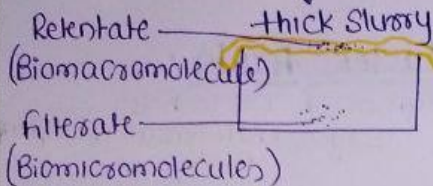


BIOMOLECULES

Chemical Analysis:

Living tissue + trichloroacetic acid (CH_3COOH)



Amino Acids:

Decides AA physical & chemical Property

- Substituted methane
- Show optical activity
- Chiral Carbon

Neutral AA: Glycine, Alanine, Valine, leucine, Isoleucine

Acidic AA: Glutamic acid, Aspartic acid

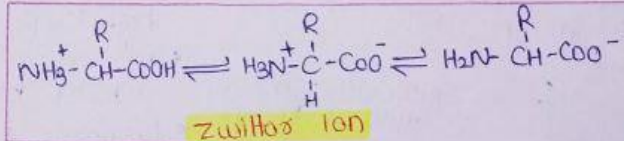
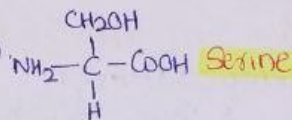
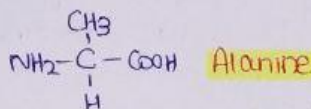
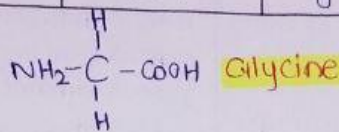
Basic AA: Arginine & lysine

Aromatic AA: phenylalanine, Tryptophan, Tyrosine

Alcoholic AA: Serine

Sulphur AA: methionine & Cysteine

Essential AA: Valine, Isoleucine, Threonine, methionine, lysine, phenylalanine, Histidine, leucine



Elemental Analysis:

Living tissue $\rightarrow$ dry $\rightarrow$ Ash

Composition of Elements:

Element	Earth Crust	Human
H	0.14	0.5
C	0.03	18.5
O	46.6	65.0
N	very little	3.3
S	0.03	0.3
Na	2.8	0.2
Ca	3.6	1.5
Mg	2.1	0.1
Si	27.7	negligible

Components	% of total cell mass
water	70-90%
Proteins	10-15%
Nucleic acid	5-7%
Carbohydrate	3%
Lipids	2%
Ions	1%

Biomacromolecules:

- molecules have size greater than 10,000 Da.

polysaccharides, proteins, nucleic acids, lipids.

Not strictly a macromol. mol. wt $\rightarrow$ 800 Da.

Biomicro-molecules:

- molecules have size less than 10,000 Da.

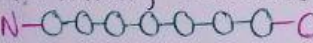
monosaccharides, AA, nucleotide.

Proteins:

RUBISCO most abundant protein in biosphere

Collagen abundant in Animals.

I. Primary structure



II. Secondary structure

Helix



B-pleated



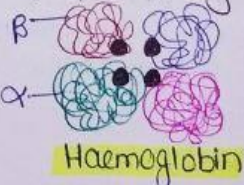
III. Tertiary



woolen

most stable

IV. Quaternary:



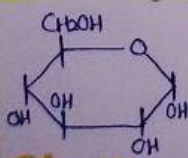
Haemoglobin

Protein	Function
Collagen	intercellular ground sub.
Trypsin	Enzyme
Insulin	Hormone
Antibody	fight infectious agent
Receptor	Sensory reception (Smell, taste)
GLUT-4	Enables glucose transport into cells

Carbohydrates

Monosaccharide

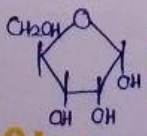
Ribose (5C)
Glucose (6C)
Fructose (6C)
Galactose (6C)



Glucose

Oligo Saccharide

Lactose = (Glu + Gal)
Sucrose = (Glu + Fru)
Maltose = (Glu + Glu)



Ribose

Structural

- Cellulose
- Chitin
- n-acetylglucosamine

Polysaccharide

Homopoly Same monomer

Storage

- Glucose
- Starch
- Inulin

Heteropoly diff monomer

- peptidoglycan
- n-acetylmuramic acid
- n-acetylglucosamine

Secondary Metabolites

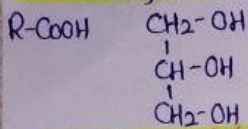
Pigments	Carotenoids, Anthocyanins
Alkanoids	morphine, Codeine
Terpenoids	monoterpens, diterpenes
Essential oil	lemon grass oil
Toxin	Abstin, Ricin
Lectins	Concanavalin A
Drugs	vinblastin, Curcumin
Polymeric Sub.	Rubbers, gum, cellulose

@Gargigaikee

Lipids: water Insoluble

Simple Lipids

FA + Glycerol



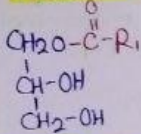
Palmitic acid (16C)

Arachidonic acid (20C)

Fatty acid

Saturated
no double
triple bond

Palmitic acid
Stearic acid

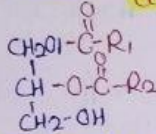


monoglyceride

Unsaturated
double bond.

Oleic acid

Arachidonic acid

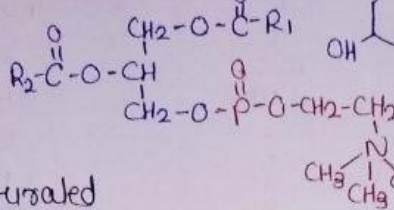


Triglyceride

Compound Lipids

FA + Glycerol + Addⁿ Group

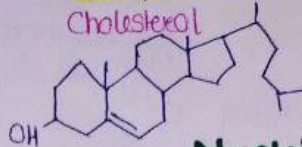
phospholipid → lecithin
found in cell mem.



Derived Lipid

Simple + Compound

Cholesterol



on the basis: MP

FAT
high MP

Ghee.
Butters

oil
low MP

Gingelly oil.

Nucleic Acids:

Polymers of Nucleotides.

Sugars + Nitrogenous + phosphate

Nitrogenous Base

Purine:

Adenine, Guanine

(2 rings)

Adenine

Adenine

Pyrimidines:

Cytosine, thymine, uracil

uracil

uracil

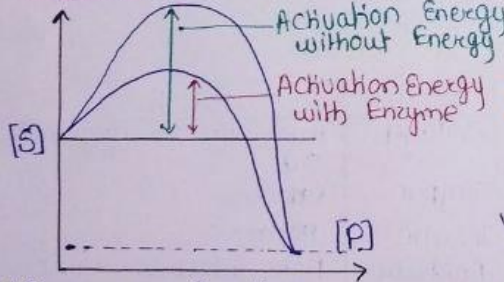
Nucleoside	Nucleotide
NB + S	+P
A + S → Adenosine	Adenylic acid
G + S → Guanosine	Guanilylic acid
C + S → Cytidine	Cyidylic acid
T + S → Thymidine	Thymidylic acid
U + S → uridine	Uridylic acid

Enzymes:

Biological Catalyst

All Enzymes → proteins.

Very specific for their substrate.



Exothermic Reaction

Inhibition:

Chemicals molecules which reduces rate of reaction.

Competitive Inhibition

Shape of substrate & Inhibitors are identical.

In presence of Inhibitors affinity reduces.

eg. Sulphur drugs
Succinate dehydrogenase

Non-Competitive

Shape of substrate & Inhibition are not identical.

Inhibition binds to regulatory site.

eg. Cyanide poisoning.

Holoenzyme = Apoenzyme + Co-factors

(Protein part)

① Prosthetic group

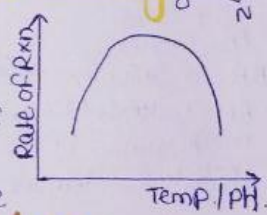
② Co-Enzyme

③ Metal ion.

Factors affecting Enzyme activity

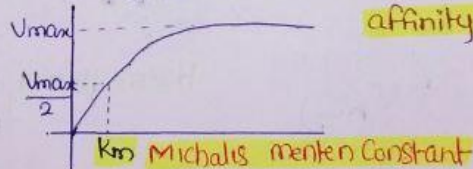
I. Temperature:

- Enzyme denature at high temp.
- For every 10°C ↓ enzymatic activity becomes $\frac{1}{2}$
- Enzymes are pH sensitive



II. Substrate Concentration:

- Rate of reaction ↑ and becomes stable once all the active sites are filled.



affinity ↑ ∝ $\frac{1}{K_m}$

@Gargigalke