BIOLOGICAL MOLECULES

- Macromolecules are polymers of similar identical small molecules linked by covalent bonds.

4 major macromolecules:

→ Carbohydrates → Proteins → Fats → Nucleic Acids

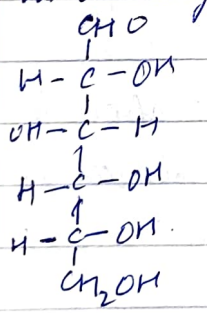
Carbohydrates:

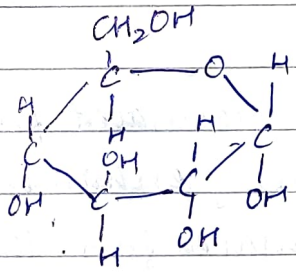
- Immediate energy source in living things.
- Classified based on number of molecules: mono-sacharides, disacharides, poly-sacharides
- Classified based on no. of C atoms: Triose (3C), Pentose (5C), Hexose (6C) etc.
- Classified based on functional group: Aldose, Ketose.

Glucose:

→ Hexose sugar

→ Can exist ~~as~~ in linear form, but is normally as a ring in water





→ Has several isomers: fructose, galactose etc.

→ Transported through blood in animals

→ Glucose is broken down and converted into chemical energy (ATP) during cellular respiration.

Disaccharides:

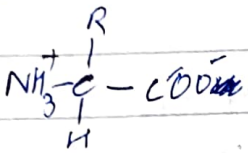
→ Sucrose is the sugar we use in houses.
→ Sucrose : α-Glucose, β-Fructose
→ α-Glucose + α-Glucose → Maltose (1-4 glycosidic linkage)
→ α-Glucose + β-Fructose → Sucrose (1-2 glycosidic linkage)
→ Glucose + Galactose → Lactose

Polysaccharides:
→ Polymers of mono-saccharides
→ Some function as short-term energy storage molecule.
→ Starch : • Homopolymer (multiple 1-4 linkages)
• Linear. : Amylose & Amylopectin
• Plants store glucose as starch.
→ Glycogen : • Branched (1-6 linkage)
• Animals store glucose as glycogen
→ Chitin : • Polymers of modified glucose (at C-2 another molecule is added)
→ Cellulose : • Linear (β glucose 1-4 linkage)
• Have H-bonds
• Present in cell walls of plant cells.
• Alternate monomers are upside down.

Proteins:
→ Made of amino acids
→ Functions:
• Support : Structural function (Gives strength)
• Transport : They regulate entry and exit of substances in a cell.
• Defense : Antibodies are proteins. They neutralize antigen (foreign substances)

- Regulation: Some hormones ~~have~~ are proteins that regulate how cells behave. They serve as intracellular messengers
- Help in contraction of muscles

Amino Acids



Properties:

- Zwitter Ions: Have +ve & -ve on same ion
- Amphoteric: basic and acidic properties on same ion
- Isoelectric: you already KNOW!

~~Proteins are amino acids bonded by peptide linkages.~~

Peptide: 2 or more A.A bonded together.

Polypeptides: Chain of many A.A joined by peptide bonds

Shape

Primary: ~~~ Chain of A.A

Secondary: Sequence of A.A linked by H-bonds
α-Helix & β-Pleated sheets

Tertiary: When attractions are present between α-Helix & pleated sheet (by disulphide linkage)

Quaternary: Containing more than 1 A.A chain.