MOLECULAR BIOLOGY

- molecules are important in living organisms.
- water, nucleic acids, proteins, carbohydrates and lipids.
- The relationship betⁿ genes and proteins are the most important in molecular biology.

RELATIONSHIP BETWEEN GENES AND PROTEINS:

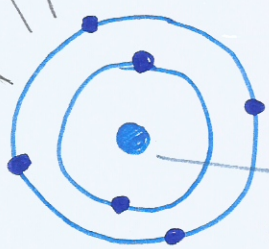
Nucleic acids compromise DNA and RNA which are the chemicals responsible for making genes. Proteins vary in structure and carry out various functions. It also controls chemical reactions of the cell by acting as enzymes.

CARBON COMPOUNDS

15th most abundant element on earth.

Tetravalent in nature, which helps it make a huge range covalent bonds & long chains with other elements.

Form covalent compounds and are stable in nature.



TETRAVALENT IN NATURE ↴
valency - 4+
- electron - 6
nucleus
(protons and neutrons) - 6 each

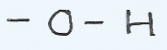
It can bond with elements such as H, P, N and O.

CARBON

LIPIDS	CARBOHYDRATES	PROTEINS	NUCLEIC ACIDS
Carbon	Carbon	Carbon	Carbon
Hydrogen	Hydrogen	Hydrogen	Hydrogen
Oxygen ↓	Oxygen	Oxygen	Nitrogen
		Nitrogen	Phosphorus
		Sulphur (22 only)	oxygen

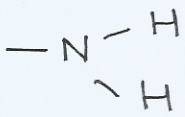
DRAWING MOLECULES

Hydroxyl



(-OH)

Amine

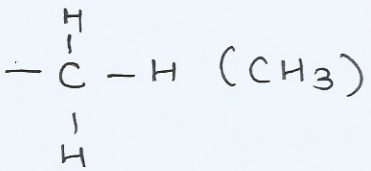


$(-NH_2)$

Carboxyl

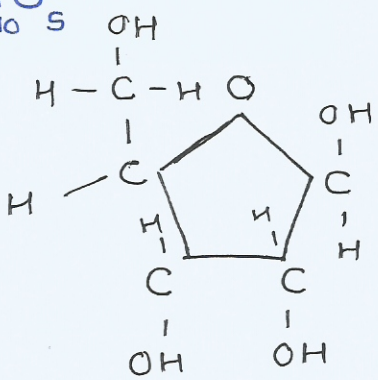
(-COOH)

Methyl

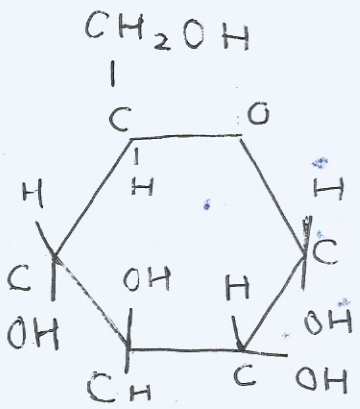


(CH_3)

Ribose - $C_5H_{10}O_5$



Glucose - $C_6H_{12}O_6$



Hydrolysis:- chemical breakdown of a compound due to reaction with water.

Condensation:- a reaction in which 2 molecules combine to form a larger one, producing H_2O as a by-product.

METABOLISM

Metabolism consists of all the chemical process that occur within a living organism in order to maintain life. Enzymes act as catalysts for these bio-chemical reaction-s.

Functions :-

→ They provide a source of energy for cellular growth.
→ They enable the synthesis and assimilation of new materials for use within a cell.

ANABOLISM

Anabolism is the synthesis of complex molecules from simpler molecules by condensation reaction.

→ Anabolic steriods promote body building.

Eg:-
- Protein synthesis using ribosomes
- DNA synthesis during replication
- Photosynthesis in plants
- synthesis of complex carbohydrates

Intake of energy from ATP.

CATABOLISM

Catabolism is the breakdown of complex molecules to form simpler molecules by the process of hydrolysis.

→ Release energy.

Eg:-
- Digestion of food
- Cell respiration
- Decompostion of organic matter