

Step 8:

DNA REPLICATION



Presented By:-

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INTRODUCTION:-

It is defined as a process in which DNA makes a copy of itself.

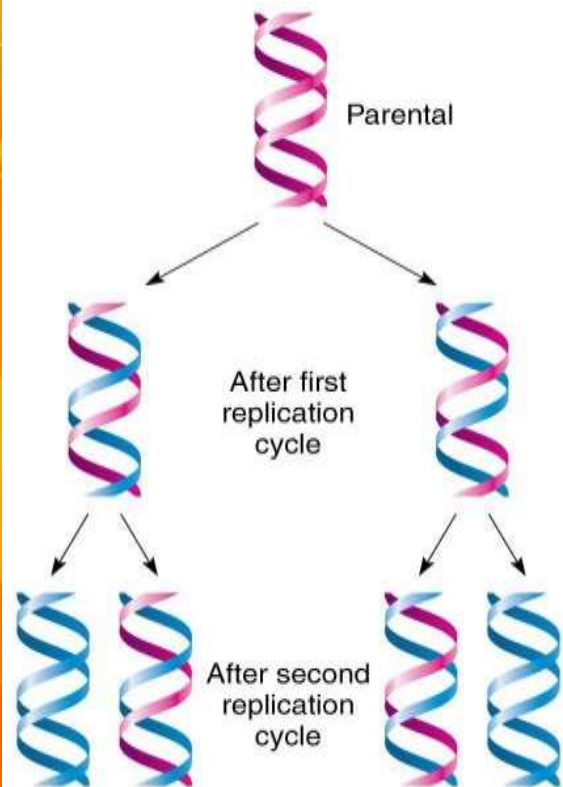
Crick proposed:- 3 types of DNA replication.

a) Semi conservative Method.

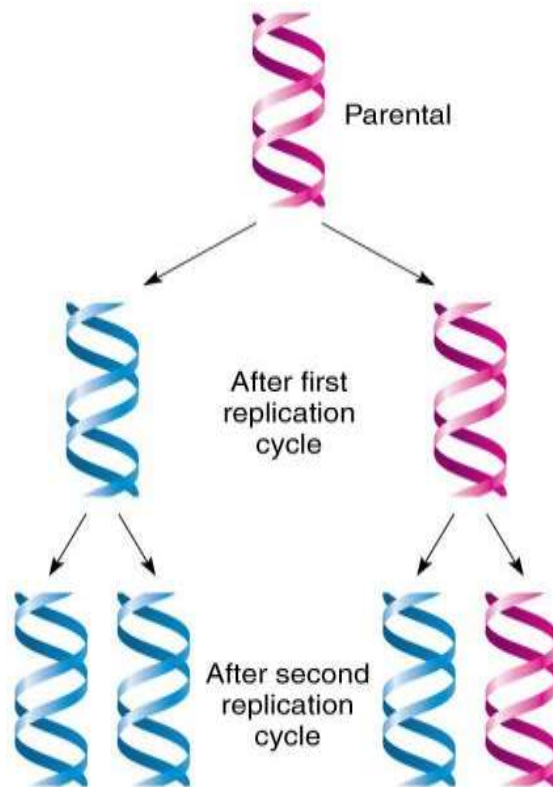
b) Conservative Method.

c) Dispersive Method.

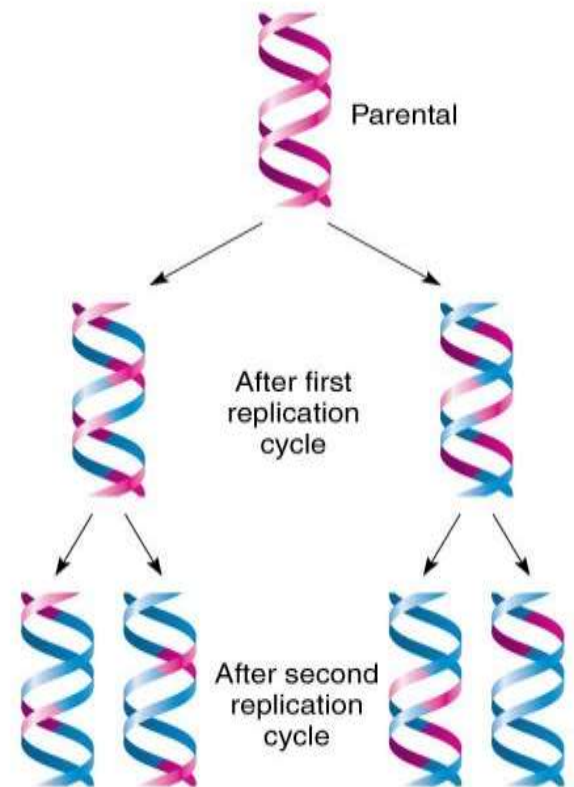
a) Semiconservative model



b) Conservative model



c) Dispersive model



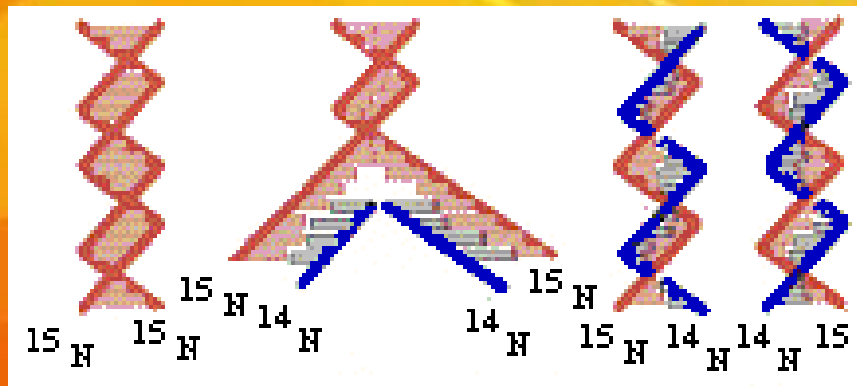
Types of DNA Replication with respect to cell.

Cell:- $\left\{ \begin{array}{l} \text{Prokaryotic-Circular DNA - Q model.} \\ \text{Eukaryotic-Linear DNA - Y shaped replicating fork.} \end{array} \right.$

SEMI CONSERVATIVE METHOD:-

Messelson & Stahl (1958) - proved DNA Replication is of Semi conservative type.

- Used heavy isotope of nitrogen - ^{15}N [naturally nitrogen is ^{14}N].
- Used CSCL for his experiment.



50% Parental DNA {strand}
&
50% New DNA {strand}

At every generation the parental DNA becomes 50%.

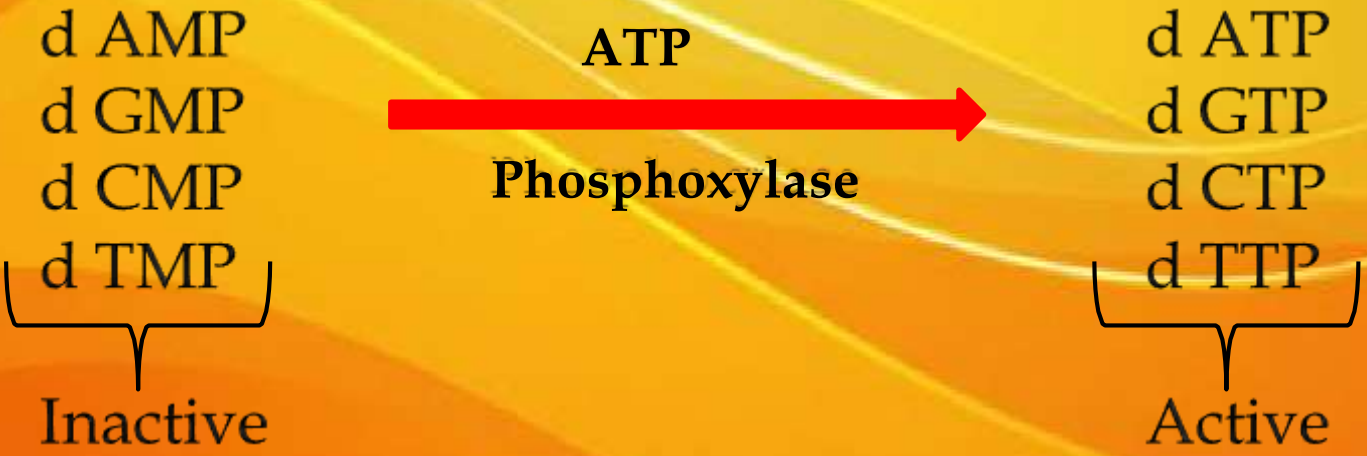
Ex:- 100% → 50% → 25% → 12.5% → 6.25%.

Key Points:-

DNA Replication takes place in the Nucleus of the cell. This place in S. phase of cell division.

STEPS OF DNA REPLICATION:- {Prokaryotic cell}.

Step 1:- Activation of all the nucleotides [dNTP 's].



Step 2:- Origin of Replication.

With respect to Cells:-

1. Prokaryotic DNA - Small DNA - Only one origin of Replication.

2. Eukaryotic DNA - Large DNA - Many origin of Replication.



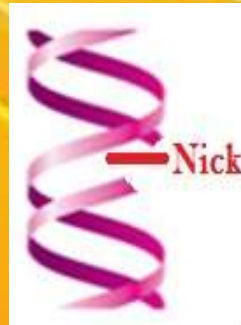
Origin of Replication.

Step 3:- NICK /CUT/Incision in DNA.

- It is done by the origin of Replication [Enzyme- Entonuclease].



Entonuclease



Step 4:- Unwinding / Unzipping of DNA.

- It is done by the help of Enzyme DNA Helicase / rep protein.
- Done by breaking all the h -bond.

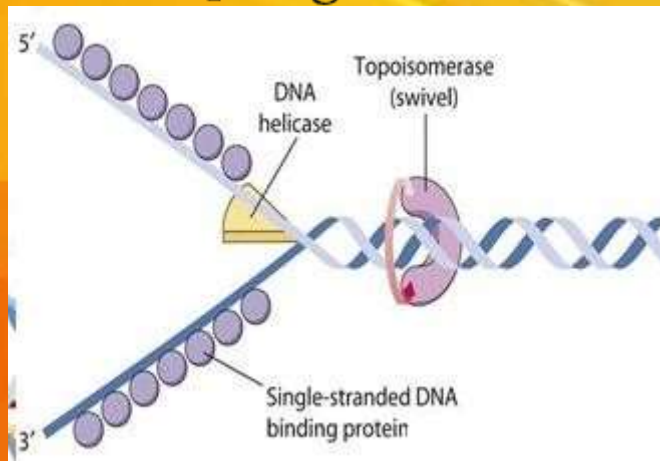


$\boxed{A=T}$
Less energy

$\boxed{C=G}$
More energy

Step 5:- Use of SSBP [To prevent intercoiling of DNA].

- The unwinded DNA strand might coil with each other.
- SSBP used [single stranded binding protein].



SSBP makes DNA appear like Y-shaped Replication

Step 6:- Release of tension caused due to unwinding of DNA.

- Due to unwinding ,the upper DNA can undergo tension /stress.
- To release it, Topoisomerase enzyme is used.

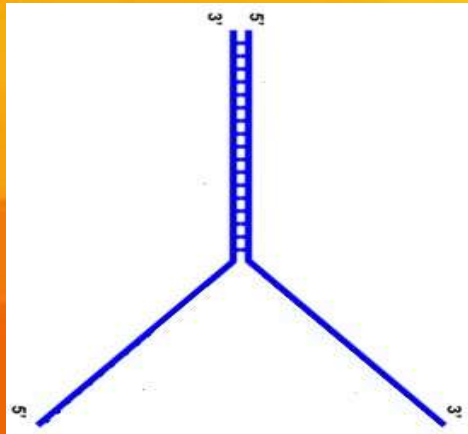


Topoisomerase

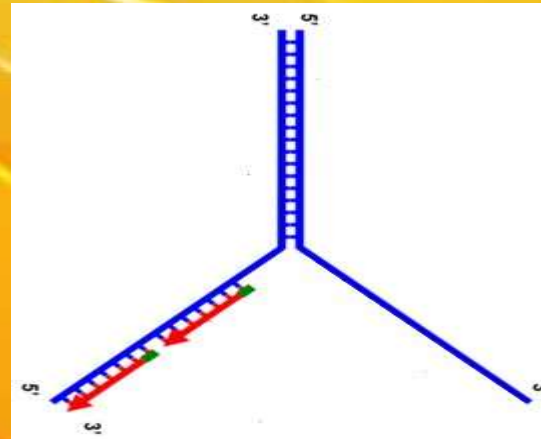


Step 7:- Formation of RNA primer.

- RNA primer is a small fragment of RNA synthesized by the help of enzyme DNA primase.



**RNA
primer**

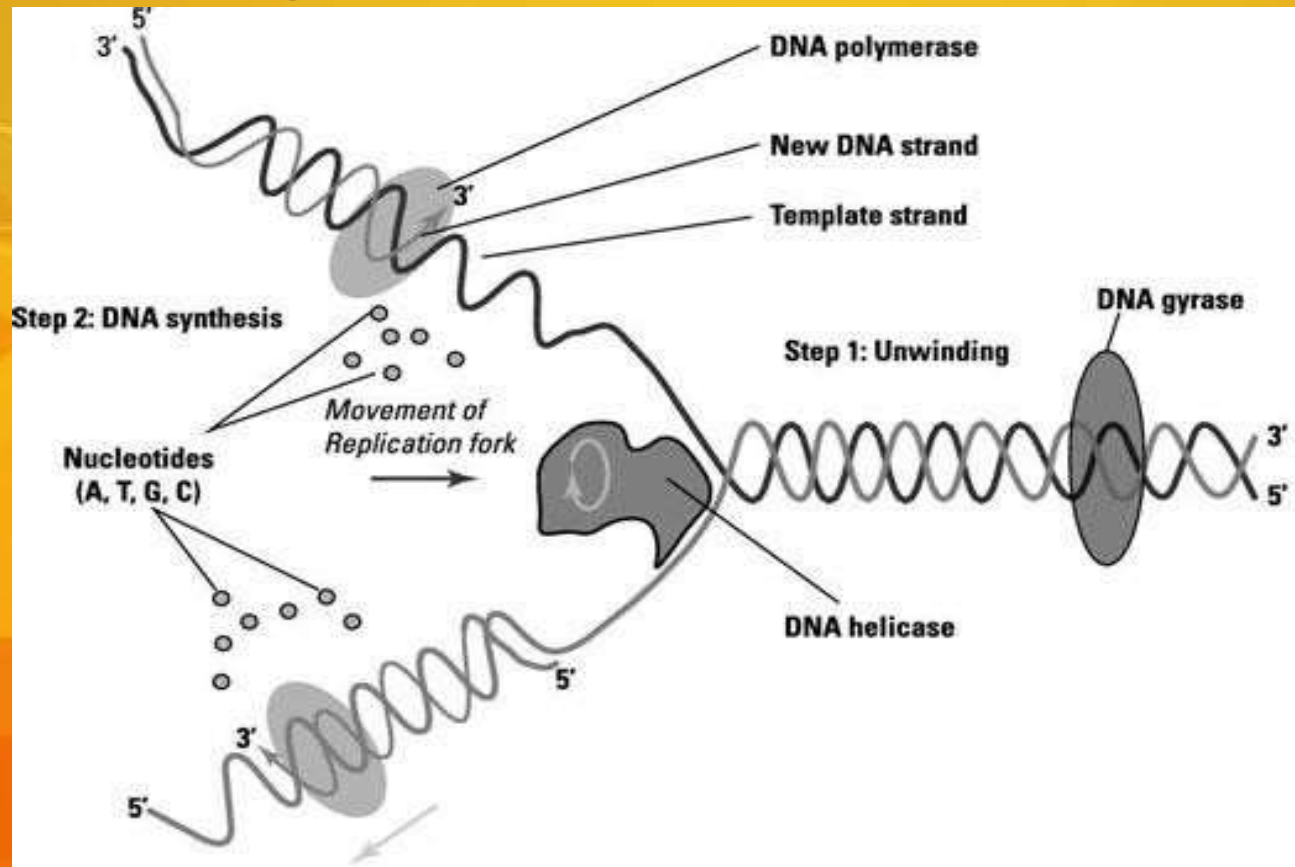


Step 8:- Synthesis of new DNA strand .

-It is brought by the help of DNA polymerase enzyme.

-DNA Polymerase can add nucleocides only in 5' \longrightarrow 3' direction of stand.

DNA POLYMERASE:- Attacts all the activated dNTP's with respect to template and new DNA is synthesized.



Thank you!

