

# BIOMOLECULES

## *Topic-1: Basics of Biomolecules*

→ Usually carbon containing (mostly organic) compound present in living tissue/forms.

### Elemental Analysis:

→ Same types of elements are present in living and non-living thing but the relative abundance of some element like C, H, O, N are higher than other elements in living things/tissue.

→ Most abundant element in living tissue is Oxygen: - 65%.

Carbon: - 18.5 %  
Hydrogen: - 0.5 % } Living tissue.

### Chemical Analysis.

Living Tissue.

↓  $\text{CCl}_3\text{COOH}$  (Trichloroacetic acid)  
(Chemical breakdown)

Grinding (Mechanical Breakdown)

↓  
Slurry

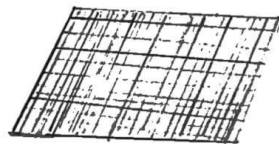
↓  
Filtration



Filtrate

(Acid soluble pool)

→ Small molecules



Retentate.

(Acid insoluble pool.)

→ Generally large molecules.

→ Biomicro molecules

→ Molecular weight is  
18 - 800 Da.

Eg:- Simple sugar, amino acids, nucleotides, etc.

→ Phosphate, sulphate, etc, are also present.

→ Mainly represents micromolecules of cytoplasm.

→ Biomacro molecules

→ Molecular weight is  
> 10000 Da.

Eg:- Polysaccharides, Proteins, Nucleic acids, (lipid)\*, etc.

↳ Strictly not a macro molecule.

→ Molecular weight < 800 Da.

→ But appears in extended portion due to being hydrophobic nature.

→ Mainly represent macro molecules of cytoplasm as well as organelles.

# Most of the abundant compound in living tissue is H<sub>2</sub>O.

# % age of some important chemicals in cells:-

H<sub>2</sub>O → 70% - 90%.

(P) Protein → 10% - 15%.

(N) Nucleic acid → 5% - 7%.

(C) Carbohydrates → 3%

(L) Lipid → 2%

Ions → 1%.

PENCIL

⇒ Metabolites : Chemicals that participate in metabolism.

- Primary metabolites: Participate in primary metabolic processes like respiration, protein synthesis etc.
  - Their functions are well known.
  - Present in almost all living forms.

Eg. carbohydrates, proteins, lipids, nucleic acids, etc.
- Secondary metabolites: Participate in secondary metabolism.
  - Their functions are not well defined.
  - Present mainly in some plants, fungi, bacteria, etc.

eg. Drugs, scents, spices, rubber, etc.

**TABLE 9.3 Some Secondary Metabolites**

Pigments	Carotenoids, Anthocyanins, etc.
Alkaloids	Morphine, Codeine, etc.
Terpenoides	Monoterpenes, Diterpenes etc.
Essential oils	Lemon grass oil, etc.
Toxins	Abrin, Ricin
Lectins	Concanavalin A
Drugs	Vinblastin, curcumin, etc.
Polymeric substances	Rubber, gums, cellulose