Biomolecules

Enzymes:

(i) Biocatalysts.

(ii) They are specific for a particular reaction and for a particular substrate.

For example, maltase catalyses hydrolysis of maltose

$$C_{12}H_{22}O_{11} \xrightarrow{\text{Maltase}} 2C_6H_{12}O_6$$

Maltose Glucose

(iii) Oxidoreductase: Enzymes which simultaneously catalyse the oxidation of one substrate and the reduction of another substrate.

(iv) Enzymes reduce the magnitude of activation energy of a reaction

Vitamins: Organic compounds required in small amounts in the diet, whose deficiency causes specific diseases.

Classification of vitamins

Fat-soluble vitamins: Vitamins A, D, E and K

Water-soluble vitamins: Vitamin C and B group vitamins

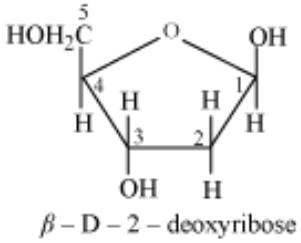
S.No.	Vitamin	Sources	Deficiency
1.	A	Fish, liver, oil, carrots, butter and milk	Xerophthalmia (hardening of cornea of eye), night blindness.
2.	B1(Thiamine)	Yeast, milk, green vegetables	Beri beri (loss of appetite, retarded and cereals growth)
3.	B2 (Riboflavin)	Milk, egg white, liver, kidney	Cheilosis (fissuring at corners of mouth and lips), digestive disorders and burning sensation of the skin
4.	Vitamin B6 (Pyridoxine)	Yeast, milk, egg yolk, cereals and grams	Convulsions
5.	B12	Meat, fish, egg and curd	Pernicious anaemia (RBC-deficiency in haemoglobin)
6.	C (Ascrobic acid)	Citrus fruits, amla and green leafy vegetables	Scurvy (bleeding gums)
7.	D	Exposure to sunlight, fish and egg yolk	Rickets (bone deformities in children) and osteomalacia (soft bones and joint pain in adults)

8.	E	Vegetable oils like wheat germ oil, sunflower oil, etc.	Increased fragility of RBCs and muscular weaknes
9.	K	Green leafy vegetables	Increased blood clotting time

Nucleic acids:
Polymers of nucleotides
Mainly two types Deoxyribonucleic acid (DNA) Ribonucleic acid (RNA)

DNA: Sugar moiety β–D–2–Deoxyribose

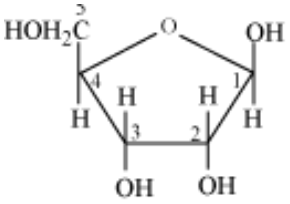
Bases: adenine (A), guanine (G), cytosine (C) and thymine (T)



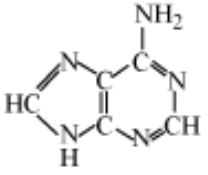
β – D – 2 – deoxyribose

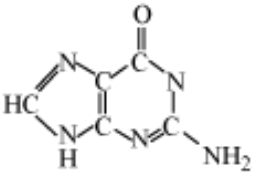
RNA: Sugar moiety β–D–ribose

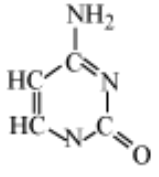
Bases adenine (A), guanine (G), cytosine (C) and uracil (U)

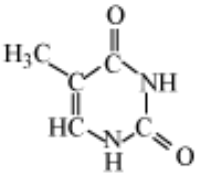


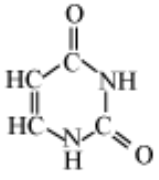
β – D – ribose


Adenine (A)

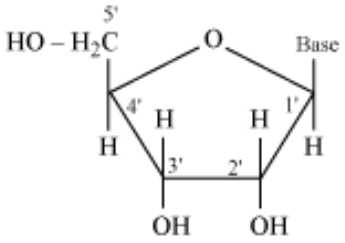

Guanine (G)


Cytosine (C)

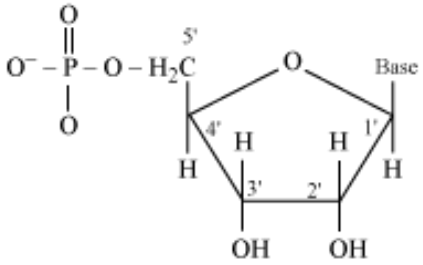

Thymine (T)


Uracil (U)

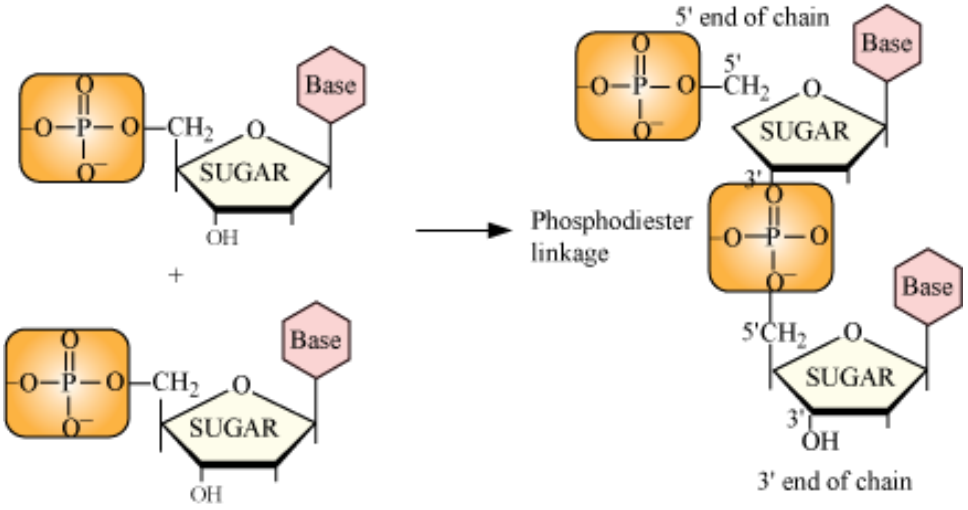
Structure of a nucleoside



Structure of a nucleotide



Formation of dinucleotide

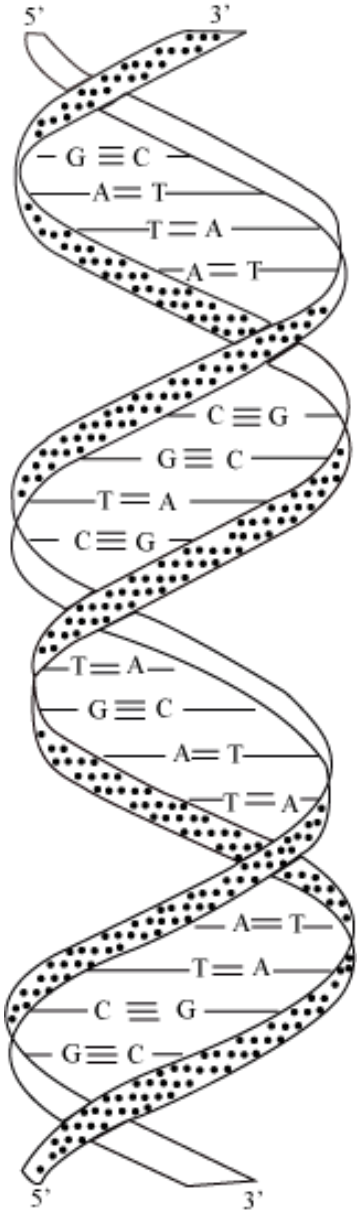


Primary structure – Sequence of nucleotides in the chain

Secondary structure – Double-strand helix structure for DNA. The two strands are complimentary. This is because H–bonds are formed between specific pairs of bases.

A – T

C – G



RNA is single stranded

Classification of RNA on the basis of their functions:

(i) Messenger RNA (m–RNA)

(ii) Ribosomal RNA (r–RNA)

(iii) Transfer RNA (t–RNA)

Biological functions of nucleic acids

DNA

(i) Maintains the identity of different species

(ii) Stores the message for the synthesis of a particular protein

RNA

(i) Carries out protein synthesis in the cell