



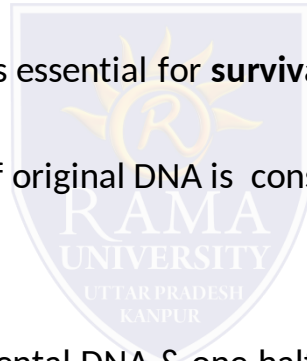
FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

Prokaryotic DNA Replication

- ❖ When cell divides a daughter cell receives identical copies of genetic information from a parent cell.
- ❖ **Definition of DNA Replication** :Replication of DNA is the process in which DNA copies produce identical daughter molecules of DNA.

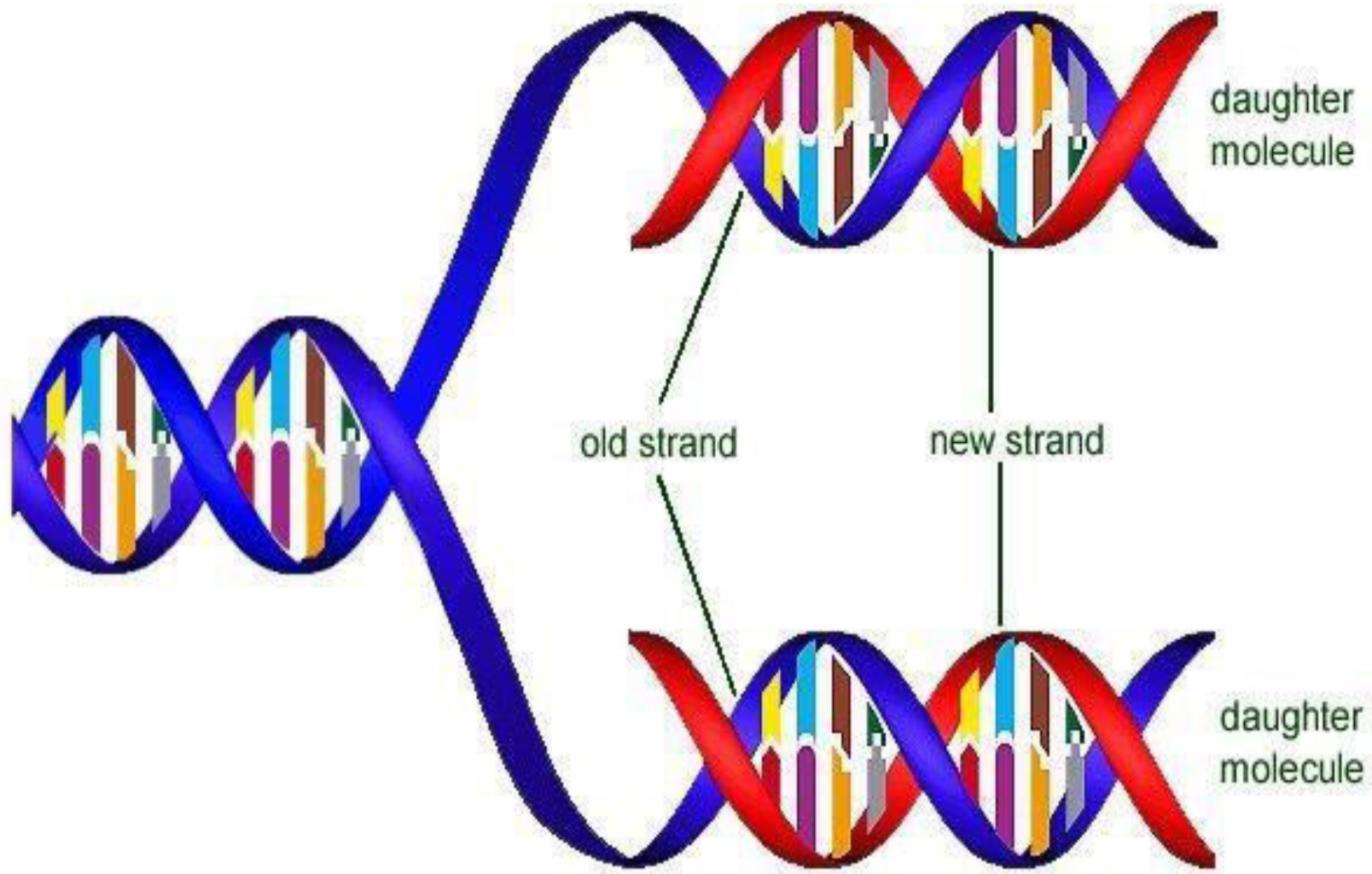
1. DNA Replication exhibits **high fidelity** which is essential for **survival of fetus**.
2. DNA Replication is **semi- conservative** :half of original DNA is conserved in the daughter DNA .(Meselson & Stahl 1958)

Newly synthesized DNA has half of the parental DNA & one half of new DNA.



Features of DNA Replication in Prokaryotes:

- **Semi- continuous, semi-conservative & bi-directional**
- Replication proceeds in 5'→3' direction
- Simultaneously both strands of DNA
- Replication in **Leading strand is continuous & forward** .
- Replication in Lagging strand is discontinuous & short pieces of DNA (15-250 nucleotides).**Okazaki fragments** are produced on Lagging strand .
- **DNA Synthesis** :bidirectional from point of origin in replication bubble
- Two replication forks move in opposite directions from replication bubble or replication eye ,which becomes larger and assumes a □ shaped structure.
- 3 Stages of replication : initiation ,elongation and termination.



Conservative



Semiconservative

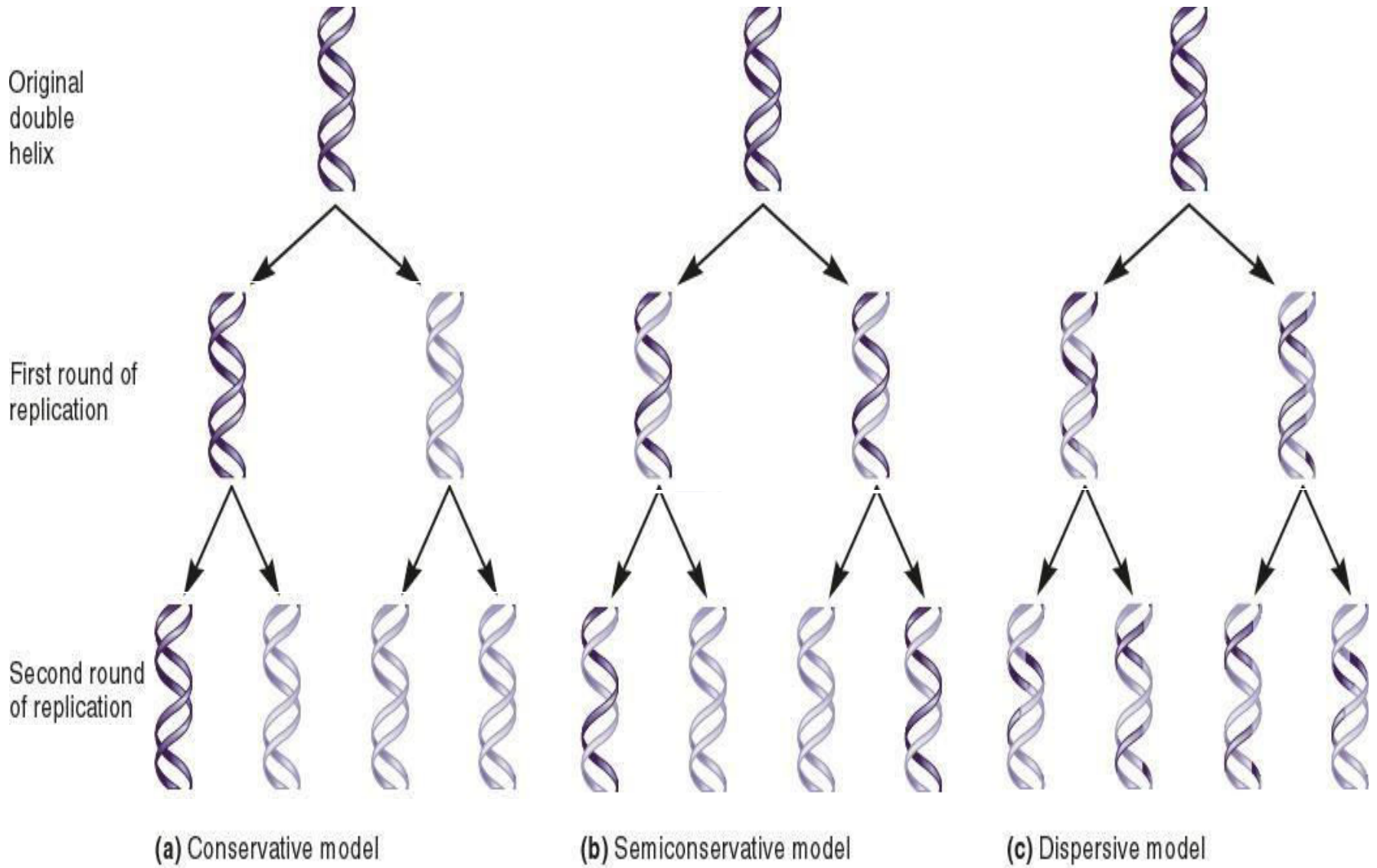


Dispersive



One round of replication — new synthesis is shown in green

Three models for DNA replication



- **Replicon** : is the unit of DNA in which individual acts of replication occurs. Bacterial chromosome contains a single replicon ,eukaryotic chromosome has a large number of replicons.
- **Replication fork**: also known as growing point ,at which replication occurs. Replication may be unidirectional or multidirectional based on whether one or more replication forks starts from the origin respectively .
- **Origin of Replication** : the site at which replication begins .These sites are generally AT – rich to facilitate unwinding . Proteins and enzymes required assembled at origins.

Overview of DNA replication

