

Carbohydrates:-

are most abundant organic molecules in nature. They are primarily composed of elements carbon, hydrogen and oxygen. The name carbohydrate literally means hydrate of carbon.

Carbohydrates can be defined as polyhydroxyaldehydes or ketones or compounds which produce them on hydrolysis.²⁵

Characteristics:-

- They are most abundant dietary source of energy for all organisms.
- They also serve as storage form of energy (glycogen) to meet the immediate energy demands of body.
- They are structural components of many organisms.
- Carbohydrates participate in structure of cell membrane and cellular functions such as cell growth and fertilization.

Classification:

Classified into 3 major groups.

Mono saccharides

Disaccharides

Polysaccharides

Monosaccharides:

Referred as simple sugar. They cannot further hydrolysed. Monosaccharides are divided into different categories based on functional group and no of carbon atom.

Based on no of carbon atom monosaccharides are regarded as trioses (3C) tetroses (4C) pentose (5C) hexoses (6C). And 2 functional group aldehyde and keto group.

Glucose:- is most abundant monosaccharide in human body. It is 6 carbon sugar. Other carbohydrates that are absorbed by body must be converted to glucose before body can break it down for energy.

where as Fructose is most abundant carbohydrate in fruits. Fructose is also 6 carbon sugar.

Disaccharides:

When two monosaccharides are bonded together a disaccharide is formed. And this process is known as dehydration synthesis.

3 common disaccharides:
Lactose, Sucrose, Maltose

Lactose is composed of glucose and galactose. Lactase enzyme is required for digestion of lactose. People who lack this enzyme are said to be lactose intolerant and they cannot digest milk. Sucrose is composed of glucose and fructose.

Maltose is composed of 2 glucose molecules.

Disaccharides like monosaccharides are soluble in water, but they are too big to pass through cell membrane by diffusion.

Polysaccharides:

are polymers of monosaccharide units with high molecular weight. They are usually tasteless.

Polysaccharides are of 2 types.

1) Homopolysaccharides:- on hydrolysis yield only a single type of monosaccharide.

Examples are starch, Glycogen and cellulose.

Starch: is carbohydrate reserve of plants which is most important dietary source for higher animals including

man

Cellulose: occur exclusively in plants and it is most abundant organic substance in plant kingdom. Cellulose is totally absent in animal body.

Glycogen: often called animal starch is the storage form of carbs in animals.

2) Heteropolysaccharides: - on hydrolysis yield a mixture of a few monosaccharides or their derivatives.

PROTEINS

Proteins are most abundant organic molecule of living system. They occur in every part of cell and constitute about 50% of cellular body weight.

Name protein derived from proteins meaning prime importance.

Characteristics:

They are polymer of Amino Acid.

Colourless and tasteless.

They are higher molecular weight biomolecules.

They contain phosphorous, Iron, copper sulphur, zinc etc.

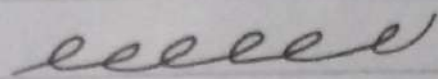
Proteins are predominantly constituted by five major elements Carbon, Hydrogen, Oxygen, Nitrogen and Sulphur.

Classification:-

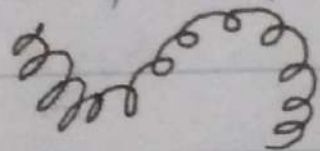
=> Based on structure of Protein.

- Primary protein: Linear sequence of amino-acid that make polypeptide chain.

- Secondary protein: spatial arrangement of protein by twisting of polypeptide chain.



- Tertiary protein: 3 dimensional structure of a functional protein.



=> Based on physical-chemical properties:-

- Simple protein:

Made up of only one type of amino acid. They are most globular type of proteins. e.g. Albumin, Globulins, Collagen. They are most abundant protein in animal kingdom.

- Compound or conjugated protein:-

Proteins which are attached to some non-protein groups examples are

phospho protein.

Derived protein:

Which are derived from simple or conjugated proteins. e.g. enzymes, peptones, oligo peptides.

Lipids.

Lipids are of great importance to body as the chief concentrated storage form of energy, beside their role in cellular structure and various other biochemical reactions.

Lipids may be regarded as insoluble in water organic substance. They are soluble in organic solvents.

Fats, oils and steroids are most important lipids found in nature.

Lipids are poor conductor of heat.

They use in manufacturing of soaps, detergents.

Classification:-

Simple Lipids:- Esters of fatty acid with alcohols. Mainly of 2 types.

(a) Fats and oils.

(b) Waxen.

- Complex or compound lipids:

They are esters of fatty acid with alcohol containing additional group such as phosphate, nitrogenous base, carbohydrate, protein etc.

Further classified as:

(a) Phospholipids.

(b) Glycolipids.

(c) Lipoproteins.

(d) other complex lipids.

- Derived lipids:-

These are substance derived from simple and compound lipids by hydrolysis e.g. vitamin D and Terpenes.

Lipids word is derived from lipos mean Fat.

Primary building block of lipids are Fatty acid, glycerol and sterols.