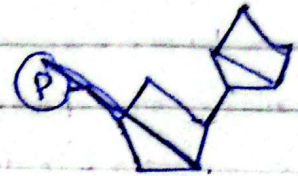


DNA & RNA:

1: DNA: DNA is deoxyribonucleic acid. It is a molecule carry genetic information in all living organism and viruses. It is first discovered by Friedrich Miescher in 1869.

(a) **Structure:** DNA is double helical structure formed by two strands, which is held together by base pairing. DNA is composed of nucleotide. Nucleotides are the fundamental building block of DNA. It is composed of:

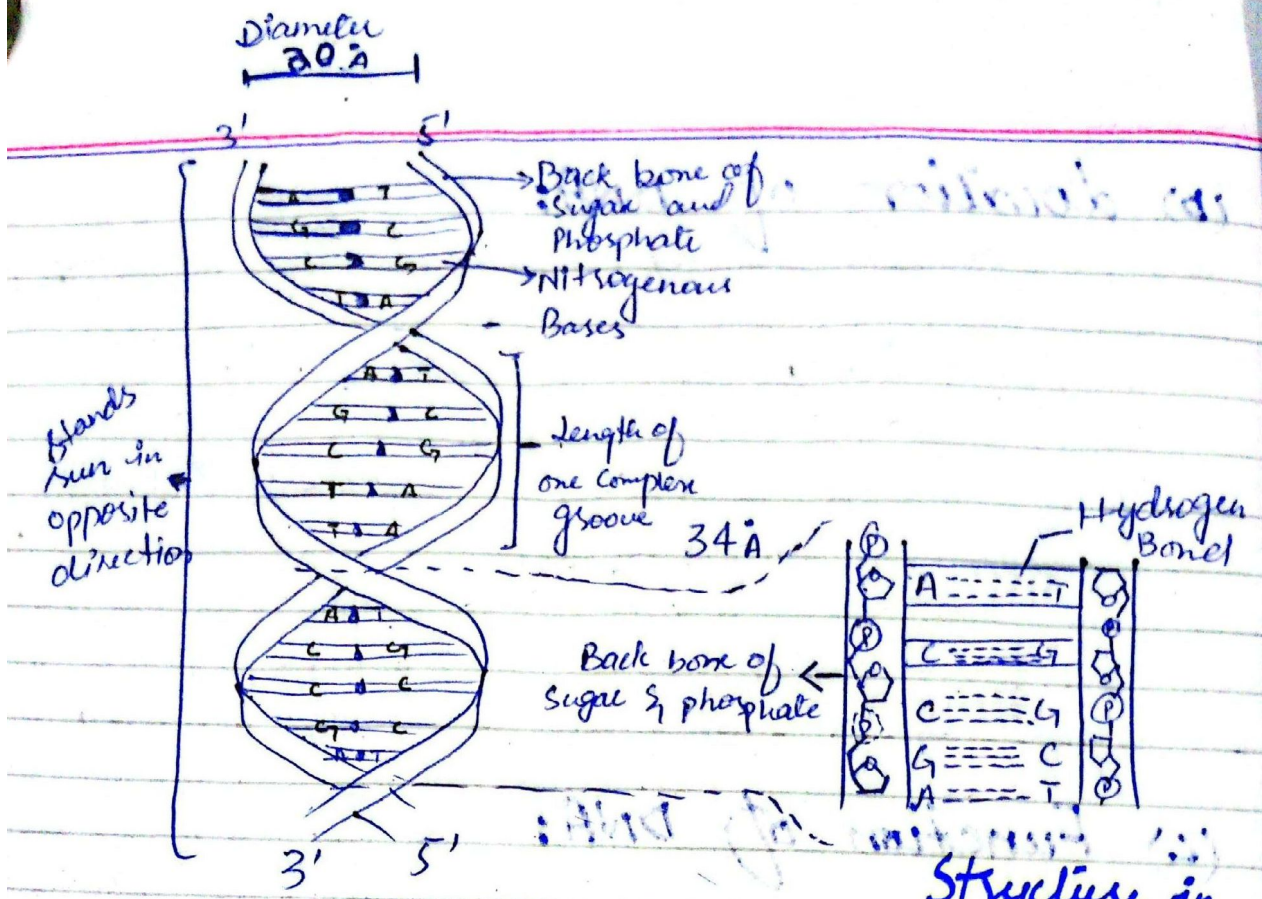
- De-oxysibose Sugar
- Nitrogenous Base
- Phosphate Group



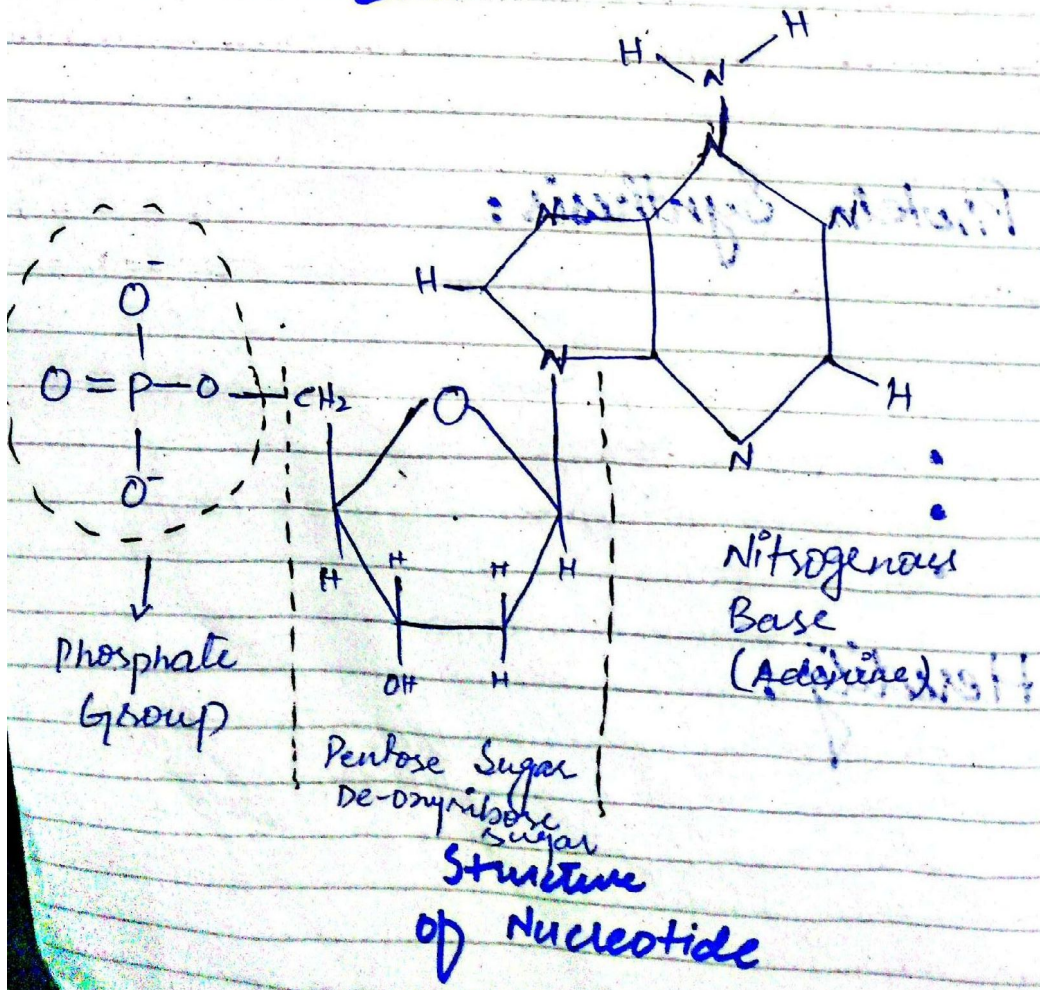
Deoxyribose sugar and phosphate group form the backbone of DNA. Nitrogenous base form base pairing. There are four types of base:

- Adenine (A)
- Guanine (G)
- Cytosine (C)
- Thymine (T)

Adenine always form double hydrogen bond with Thymine, and, Guanine form Tripple hydrogen bond with cytosine.



Structure of DNA



(D) Location of DNA:

In Eukaryotic cell DNA is present in the nucleus. It is called Nuclear DNA. A small amount of DNA is also present in mitochondria which is called mitochondrial DNA.

In prokaryotic cell DNA is present in the cytoplasm directly as prokaryotes do not have nucleus.

(E) Function of DNA:

Store Genetic information:

DNA contains instructions for building and maintaining an organism. These instructions are encoded in sequence of nucleotides.

Protein Synthesis:

DNA directs the synthesis of proteins which are essential for carrying out various cellular functions for example:

- Enzyme activity
- Structural support
- Signaling

Heredity:

DNA is responsible for transmission of genetic information from one generation to other generations during the reproduction.

Self Replication:

DNA has the unique ability to make the copy of itself by a process called replication. This ensure that each new cell receive a complete and Accurate copy of genetic information.

2: RNA:

RNA is ribonucleic Acid. It carry the genetic information in some viruses and play various biological role including protein synthesis. It is first describe by Richard Altmann as nuclear substance that were later identified as RNA in 1889.

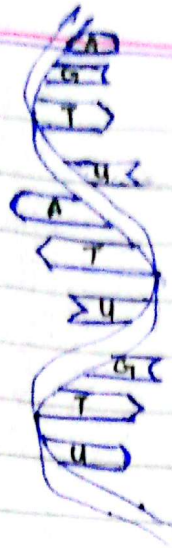
(a) Structure

RNA is single strand structure with is fold into complex three dimension structure through base pairing. RNA is also composed of nucleotide which is composed of:

- Ribose Sugar
- Phosphate Group
- Nitrogenous base

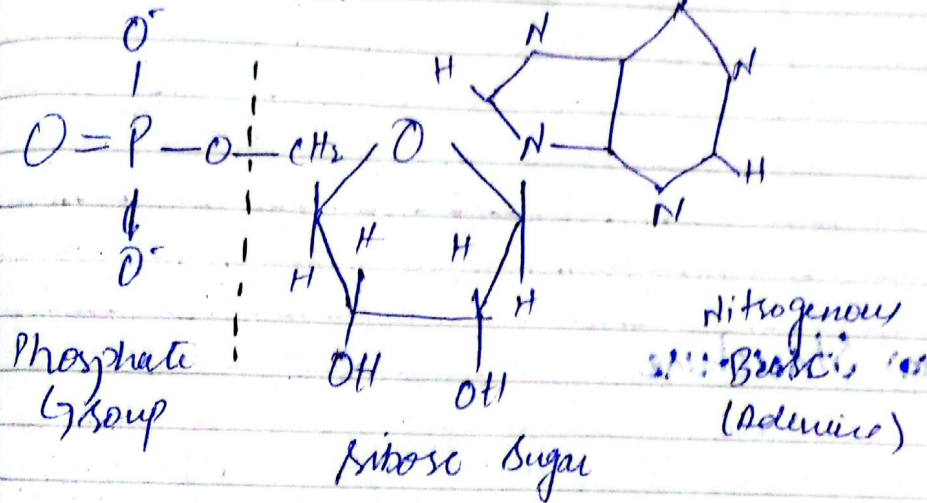
There are Four type of nitrogenous bases:

- Adenine (A)
- Guanine (G)
- Cytosine (C)
- Uracil (U)



$A \Rightarrow$
 $T \Rightarrow$
 $G \Rightarrow$
 $C \Rightarrow$

Structure of RNA



(b) Function of RNA:

Protein Synthesis:

RNA play an important role in protein synthesis by acting as mRNA, tRNA, rRNA.

Genetic Material:

Some viruses use the RNA as genetic material instead of DNA. For example, HIV, influenza, and Coronavirus.

Enzyme Activity:

Some enzymes are RNA molecules called ribozymes which catalyze chemical reactions by binding to specific molecules and facilitate chemical changes.

(c) Types of RNA:

There are major three types of RNA's

- Ribosomal RNA (rRNA)
- Transfer RNA (tRNA)
- Messenger RNA (mRNA)

rRNA:

The major part of ribosomes which is the house of protein synthesis.

mRNA:

Carry the information of protein synthesis from the DNA to ribosomes

tRNA:

Transport the ribosomes amino acid to ribosomes for protein synthesis.