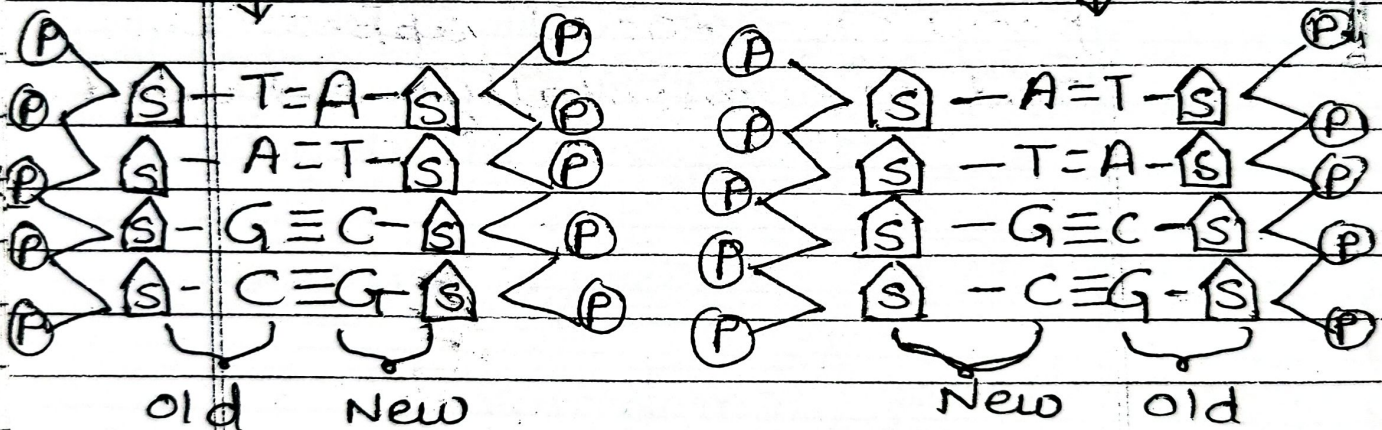
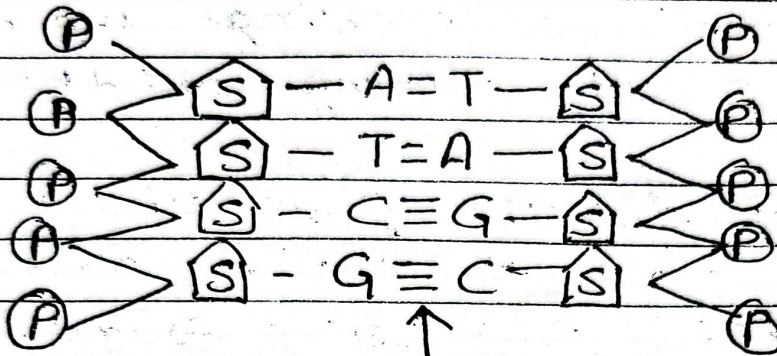


Discuss the Process of DNA Replication.



\* Nucleic acid is consisted of DNA & RNA both. The full name of DNA is deoxy ribose nucleic acid. The presence of nucleic acid was first of all explained by Miesher.

## Structure :-

DNA is a large molecule and consisted of millions of nucleotides. Each nucleotide is consisted of three components named as -

- a) Sugar
- b) Nitrogenous base
- c) Phosphate group

The DNA molecule is double stranded helical structure which was proposed by Watson and Crick.

The whole DNA molecule is consisted of two strands also known as polynucleotide chains. These chains form a double helical like spiral staircase. Both the strands are antiparallel means if one chain has the polarity  $5' \longrightarrow 3'$  then the other has  $3' \longrightarrow 5'$

The sugar phosphate units form the back bone and nitrogenous base form the centre. Both the strands are connected with each other by weak hydrogen bonds present between the nitrogenous bases of two strands.

In the whole structure Adenine forms pairing with thymine with the help of two hydrogen bonds and thymine also forms pairing with adenine with the help of two hydrogen bonds. Similarly cytosine forms pairing with guanine with the help of three hydrogen bonds. Thus the pairing between A and T is complementary and the pairing between C and G is also complementary.

The pairing always takes place between purine and pyrimidine.

In RNA uracil is present in place of thymine. In purine adenine and guanine is included. And in pyrimidine thymine, cytosine and uracil are included.

The double helix takes a complete turn after 3.4 nm. There are 10 base pairs in a complete turn. The width of DNA molecule is 0.20 nm.

The nucleotides in helix are joined together by phosphodiester bonds.

DNA is genetic material.

Explanation: -

Just to prove that the DNA is genetic material the following experiments may be done -

DNA is genetic material. It can be proved by :-

1) Conjugation -> The process of conjugation was first of all introduced by 'Lederberg' and 'Tatum'.

They made their experiment on E. coli bacteria.

They took two types of bacteria - one was motile and another was non-motile. The motility determines maleness and femaleness.

The motile bacterium behaves like male while the non-motile behaves like female.

The motile bacterium comes in contact with non-motile thus physical contact is formed.

For this process pili plays important role.

With the help of enzyme the contact wall is dissolved and a thin cytoplasmic tube like structure is formed, known as conjugation tube.

Through the conjugation tube the materials pass from one to another bacterium. With the help of certain enzyme some part of DNA of motile bacteria breaks and passes away through the conjugation tube.

into the recipient bacteria. The cell contributing the DNA is known as donor cell and another is recipient cell.

The recipient cell becomes recombinant due to presence of some new genetic material from donor cell.

As the fusion between the two cells is only partial the recipient cell is termed as 'merozygote'. And finally this merozygote produces a new strain of bacterium.

2) Transformation:-

- Avery, McCleoid & McCarty.
- Griffith
- Pneumococcus

DNA is genetic material and can be proved by transformation experiment.

The transformation process was first of all explained by:

'Griffith'. The whole process was established by three scientists known as Avery, McCleoid and McCarty.

The whole experiment was done in pneumococcus bacteria. According to them if a suspension of dead cells of one strain (type) is mixed living cells of the other strain, recombination may occur resulting into the change of character in the living cells. They observed that the third strain of pneumococcus which is capsulated is responsible for the pneumonia disease. The other strain are II is non-capsulated <sup>and</sup> are not capable of causing the disease.

When non-capsulated are II is mixed with the DNA