

CHAPTER – 3 Social Pharmacy

Topic: Macronutrients and Micronutrients

3.1

INTRODUCTION

Food is eaten and digested in the body to allow the absorption of energy and nutrients.

There are two different types of nutrients:

1. Macronutrients;
2. Micronutrients.

Macro Nutrient:

Macro nutrients are essential nutrients the body needs in large quantities to remain healthy. Macro nutrients provide the body energy help prevent disease and allow the body to function correctly.

They are 3 main types of macro nutrients.

1. Carbohydrates
2. Protein
3. Fats

Macronutrients are measured in grams (g).

3.2

Macronutrients

1. Carbohydrates: The two types of carbohydrate that provide dietary energy are starch and sugars. Dietary fibre is also a type of carbohydrate which is not digested to provide energy. Starchy carbohydrate is an important source of energy.

1 gram of carbohydrate provides 4kcal (17kJ). Carbohydrates are a preferred source of energy for several body tissues and primary energy sources of the brain.

- Requirement:- 45 - 65%
- Source:- Rice, potatoes, corn, honey, dairy and beans sugars etc.

Structure of carbohydrate

All types of carbohydrate are compounds of carbon, hydrogen and oxygen. They can be classified in many different ways. One common way is according to their structure.

a. Sugars

Sugars come from a variety of foods. Some are within the cellular structure of the food, e.g. in fruit or vegetables. Other sugars are not bound into the cellular structure of the food, e.g. in milk or honey.

Free sugars include all sugars added to foods plus sugars naturally present in honey, syrups and unsweetened fruit juice.

The term does not include lactose (the sugar in milk) when naturally present in milk and dairy products and the sugars contained within the cellular structure of foods (e.g. fruit and vegetables).

The recommendations state that **less than 5% of total energy** intake should come from free sugars.

b. Starch

Starch is found in a variety of foods. It is made up of many sugar molecules.

2. Protein: Protein is essential for growth and repair and keeping cells healthy. Protein also provides energy: 1 gram of protein provides 4 kcal (17 kJ).

It consists of long chain of amino acids. They help in the growth, development, repair and maintenance of body tissues.

- Requirement:- 10 - 35%
- Source:- Meat, Chicken, fish, nuts, seed, whole grains, beans, eggs, dairy, and soy.

Structure of protein

- ❖ Protein is made up of building blocks called amino acids. Different foods contain different amounts and different combinations of amino acids.
- ❖ Protein from animal sources (e.g. meat, fish, eggs and dairy products) contains the full range of essential amino acids needed by the body.
- ❖ Protein from plant sources (e.g. pulses and cereals) typically contain fewer essential amino acids.

3. Fats: Fat provides fat-soluble vitamins A, D, E and K, and is necessary for their absorption. It is also important for essential fatty acids the body cannot make. Fat provides a concentrated source of energy: 1 gram of fat provides 9 kcal (37 kJ) of energy.

Foods that contain a lot of fat provide a lot of energy. They are important part of the diet that can also provide the body with energy.

- Requirement:- 20 - 35%
- Source:- oily fish, olive oil, nuts, meat, butter and cheese.

Structure of fat

Fat is made up of different types of fatty acids and glycerol. The structure of the fatty acids determines:

- ❖ their effect on our health;
- ❖ their characteristics, e.g. melting point.

Depending on their chemical structure, fatty acids are usually classified as:

- a. saturated;
- b. monounsaturated;
- c. polyunsaturated.

3.3

Micronutrients

They are one of the major groups of nutrients your body needs. They include:

1. Vitamins
2. Minerals.

Vitamins and minerals are needed in much smaller amounts than macronutrients. Their amounts are measured in milligrams (mg) and micrograms (μg).

(1mg = 0.001g)

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Their content of each food is different so it's best to eat a variety of foods to get enough vitamins and minerals.

They are critical for several important functions in your body and must be consumed from food.

Vitamins

There are two groups of vitamins:

- **Fat-soluble vitamins:** which can be stored in the body, e.g. vitamins A, D, E and K.
- **Water-soluble vitamins:** which cannot be stored in the body and are therefore required daily, e.g. B Complex and vitamin C.

Fat soluble vitamins

1. Vitamin A: Vitamin A is needed for:

- dim light vision;
- healthy skin and eyes;
- resistance to infection.

2. Vitamin D: Vitamin D is needed for the absorption of calcium from foods to keep bones and teeth healthy.

- We get most of our vitamin D via the sun during the summer months.
- Vitamin D is also provided by the diet from oily fish, meat, and eggs.

Water soluble vitamins

The B vitamins

There are many different B vitamins and each has a specific function in the body.

These include:

- vitamin B1 (Thiamin);
- vitamin B2 (Riboflavin);

- vitamin B3 (Niacin);
- vitamin B6;
- vitamin B12;
- Folate/folic acid.

❖ **Thiamin (vitamin B1)**

Thiamin is required to release energy from carbohydrate. It is also involved in the normal function of the nervous system.

Sources of Thiamin (vitamin B₁)

- Whole grains.
- Nuts.
- Meat (especially pork).
- Fruit and vegetables.
- Fortified breakfast cereals.

❖ **Riboflavin (vitamin B2)**

Riboflavin is required to release energy from protein, carbohydrate and fat. It is also involved in the transport and use of iron in the body.

Sources of Riboflavin (vitamin B2)

- Milk.
- Eggs.
- Rice.
- Fortified breakfast cereals.
- Legumes.
- Mushrooms.
- Green vegetables.

❖ **Niacin (Vitamin B3)**

Niacin is required for the release of energy from food. Niacin is also required for the normal function of the skin, mucous membranes and nervous system.

Sources of Niacin

- Meat.
- Wheat and maize flour.
- Eggs.
- Dairy products.
- Yeast.

❖ Vitamin C

Vitamin C is needed to make collagen.

This is required for the structure and function of skin, cartilage and bones.

It is an important nutrient for healing cuts and wounds and can also help with the absorption of iron.

Sources of vitamin C

- Fresh fruit especially citrus fruits and berries.
- Green vegetables.
- Peppers.
- Tomatoes.
- New potatoes.

Minerals

Minerals are inorganic substances required by the body in small amounts for a variety of different functions. The body requires different amounts of each mineral.

People have different requirements, according to their:

- age;
- gender;
- physiological state (e.g. pregnancy).

Calcium

The body contains more calcium than any other mineral. It is essential for a number of important functions such as the maintenance of bones and teeth, blood clotting and normal muscle function.

Iron

Iron is essential for the formation of haemoglobin in red blood cells. Red blood cells carry oxygen and transport it around the body.

Iron is also required for normal metabolism and removing waste substances from the body.

Sodium

Sodium is found in all cells and body fluids. It is needed for regulating the amount of water and other substances in the body.

Sodium is a component of table salt, known as sodium chloride (NaCl).

