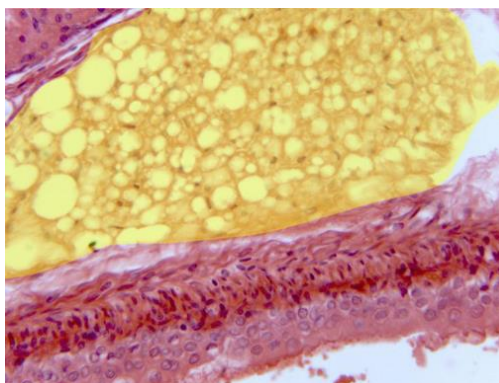
Most foods contain carbohydrates, which the body breaks down into simple sugars. They are the major source of energy for the body.

Simple carbohydrates: These are also called simple sugars. They have a sweet taste, are crystalline and soluble in water. Monosaccharides (that can be used directly by the cell) such as glucose and fructose are found in honey and fruits. Disaccharides (are formed by two monosaccharides and must be split into simpler forms by our body in order to be used) such as sucrose are found in sugar and lactose in milk.

Complex carbohydrates: Comparing them with the previous group they are neither sweet nor crystalline and they are made by joining several simple carbohydrate molecules together. They must be split in order to be used. The most important one involved in human nutrition is starch, which is made by joining several glucose molecules together. Cellulose, contained in vegetable fibre, is a carbohydrate included in this group but cannot be used as source of energy by human beings.



Some sources of lipids in our diet.³



Body fat storage in the liver (yellow).⁴

Lipids

Lipids are a diverse group including different substances that are characterised as being insoluble in water and have an oily appearance. Groups within lipids are:

Fats: they are highly energetic molecules that, depending on their chemical composition, can be classified as saturated and unsaturated fats. Saturated fats come from animal sources with some exceptions, whereas vegetable sources are usually liquids and are called oils. Fat is the main energy storage source in our bodies and is found as body fat (adipose tissue).

Source of proteins are eggs, milk, meat or cheese among others.⁵



Proteins

These nutrients are the most important macromolecules. Around 50% of the dry cell mass in our body are proteins. They are formed by simpler molecules which are called amino acids (there are 20 different ones).

All proteins are made from the same amino acids, but the proportions and the order of assemblage are different. The body uses proteins to repair and build up structures and uses

amino acids present in food to carry on this task. Proteins are broken down into amino acids that will then be used and assembled in a different order to form human cells and tissues.

There are 20 amino acids of which 12 can be produced from other amino acids. In this case, if an amino acid is deficient or lacking in the diet it would never cause a problem. On the other hand, the remaining 8 amino acids, known as **essential amino acids**, cannot be made by the

organism and must be included via food. For this reason it is important to know which kind of amino acids are present in each food. Usually animal proteins do have the most ideal balance between amino acids, especially of the essential ones.

Vitamins

Vitamins are substances which have a different chemical composition, and are necessary for the human body to function correctly. They are only needed in small proportions. Lacking the necessary vitamins can cause a variety of problems and illnesses.

Vitamins can be destroyed easily when heated, so they tend to be found in raw or uncooked food. Light, or even oxygen, present in the air can destroy vitamins so it is important to include fresh food in our diet.

<i>Vitamin</i>	<i>Food sources</i>	<i>Function of vitamin</i>
Vitamin A	Liver, dairy products and margarine.	The maintenance of good vision and healthy skin, nails and hair.
Beta carotene	Carrots, butternut, pumpkin, green leafy vegetables, apricots, pawpaw and ripe mangos.	An anti-oxidant vitamin which protects against cell damage by free radicals.
B vitamins	Oily fish, meat, bread, wholewheat cereals, fortified cereals, pulses, nuts and yeast extracts.	Involved in energy - producing reactions in cells.
Vitamin B12	Only found in food of animal origin – meat, poultry, fish, eggs, dairy products.	Assists in the formation of red blood cells. Contributes to the health of the nervous system.
Folate	Yeast extracts, fortified cereals, wheatgerm, pulses, sugarbeans, broccoli and green leafy vegetables.	Aids in the formation of red blood cells.
Vitamin C	Fresh and frozen vegetables, citrus fruit, guava, strawberries, broccoli, kiwi fruit, parsley and peppers	An anti-oxidant. Plays a role in the body's defence system. Helps keep bone, gums and blood vessels healthy.
Vitamin E	Vegetable oils, wholegrain cereals, wheatgerm, nuts, seeds and margarine.	An anti-oxidant, helps to prevent oxidation in cell membranes and other tissues.
<i>Minerals</i>	<i>Food source</i>	<i>Function of mineral</i>
Calcium	All milk and dairy products, canned fish with bones, green leafy vegetables and sesame seeds.	Builds strong bones and teeth and keeps them strong.
Iron	Lean meat, offal, chicken, egg yolk, green leafy vegetables, pulses and iron fortified cereals.	Needed for the development of healthy red blood cells for transportation of oxygen.
Selenium	Meat, fish, avocados, Brazil nuts and lentils.	Anti-oxidant mineral : protects against cell damage by free radicals.
Magnesium	Wholegrain cereals, wheatgerm, pulses, nuts, sesame seeds, dried figs and green vegetables.	Needed for healthy transmission of impulses along nerve and muscle cells.

List of some vitamins and their function.⁶

Salts

Inorganic substances that carry out different roles in our bodies. Some minerals make up the structure of our body, for example calcium is an important constituent in bones and teeth. Some other minerals are used to regulate the nervous system, muscles and metabolic reactions. Mineral salts are found in food and some are dissolved in the water that we drink.

Water

It is the most common molecule in our bodies (approximately 63% of our body mass). Water acts as a solvent for the majority of the immediate principles and it is essential in order to carry out metabolic reactions due to body activity. Water acts as a transport media for substances between different parts of the body and regulates body temperature.

There is an equilibrium between water excreted through urination, respiration, sweating and solid excretion, and the food and drink which we intake in.

What are the functions of nutrients?

The nutrients we obtain from foods help us which three important functions: the obtaining of energy, the building of our own matter and regulating some of the processes which take place in our system. According to the function they carry out in our system, we can classify foods into three types:

- **Energetic foods** are those which provide us with energy. We obtain energy mainly from macronutrients such as carbohydrates and lipids.
- **“Building” foods** are those which provide our system with substances that allow us to build our own matter and maintain it. We build our own matter mainly using proteins. However, some lipids are used in the building of cellular membranes, and mineral salts are found in the skeleton.
- **Foods that serve as regulators** are micronutrients such as vitamins and minerals, which are necessary to regulate many of the chemical reactions that take place inside our cells (metabolic pathways). Vegetables and fruits are rich in these substances. Although we need these substances (micronutrients) in very small quantities, if we have a deficiency of any in our diet we could suffer from severe illnesses.

Food pyramid (balanced diet)

On the right you see the food pyramid which illustrates the comparison of the amount of each group of biomolecules we need to obtain through our diet.



Mediterranean diet

What is the Mediterranean diet?

A Mediterranean diet is defined as the traditional diet that is used in the countries surrounding the Mediterranean Sea and it is considered to be one of the healthier and most well balanced diets.

The common Mediterranean dietary pattern has these characteristics:

- high consumption of fruits, vegetables, bread and other cereals (complex carbohydrates), potatoes, beans, nuts and seeds.
- olive oil is an important monounsaturated fat source compared to saturated fats found in animal products such as butter.
- dairy products, fish and poultry are consumed in low to moderate amounts, and little red meat is eaten
- eggs are consumed zero to four times a week
- wine is consumed in low to moderate amounts

The benefits from this diet are:

It prevents circulatory system illnesses due to high cholesterol, constipation (or even finding it difficult to go to the toilet), colon cancer or obesity. The variety in this diet has a worldwide reputation for its high standards.

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