

Module 2: Nutrients



Activity 1

Page 19 in the textbook

1. Explain what biological value means.

Biological value refers to the proportion of essential amino acids found in proteins that are required by the body.

When a protein contains all the essential amino acids in a proportion that is required by the body, **the protein has a high biological value.**

When one or more of the essential amino acids are missing, **the protein has a low biological value.**

2. Classify proteins according to their biological value. Provide examples of each.

Classification of proteins	Biological value	Examples
Complete proteins	Proteins that contain all the amino acids necessary for growth and repair of the body. These are proteins that have the highest biological value.	Milk, eggs, meat, fish, soya, Brazil nuts and gluten in cereal
Semi-complete proteins	Proteins that do not contain all the essential amino acids and can repair wornout tissue but cannot promote growth.	Pulses, most nuts and cereals
Incomplete proteins	Proteins lacking in most essential amino acids and cannot promote growth or repair tissue.	Gelatin, zein in maize

3. Name the TWO types of proteins.

Animal proteins and vegetable proteins

4. Name the protein found in each of the following foods:

4.1 Milk	Lactoalbumin
4.2 Egg yolk	Ovovitellin
4.3 Meat	Myosin, collagen
4.4 Legumes	Legumin
4.5 Maize	Zein
5.6 Soya beans	Glycenin

5. List FOUR functions of proteins.

- Essential for general growth and muscle development.
- Build, repair and maintain the body.
- Prevent certain deficiency diseases.
- Responsible for haemoglobin synthesis in red blood cells.

6. Explain the following terms:

- 6.1 Balanced diet** – A diet that contains adequate amounts of all the necessary nutrients required for the needs of an individual at a particular stage in his/her life.
- 6.2 Digestion** – The process of breaking down food down in the body.
- 6.3 Nutrient** – The components in food that must be supplied.
- 6.4 Absorption** – Food is broken down and then passed through the walls of the digestive tract into the bloodstream.
- 6.5 Food** – Any substance, liquid or solid which provides the body with materials necessary for the following functions:
 - heat and energy
 - growth, repair and maintenance
 - regulate body processes.
- 6.6 Malnutrition** – Lack of proper nutrition, caused by not having enough to eat, not eating enough of the right things, or being unable to use the food that one does eat.

7. List FIVE foods rich in Vitamin C.

- Blackcurrents, green peppers, oranges, grapefruit, lemons, strawberries, cabbage, spinach, Brussel sprouts, broccoli and potatoes.

8. Compare the different types of vitamins, their functions and ONE source. Tabulate your answer as follows:

Types of vitamins	Vitamins	Functions	Sources
8.1 Fat-soluble vitamins	Vit. A: Xerofterol	<ul style="list-style-type: none"> • Enables people to see better at night. • Helps with maintenance and health of the skin. • Required for normal growth of children. • Keeps the mucous membrane moist and free from infection. • Growth of the skeleton and teeth. 	<ul style="list-style-type: none"> • Milk, cheese, eggs • Oily fish: herring, pilchard, sardine, cod-liver oil
	Vit. D: Calciferol	<ul style="list-style-type: none"> • Vitamin D controls the body's use of calcium. Required for the proper formation of bones and teeth. 	<ul style="list-style-type: none"> • Sunlight • Liver, fish-liver oils, oily fish e.g. herring, pilchard, sardine • Small amounts in egg yolk, margarine, milk and dairy products
	Vit. E: Tocopherol	<ul style="list-style-type: none"> • Increases the lifespan of red blood cells. • Promotes a health condition of muscles and counteracts ageing. • Important for normal reproduction. 	<ul style="list-style-type: none"> • Milk and milk products, egg yolk • Small quantities in lettuce, peanuts, seeds, wheatgerm oil

Types of vitamins	Vitamins	Functions	Sources
	Vit. K: Menadine	<ul style="list-style-type: none"> Assists in the production of coagulation factors in the blood, to clot properly after an injury. Assists in the prevention of excessive breathing. 	<ul style="list-style-type: none"> Leafy vegetables such as spinach
8.2 Water-soluble vitamins	Vit. B complex	<ul style="list-style-type: none"> Keeps nervous system in good condition. Enables the body to obtain energy from carbohydrates. Helps with growth. 	<ul style="list-style-type: none"> Wholegrain cereals, e.g. bread, yeast, beer, wheatgerm Meat: pork, ham, bacon, liver, kidney, eggs Fish roe and milk
	Vit. B1: Thiamin	<ul style="list-style-type: none"> Involved in releasing energy from carbohydrates. Normal growth of children. Keeps nervous system in good condition. Prevents constipation. 	<ul style="list-style-type: none"> Yeast, bacon, oatmeal, peas, wholemeal, bread Meat, especially pork products Egg yolk Marmite
	Vit. B2: Riboflavin	<ul style="list-style-type: none"> Essential for normal growth. Required for release of energy from food. 	<ul style="list-style-type: none"> Milk and dairy products, cheese, liver, hearts, kidneys, yeast, eggs, dried cereals
	Vit. B3: Niacin	<ul style="list-style-type: none"> Important factor in the release of energy from food. Involved in the health of the skin. 	<ul style="list-style-type: none"> Meat extract, poultry, fish, brewer's yeast, liver, kidney, beef, eggs, legumes, wholegrain cereals, peanuts, peanut butter
	Vit. B6: Pyridoxine	<ul style="list-style-type: none"> Promotes growth and formation of new cells. Plays a role in the breakdown of proteins. 	<ul style="list-style-type: none"> Wholegrain products, soya beans, meat, internal organs
	Vit. B12: Cobalamin	<ul style="list-style-type: none"> Required for the metabolism of amino acids and other enzyme systems. 	<ul style="list-style-type: none"> Kidneys

Types of vitamins	Vitamins	Functions	Sources
	Vit. C: Ascorbic acid	<ul style="list-style-type: none"> • Growth of children, building strong bones and teeth. • Assists in healing of cuts. • Prevents gum and mouth disease • Helps with building and maintenance of the skin. • Required for the production of blood. 	<ul style="list-style-type: none"> • Black currents, green peppers, oranges, grapefruit, lemons, strawberries, cabbage, spinach, Brussel sprouts, broccoli and potatoes

9. ‘Vitamins are only required in small quantities’. Motivate this statement.

A balanced diet will provide the amounts of nutrients required.

10. Proteins are essential for all living organisms because they are a building block of the body.

10.1 Provide a reason for the above statement.

Proteins are essential for general growth and muscle development.

10.2 Explain what happens to proteins when they are heated.

Heat breaks down proteins and changes the structure and function of proteins in food.

11. Name the vitamin that is essential for the absorption of calcium.

Vitamin D

12. Give THREE functions of vitamin C in the body.

- Growth of children, building strong bones and teeth.
- Assists in healing of cuts.
- Prevents gum and mouth disease
- Helps with building and maintenance of the skin.
- Required for the production of blood.

13. Why do we need water intake into the body?

Water is required for:

- All body fluids
- Metabolism
- Lubricating joints and membranes
- Regulating body temperature
- Absorption of nutrients
- Protecting the nervous system
- Excretion of waste products
- Carrying enzymes for digestion

14. Provide FIVE examples of starch products and a reason we need these foods in the body.

Examples of starch products	Function
Rice, barley, tapioca, cereals, pastas	To provide heat and energy. Starch is formed from many glucose units and during digestion starch is broken down into glucose.

15. Explain what happens to the following types of carbohydrates when they are heated.

15.1 Sugar: Moist heat causes sugar to dissolve. Further heating will change it into a syrup, darken it, and cause it to caramelize and at 160 °C burn to carbonise.
Dry heat will quickly melt sugar, brown it and then burn.

15.2 Starch: Moist heat makes the grain swell, the cell walls break, releasing starch which thickens liquid.