Micronutrients & Macronutrients

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Nutrients

Essential
(from food)

- Vitamins
- Minerals
- Amino acids
- Fatty acids
- Some carbohydrates

Non-Essential
(built up in body)

- Others

Nutrients

Macronutrients

Needed for growth, maintenance and activity

Carbohydrates, proteins, fats, macro minerals, and water

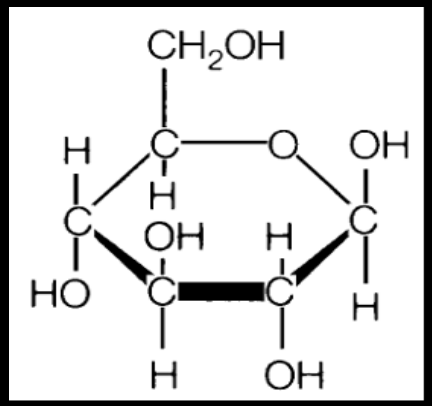
Micronutrients

Act as catalysts, help to trigger other reactions in the body & help metabolism

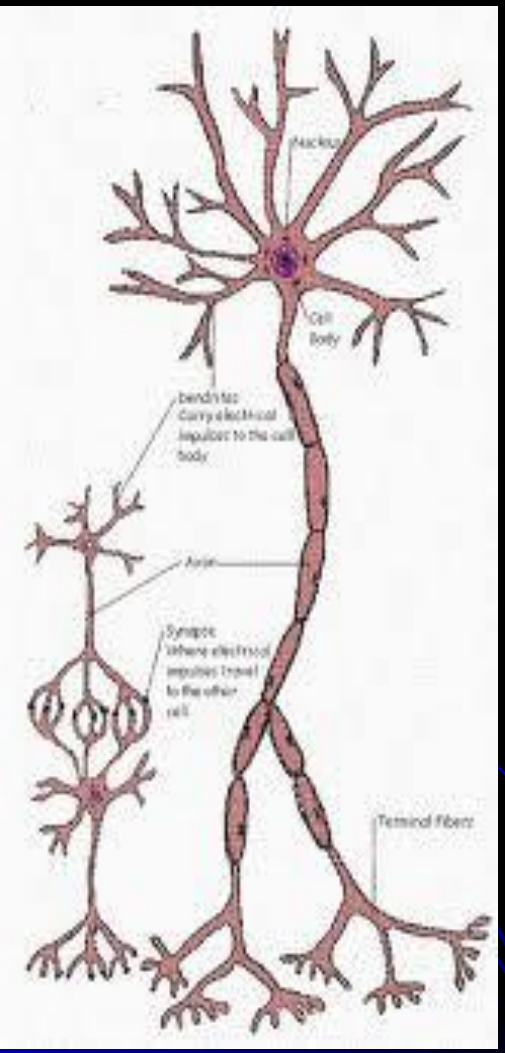
Vitamins
Trace elements

Carbohydrates

- Composed of carbon, hydrogen, and oxygen.
- Constitute the main source of energy for all body functions, particularly brain functions, and are necessary for the metabolism of other nutrients.
- Once ingested carbohydrates are turned into glucose, which circulates in the bloodstream being readily available, and into glycogen which is stored in the liver and muscle cells, for later use.
- Provide 4 calories/gram.



The Functions of Carbohydrates

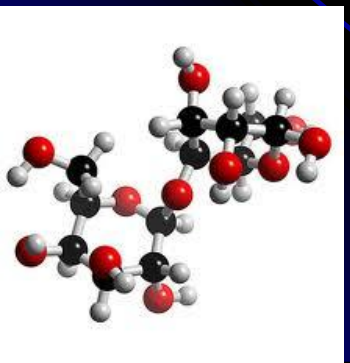


- For fat to be metabolized properly.
- For the regulation of nerve tissue.
- The only source of energy for the brain.
- To encourage the growth of healthy bacteria in the intestines for digestion.
- Some are high in fibre, which helps prevent constipation and lowers the risk for certain diseases such as cancer, heart disease and diabetes.

Carbohydrates

Monosaccharides

Single sugars, e.g.
Glucose (blood)
Fructose (fruit)
Galactose (milk)



Disaccharides

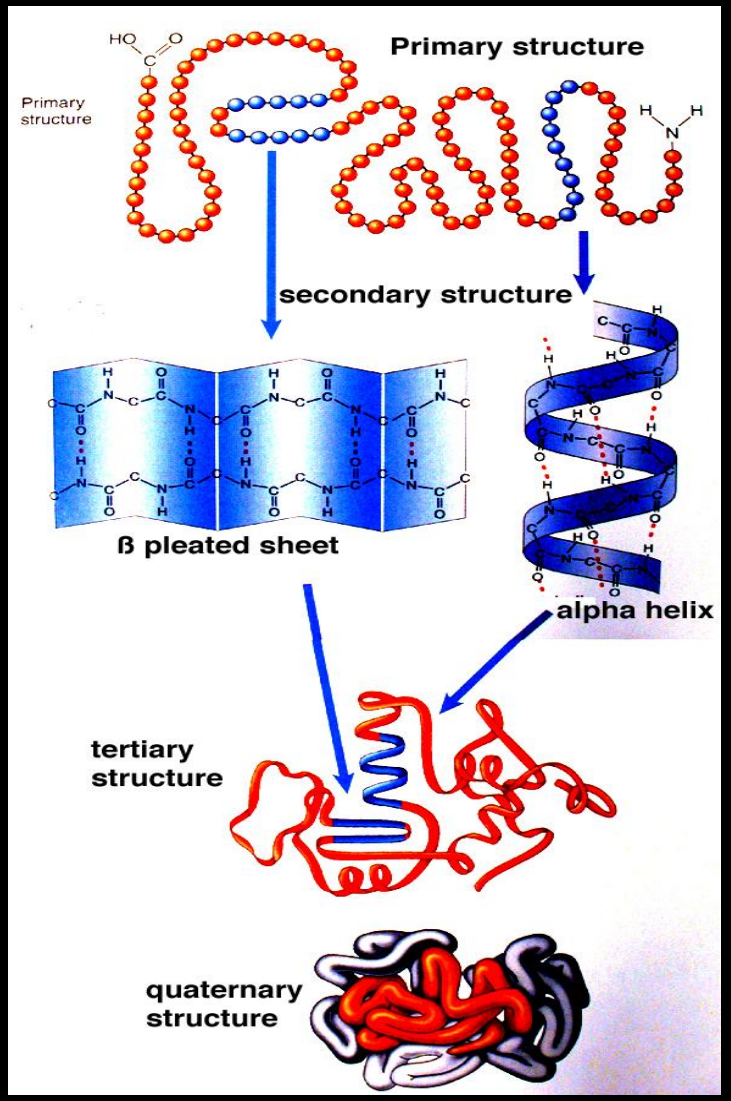
Double sugars / simple carbohydrates, e.g.
Sucrose (table)
Lactose (milk)
Maltose (malt)

Polysaccharides

Multiple sugars / complex carbohydrates, e.g.
Starch & Cellulose (plants)
Glycogen (animals)
Dietary fibre

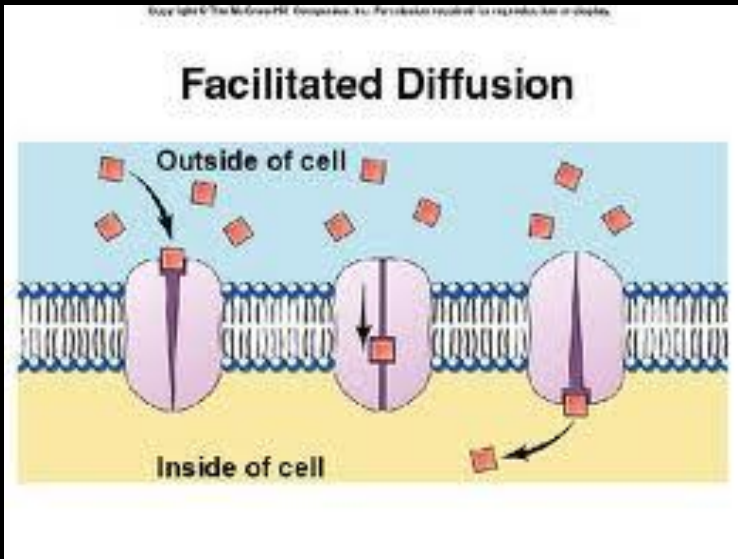
Proteins

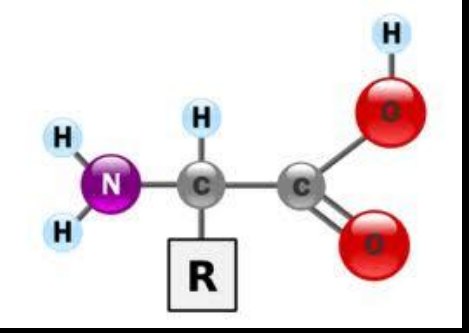
- Composed of large combinations of amino acids containing the elements carbon, hydrogen, nitrogen, and oxygen.
- The major source of building materials for muscles, blood, skin, hair, nails, and internal organs.
- Provide 4 calories/gram.



The Functions of Proteins

- Required for building and repair of body tissues (including muscle).
- Enzymes, hormones, and many immune molecules are proteins.
- Essential body processes such as water balancing, nutrient transport, and muscle contractions require protein to function.
- Protein is a source of energy.
- Help keep skin, hair, and nails healthy.



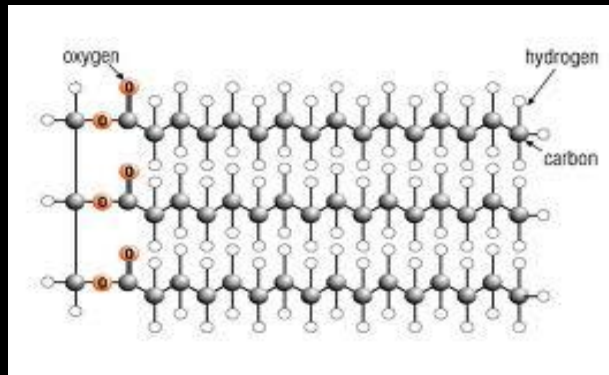


Proteins

- Peptides
- Amino Acids (22)
  - Non-Essential (13)
    - Alanine
    - Arginine
    - Aspartate
    - Cysteine
    - Glutamate
    - Glutamine
    - Glycine
    - Proline
    - Serine
    - Asparagine
    - Pyrrolysine
  - Essential (9)
    - Isoleucine
    - Leucine
    - Lysine
    - Methionine
    - Phenylalanine
    - Threonine
    - Tryptophan
    - Valine
    - Histidine
    - Tyrosine
    - Seleno-cysteine

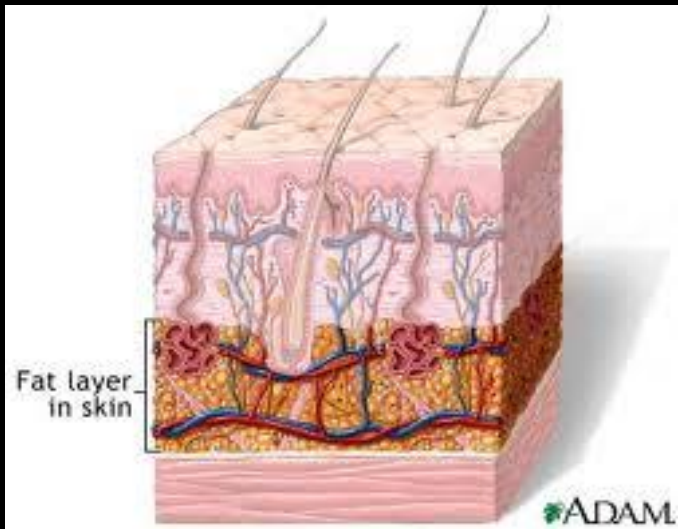
Fats

- Composed of carbon, hydrogen, and oxygen; however, in fats these elements are connected together differently than in carbohydrates.
- Broken down into fatty acids and glycerol.
- Provide 9 calories/gram.



The Functions of Fats

- Fat surrounds and insulates nerve fibres to help transmit nerve impulses.
- Fat is part of every cell membrane in the body. It helps transport nutrients and metabolites across cell membranes.
- Your body uses fat to make a variety of other building blocks needed for everything from hormones to immune function.



The Functions of Fats

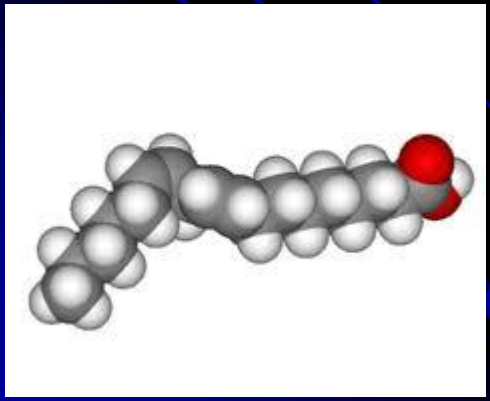
- Fat provides needed energy.
- Fat is needed so your body can absorb the fat soluble vitamins A, D, E, K, and prevent deficiencies of these vitamins.
- Provides back-up energy if blood sugar supplies run out (after 4-6 hours without food).
- Provides insulation under the skin from the cold and the heat.
- Protects organs and bones from shock and provides support for organs.

Fats

Simple (triglycerides)

Compound (phospholipids, glucolipids, lipoproteins)

Derived (cholesterol)

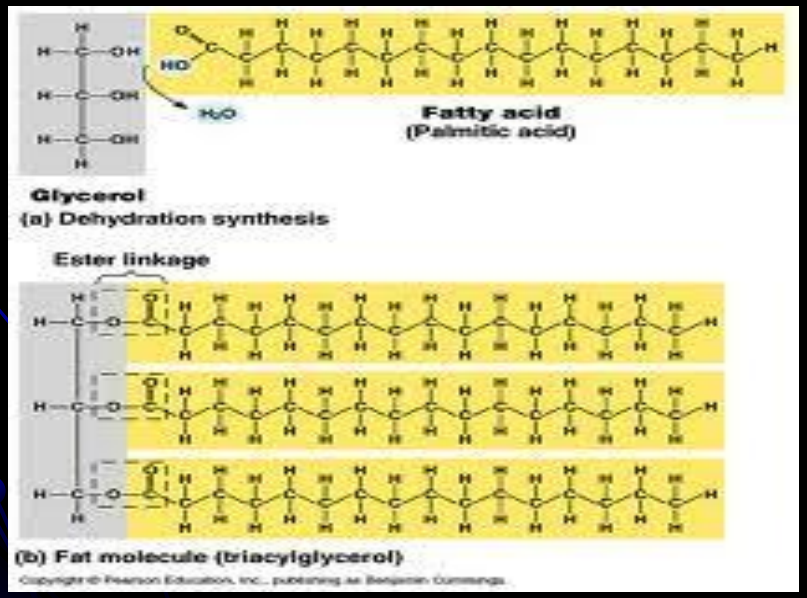


Fats

Saturated

Unsaturated

Polyunsaturated



Saturated Fats

- Used by the liver to manufacture cholesterol.
- Cholesterol is found only in animal tissues.
- Cholesterol acts as a precursor for the synthesis of various steroid hormones and vitamin D in the body.
- High levels of saturated fat can significantly raise one's levels of low density lipoprotein cholesterol (LDL, bad cholesterol) which is associated with atherosclerosis (hardening of the arteries).
- Found in the foods such as: beef, lamb, pork, chicken, shell fish, egg yolks, milk, cheese, butter, and chocolate.

Unsaturated Fats

- Lower your LDL (bad cholesterol) without affecting your HDL (good cholesterol) making them the healthiest of possible fat sources in the diet.
- Found in the foods such as: avocados, cashews, olives, olive oil, peanuts, peanut oil, and peanut butter.

Polyunsaturated Fats

- Lower blood cholesterol level.
- Lower both your low density lipoprotein cholesterol (LDL, bad cholesterol), as well as lowering your high density lipoprotein cholesterol (HDL, good cholesterol).
- Found in foods such as : almonds, pecans, sunflower oil, corn oil, fish, safflower oil, soybean oil, walnuts.

Trans-Fatty Acids

- Significantly increase the risk of heart disease, Alzheimer's disease, diabetes, obesity, liver dysfunction, depression and infertility in women.
- Increase LDL cholesterol and decrease HDL cholesterol.
- Found in fast food oils and other commercially used oils.

Cell Membrane