



Nutrition and Biochemistry for Nurses Introduction

Lecture.1

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- **Nutrition:** is the study of the organic process by which human uses food and liquids for normal functioning, growth and maintenance and to maintain the balance between health and disease..
- **Food:** Is any substance normally eaten or drunk by living human. The term food also includes liquid drinks.
- **Food:** is the main source of energy and of nutrition for human, and is usually of animal or plant origin.

Nutrient

- It is any element or compound necessary for or contributing to the human metabolism, growth, or other functioning.




- **Classes of Nutrient:**

Essential nutrients include:

A-The macronutrients:(carbohydrates, fats, and proteins) it is supply energy and build tissue.

B- The micronutrients:(vitamins and minerals) needed in much smaller amounts, form specialized structures and regulate body processes.

- **Nutritional status:** physical condition as determined by the diet or condition of the body as it relates to the consumption and utilization of food.
- **Optimum nutrition :** the state of receiving and utilizing essential nutrients to maintain health and well-being at the highest possible level
- **Malnutrition :** means an undesirable kind of nutrition leading to ill health. It results from a lack, excess or imbalance of nutrients in the diet

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- **Over nutrition** : an excessive intake of one or more nutrients, frequently referring to nutrients providing energy.
 - **Undernutrition** : is a state of an insufficient supply of essential nutrients or a deficiency of one or more nutrients, including nutrients providing energy



- **Therapeutic Nutrition**

- Therapeutic nutrition is based on the modification of the nutrients or other aspects of a normal diet to meet a person's nutritional needs during an illness.

General function of nutrition

1. Provide energy (carbohydrate, fat, and protein can be used for energy).

2. Build and repair body tissues and structures (Protein is the primary nutrient for building and maintaining body tissues)

3. Regulate the metabolic processes that maintain homeostasis (water, Specific vitamins and minerals are necessary for enzyme activities responsible for a host of chemical reactions).

4. Regulate activities of the body



- **Clinical signs of good nutritional status**

1. Shiny hair

2. Bright , clear eyes

3. Pink ,firm gums and well development teeth.

4. Firm well-development muscles and bone structure

5. Normal weight for height

- **Use of Nutrition in the body:**

- **Digestion:** is the process of breaking up food.
- **Absorption:** is the process which carries these nutrients into the circulation system and delivers them to the cell.
- **Utilization:** cell is the functional unit of life. Chemical reactions in the cell use the nutrients absorbed to produce materials needed for the life.

Digestive system

- Digestive tract and other organs that help the body break down and absorb food.
- It starts from the mouth and ends at the anus.

- **Function of each organ of the digestive system in digestion.**


1- Mouth : teeth chew food, glands in the cheeks and under the tongue produce saliva that coats the food.

- Saliva also contains enzymes that start to digest the carbohydrates in food.

2- Oesophagus: is the muscular tube that carries food from the mouth to the stomach after it is swallowed.

- A ring of muscle at the end of the oesophagus prevent stomach contents from escaping back up the oesophagus.

- **3- Stomach :** stomach wall produces gastric juice that digests proteins.
- **4- Small intestine:** break down protein into amino acids and fat into fatty acids.
- Sugars, vitamins and minerals, are absorbed into the bloodstream through the wall of the small intestine.
- Most of the chemical digestion of proteins, fats and carbohydrates is completed in the small intestine.

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- **5- Large intestine and anus:** absorbs water, mineral salts and vitamins.
 - Faces are formed and stored in the last part of the large intestine (the rectum) before being passed out of the body through the anus.

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- **Metabolic rate:** the rate of heat release during chemical reactions, it is expressed in units called calories.
- **The basal metabolic rate (BMR) :** the energy needed to maintain essential physiological functions, such as respiration, circulation, and muscle tone.

● **Energy Balance**

- The relationship between the energy derived from food and the energy used by the body.
- The body obtains energy in the form of calories from **carbohydrates, protein, and fat.**
- The body uses energy for **voluntary activities** such as walking and talking and for **involuntary activities** such as breathing and secreting enzymes.

• **Factors which Affect Basal Metabolic Rate (BMR) .**


1. Body surface area

Tall, thin people have higher BMRs If we compare a tall person with a short person of equal weight

2. Sex


Males average a higher BMR because of a greater part of lean body mass.

3. Body temperature: fever increases BMR.



4. Hormones: Thyroid hormones have a stimulatory effect on the metabolism of the body. Thus BMR is raised in hyperthyroidism and reduced in hypothyroidism.

5. Age: Metabolic rate declines with age. In infants and children BMR is higher and in adults it is less.



6. Diet: hunger or serious abrupt calorie reduction can dramatically reduce BMR. Restrictive low-calorie weight loss diets may cause BMR to drop.

7. Pregnancy/breast feeding: these increase metabolic rate

8. Environment: In cold weathers, the BMR is higher compared to warm weathers.

- **9. Rapid growth and/or development:** infancy, growth spurts, healing after illness or injury.
- 10. Disease states:** BMR is higher in cardiac failure, leukemia, and hypertension.
- 11. Weight:** Heavier the weight, the higher BMR.
- 12. Exercise:** Physical exercise not only influences body weight by burning calories, it also helps raise the BMR by building extra-lean tissue.



Thank
You