Energy
Introduction

• The body needs energy for maintaining body temperature and metabolic activity and for supporting physical work and growth.

• The energy allowances recommended are designed to provide enough energy to promote satisfactory growth in infants and children and to maintain constant appropriate body weight and good health in adults.
Factors influencing energy needs

The factors which influence energy needs are

• age

• body size,

• physical activity

• climate and

• altered physiological status such as pregnancy and lactation
Role of macronutrients in providing energy

Nutrients are environmental substances used for energy, growth, and bodily functions by organisms. Depending on the nutrient, these substances are needed in small amounts or larger amounts. Those that are needed in large amounts are called macronutrients.
There are three macronutrients required by humans: carbohydrates (sugar), lipids (fats), and proteins. Each of these macronutrients provides energy in the form of calories. For example:

- Carbohydrates provide 4 calories per gram
- Proteins provide 4 calories per gram, and
- Lipids provide 9 calories per gram
• This means that if you look at a food label and it lists 10 grams of carbohydrates, 0 grams of protein, and 0 grams of fat, that food would contain 40 calories.

• If a food label contain 10 g of carbohydrates, 5 g of protein and 5g of fat, the food would give 105 calories.
Carbohydrates

- Humans need carbohydrates in the largest amounts.

- The adults get 60-65% of their daily caloric intake from carbohydrates.
• Carbohydrates are easily metabolized, which just means chemically broken down, and used as the body's main fuel source.

• All of our bodily tissues have the ability to use the simple carbohydrate, glucose, as energy
• Carbohydrates are primarily found in starchy foods, like grain and potatoes, as well as fruits, milk, and yogurt.

• Other foods like vegetables, beans, nuts, seeds, and cottage cheese contain carbohydrates, but in lesser amounts.
• Carbohydrates can be simple or complex, which refers to their chemical structure.

• Simple carbohydrates taste very sweet (like fruit sugar), while complex carbohydrates taste savory (like starch in potatoes).
• Fibre is an indigestible form of carbohydrate.

• Since humans cannot break down fibre carbohydrates, they pass through the digestive system whole and take other waste products with them.
Proteins

- 15% - 25% of calories in the human diet come from protein.

- Proteins are used to produce new tissues for growth and tissue repair, and regulate and maintain body functions.
• Enzymes used for digestion, protection, and immunity are made of protein, and essential hormones used for body regulation require protein.
• Finally, proteins may be used as a source of energy when carbohydrates are not available.

• Protein is found in meats, poultry, fish, meat substitutes, cheese, milk, nuts, legumes, and in smaller quantities in starchy foods and vegetable
• The body breaks down protein into its building blocks - amino acids

• There are 500 known amino acids, 21 of which are needed by humans

• Nine are considered essential since they cannot be produced by the body and must be eaten.
• Proteins that contain all nine essential amino acids are considered 'high quality' proteins.

• These high quality proteins tend to come from animal sources.

• Proteins that do not contain all nine essential amino acids are considered 'low quality' proteins, and tend to come from plant sources.
Lipids

• It is recommended that 15–20% of our daily energy requirement should be supplied through the consumption of fats and oils.

• In addition to supplying energy, fats are needed to supply fatty acids that the body needs but cannot make (such as omega-3) assist with absorption of the fat-soluble vitamins A, D, E and K and carotenoids provide foods with flavour and texture.
Dietary fats are of 3 main types:

- **Saturated fat** – found in foods like meat, butter and cream (animal sources).

- **Unsaturated fat** – found in foods like olive oil, avocados, nuts and canola oil (plant sources).

- **Trans fats** – found in commercially produced baked goods, snack foods, fast foods and some margarines.