

Chapter 3 – Food

Why we need food?

- 1. Energy**
- 2. Growth and Repair**
- 3. Make chemicals needed for metabolic reactions**

What is food made up of?

Food is made up of 6 **chemical elements**

(SNOPCH)

Sulfur, Nitrogen, Oxygen, Phosphorous, Carbon, Hydrogen

3 **Trace elements**

Iron, Zinc, Copper

5 **Salts**

Sodium, Chlorine, Potassium, Calcium, Magnesium

6 **components of food**

Water, Protein, Carbohydrates, Minerals, Vitamins, Lipids (fats)

4 major types of biomolecules found in food

Carbohydrates, Lipids, Proteins, Vitamins

Carbohydrates

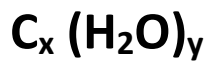
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Carbon

Hydrogen

Oxygen

General formula for Carbohydrates



Thus



3 Types of Carbohydrates

1. Monosaccharides
2. Disaccharides
3. Polysaccharides

Monosaccharides	Disaccharides	Polysaccharides
Single Sugar Molecule	Two Monosaccharides Joined Together	Many saccharides Joined Together
Sweet to taste Soluble in Water GLUCOSE, FRUCTOSE	Sweet to taste Soluble in Water MALTOSE, SUCROSE, LACTOSE	Not sweet to taste Partially Soluble in Water Starch, Cellulose
Found: Fruit	Found: Table Sugar, Milk	Found: Pasta, Bread, Cereal

Additional Information –

Cellulose – Structural Polysaccharide in plant cell walls

Thus – Cellulose is in the Plant Cell Walls & And it is Fiber in our diet

Glycogen – Glucose reserve in plants

Chitin – In cell walls of fungi

Metabolic Role of Carbohydrates

Energy Source –

Energy released by Glucose is used to make ATP

Energy Storage –

Starch in plant

Glycogen in animals

Lipids (Fats & Oils)

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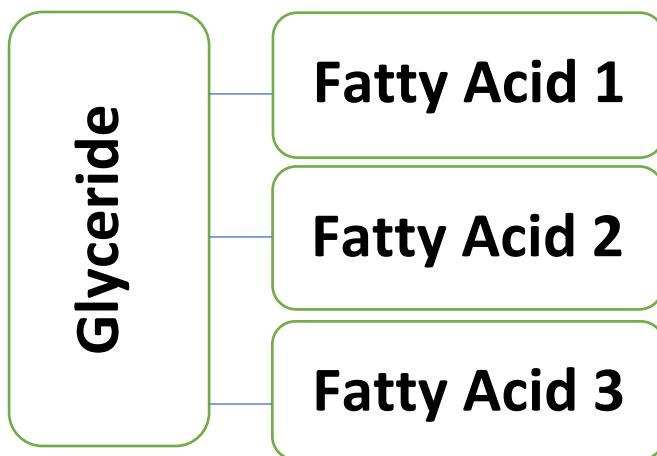
Carbon

Hydrogen

Oxygen

These are in a different ratio to Carbohydrates

Triglyceride

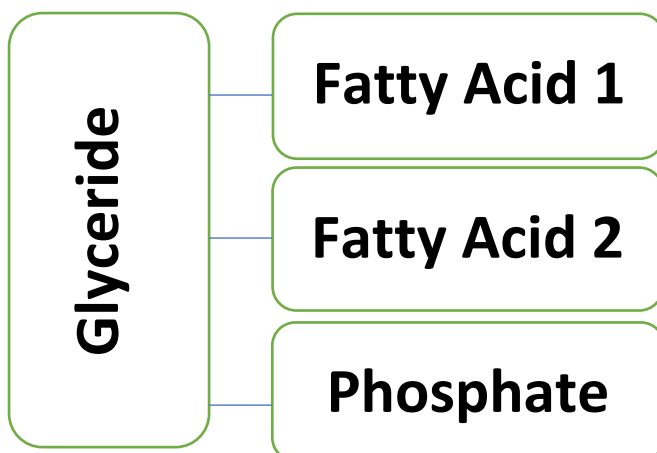


Oil: Liquid at room temperature

Fat: Solid at room temperature

Phospholipid is important for cell membrane

Phospholipid



Structural Role of Lipid

Lipids and Phospholipid are very important in the cell membrane structure

Lipids gives heat insulation and protects organs in animals

Metabolic Role of Lipids

Energy storage – 2x more the energy of carbohydrates or protein contained in lipids

Energy source – 2x more energy than Carbohydrate or Protein contained in lipids

Storage of fat - Soluble vitamins in fatty tissues

Some lipids function as hormones (Chemical messages) E.G Insulin

Protein

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Long chain of amino acids folded into 3D shape

Each different sequence of acid produces a different protein

Each protein has a specific 3D Shape

Sources of Protein:

Eggs, Meat, Fish, Milk

Peptide – the bond of two amino acids

A polypeptide chain folds into a 3D structure which results in a protein

2 Types of Protein

Globular – 3D with lots of folding E.g Egg White

Fibrous – Flat with little or no folding E.g Hair, Nails

Structural Role of Protein

Keratin – Hair, Nails

Myosin – Skeletal & Cardiac muscle

Metabolic Role of a Protein

Enzymes are proteins

Some hormones are proteins

Vitamins

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Chemicals required in small quantities to prevent deficiency diseases

They are all referred to by letters

Vitamin D

- **Fat Soluble**
- **If lack of vitamin D,
Deficiency is Rickets (Softening of bone)**

Vitamin C

- **Water Soluble**
- **If lack of vitamin C
Deficiency is Scurvy's (Bleeding gums, skin irritation)**