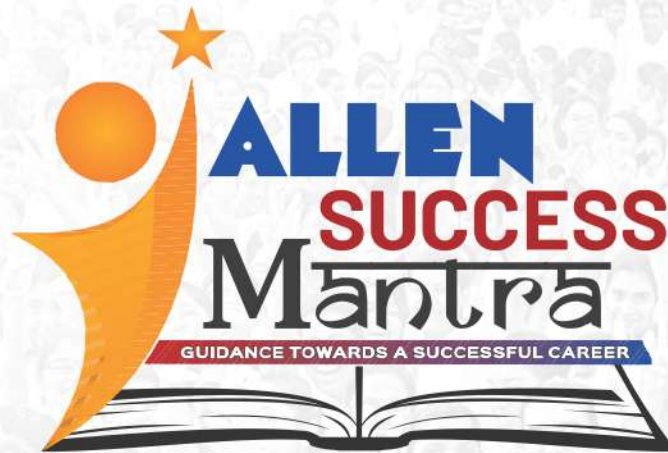


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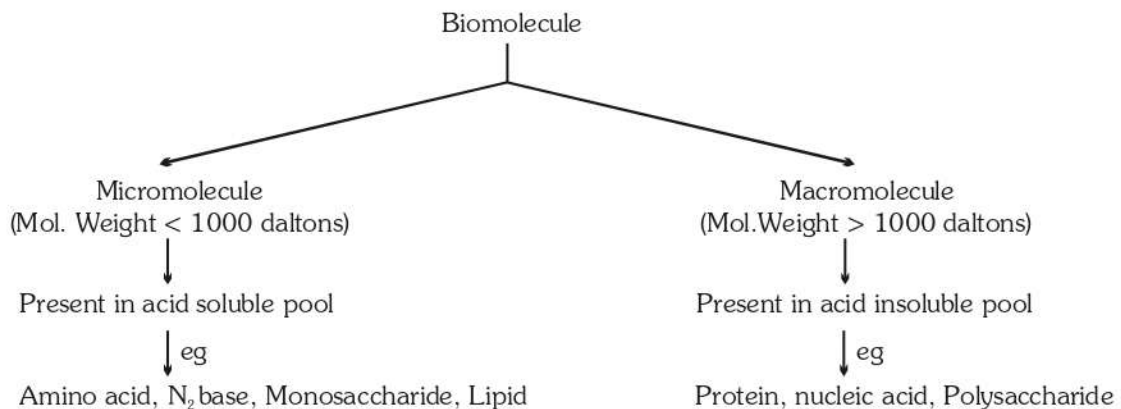
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HELPLINE

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BIOMOLECULES (PROTOPLASM)

Biomolecule → All the carbon compound that Present in living tissue.



- But exceptionally lipid is micromolecule but present in acid insoluble fraction.

CARBOHYDRATE

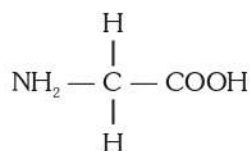
- Although polysaccharide is non reducing but in a polysaccharide chain one end is reducing and another end is non reducing.
- Starch form helical structure so starch can hold I_2 molecules in the helical portion so starch- I_2 is blue in colour. While cellulose have linear structure so it cannot hold I_2 and don't give Iodine test.
- Paper made from plant pulp is cellulose.
- Difference between gums and fevicol → Gums are natural mucopolysaccharide while fevicol is synthetic rubber based adhesive.

LIPID

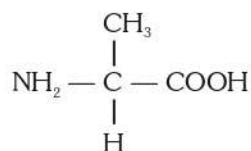
- Fatty acids are of two types →
(i) Saturated → eg palmitic acid (16 carbon compound), stearic acid
(ii) unsaturated → eg oleic acid, Linoleic acid, Linolenic acid, Arachidonic acid (20 carbon compound)
- Glycerole is trihydroxy propane.
- Lipids are called fats and oils on the basis of melting point. Oils have lower melting point and fats have higher melting point.
- Some lipids also have phosphorus like lecithin.

PROTEIN

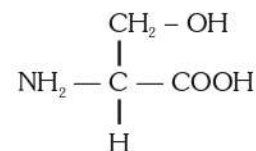
- Proteins are heteropolymer of amino acids.
- Amino acids contain an amino group and carboxylic group on the same carbon i.e. the α -carbon so they are called α -amino acid.
- Amino acid are substituted methane.



Glycine



Alanine



Serine

- Amino acids are of two types:–
(i) Essential amino acid (ii) Non essential amino acid
- Protein show mainly four type of configuration:–
(A) Primary configuration (B) Secondary configuration
(C) Tertiary configuration (D) Quaternary configuration
- Tertiary structure is absolutely necessary for the many biological activities of protein.

DNA

- In mostly living DNA is a hereditary long material. In some viruses RNA also act as hereditary long material.
- RNA act as adaptor (tRNA), structural (rRNA) and in some condition catalyst (Ribozyme).
- In a DNA molecule one purine always pairs with a pyrimidine. This generates approximately uniform distance between the two strands of DNA.
- In DNA plane of one base pair stacks over the other in double helix. This, in addition to H-bonds, confers stability of the helical structure of DNA.
- Difference between DNAs and DNase is that DNAs means many DNA and DNase means DNA digestive enzymes.
- Oswald Avery, Colin Macleod and Maclyn McCarty firstly proved the genetic material is DNA.
- Alfred Hershey and Martha Chase Firstly proved that in bacteriophage DNA is also genetic material.
- A molecule that can act as a genetic material must fulfil the following criteria–
 - (i) It should be able to generate its replica (replication)
 - (ii) It should chemically and structurally be stable
 - (iii) It should have property of mutation.
 - (iv) It should be able to express itself in the form of “Mendelian Characters”.
- The presence of thymine at the place of uracil also provide additional stability to DNA.
- Both DNA and RNA are able to mutate. In fact, RNA being less stable, mutate at faster rate so virus having RNA genome and having shorter life span mutate and evolve faster.
- RNA was the first genetic material.

DNA-REPLICATION

- The machinery and the enzyme :-
- The main enzyme of replication is DNA-dependent DNA polymerase.
- It uses DNA template to catalyse the polymerisation of deoxyribonucleotides and also have to catalyse the reaction with high degree of accuracy.
- DNA polymerase catalyse polymerisation in one direction that is 5' – 3'.
- On one strand (3' – 5'), the replication is continuous and on the other (5' – 3') strand, it is discontinuous.
- The discontinuous fragments are later joined by DNA ligase.
- DNA polymerase can not initiate the process of replication
- Any failure in cell division after DNA replication result into polyploidy.

TRANSCRIPTION

- If both strands act as a template during transcription they would code for RNA molecule with different sequence and if they code for proteins the sequence of amino acid in these proteins would be different and another reason that if the two RNA molecule produced they would be complementary to each other and form a ds RNA which prevent translation of RNA.
- A transcription unit of DNA has three region
 - (i) A promoter
 - (ii) The structural gene
 - (iii) A terminator
 Cistron is a part of DNA which form polypeptide chain.
- The DNA dependent RNA polymerase catalyse the transcription process only in 5' – 3' direction.
- Sigma factor and Rho factor are also involve in transcription for initiation and termination.
- In eucaryotes after transcription splicing process also occurred.
- The split gene represent an ancient (primitive) feature of gene.
- The splicing process represent the dominance of RNA world.

GENETIC CODE

- H.G. Khorana artificially synthesized an mRNA.
- Severo ochoa enzyme (RNA polymerase enzyme) is also helpful in polymerising RNA with defined sequences in a template independent manner.
- Genetic code is triplet, nonambiguous, degenerate, commaless and nearly universal.

TRANSLATION

- Translation refers to the process of polymerisation of amino acid to form a polypeptide chain on the basis of sequence of nucleotides on mRNA.
- Firstly amino acid are activated and attached to its tRNA called charging of tRNA.
- The ribosome also act as a catalyst (23'srRNA, ribozyme) for the formation of peptide bond.
- A translation unit on mRNA is the sequence of RNA that is flanked by the start codon (AUG) and the stop codon and codes for a polypeptide.
- The UTR(untranslated regions) present on mRNA are required. for efficient translation process (by recognising the smaller subunit of ribosome by mRNA and by prevent the degradation of mRNA)
- **Secondary metabolites** : These are the product of metabolic reactions but they are not directly involve in the growth, reproduction and development of organism. Many secondary metabolites are used in human-welfare. eg. drugs, rubber, spices etc.