PHYSICS WALLAH

BIO MOLECULES

proteins

(Polymers of α – amino acids)

Amino acids contain $-NH_2$ and $-COOH$ groups.

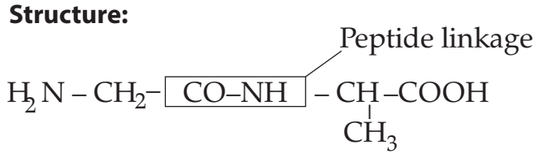
Classification:

-On the basis of relative number of $-NH_2$ and $-COOH$ group
(i) Neutral – equal number of $-NH_2$ and $-COOH$ group
(ii) Basic – more number of $-NH_2$ than $-COOH$ group
(iii) Acidic – more number of $-COOH$ than $-NH_2$ group

-On the basis of place of synthesis
(i) Essential – cannot be synthesized in the body.
(ii) Non-essential – synthesized in the body.

-On the basis of shape
(i) Fibrous – fibre –like structure
(ii) Globular – spherical

Structure:



Denaturation of proteins :

When a protein in its native form is subjected to physical change, globules unfold, helix get uncoiled and protein losses its biological activity

enzymes

Globular proteins specific for particular reaction and for particular substrate.

Mechanism : Reduces the magnitude of activation energy

carbohydrates

Optically active polyhydroxy aldehydes or ketones or compounds which produce such units on hydrolysis

Classification:

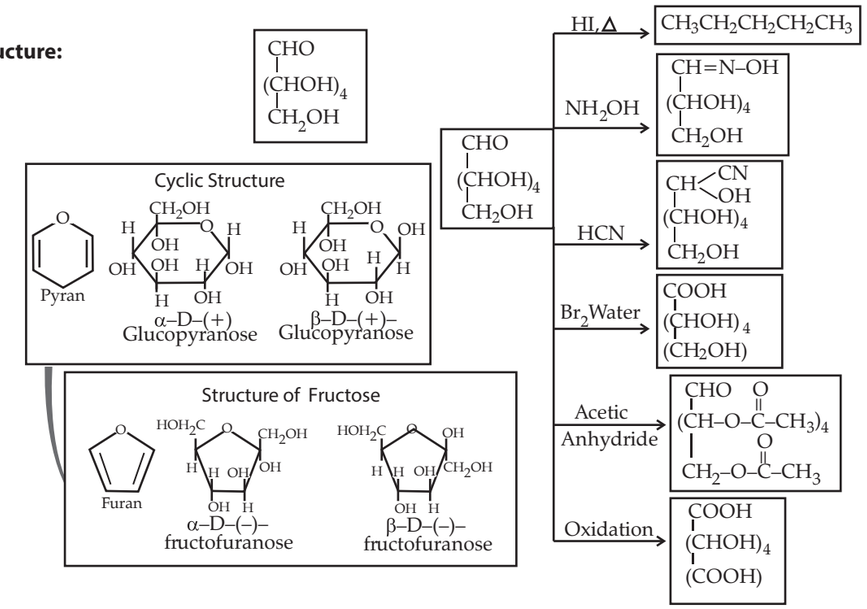
(I) Monosaccharides : (Aldehyde group – aldose, keto group –ketose)

Glucose : Preparation :

a) From sucrose: $C_{12}H_{22}O_{11}$ (sucrose) $+ H_2O \xrightarrow{H^+} C_6H_{12}O_6$ (Glucose) $+ C_6H_{12}O_6$ (Fructose)

b) From starch: $(C_6H_{10}O_5)_n + nH_2O \xrightarrow[393K;\ 2\text{-}3\ atm]{H^+} nC_6H_{12}O_6$

Structure:



(ii) Disaccharides : Linkage between 2 monosaccharides– Glycosidic linkage
1) Sucrose-C-1 of α-glucose and C-2 of β-fructose
2) maltose-C-1 of α-D-glucose with C-4 of another α-D-glucose
3) lactose-C-4 of β-D-glucose with C-1 of β-D-galactose

(iii) Polysaccharides : Large number of monosaccharides units joined by glycosidic linkages.
(a) Starch : Polymer of α-glucose with two components amylose and amylopectin
(b) Cellulose: Polymer of β-D-glucose
(c) Glycogen: Animal starch-Polymer of glucose

Importance:
- Form a major portion of food.
- Cellulose forms cell wall of bacteria and plants.
- Raw materials for industries like textiles, paper, lacquers and breweries

nucleic acids

Two types : Deoxyribonucleic acid (DNA), ribonucleic acid (RNA)

Deoxyribonucleic acid (DNA)	Ribonucleic acid (RNA)
Sugar is β-D-2-deoxyribose	Sugar is β-D-ribose
DNA Contains A=T, G=C	RNA Contains A=U, G=C.

Biological Functions :
- Chemical basis of heredity.
- Responsible for identity of different species of organisms.
- Nucleic acids are responsible for protein synthesis in cell.

vitamins

Organic compounds required in diet in small amounts to perform specific biological functions for maintenance and growth

Classification:

(i) Fat soluble : Soluble in fats and oils but insoluble in water. (vitamins A,D,E and K)
(ii) Water soluble : B group and vitamin C are soluble in water