DNA Replication

Semiconservative Replication

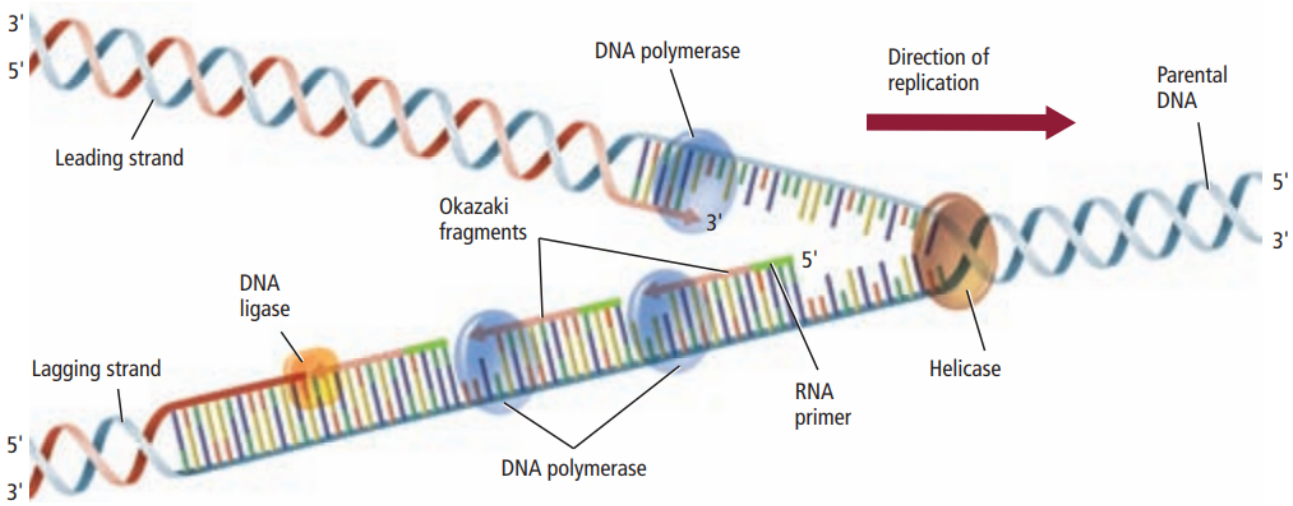
- Each strand serves as a guide to replicate onto the other side
- Steps
    - Unwinding
    - Base pairing
    - Joining

Unwinding

- Starts with the double helix
- **DNA helicase** starts to **separate** the two sides of the double helix **starting at the origin**
- Single Stranded Binding Proteins (**SSB**) associate with the DNA to **prevent it from joining back together**
- **RNA Primase** adds a small RNA Primers to both strands of the DNA to **signal the DNA Polymerase to start**

Base Pairing

- **DNA Polymerase** begins to **add new neucleotides** to each strand
    - Can only work in the **5' to 3'** direction (the added strand is 5' to 3')
    - Since **DNA is antiparallel**, one strand follows the helicase and one goes away
    - The strand going away is the **lagging strand**, the other is the **leading strand**
    - Since the lagging strand goes backwards, there will be many fragments of DNA, these are called **Okazaki Fragments**
    - The leading strand is continuous in replication while the lagging strand is discontinuous, which is why the replication is called **semidiscontinuous**
    - Each new strand contains one half strand of the old DNA, so it is called **semiconservative**
    - Also **checks the DNA** as it replicates it **for problems**

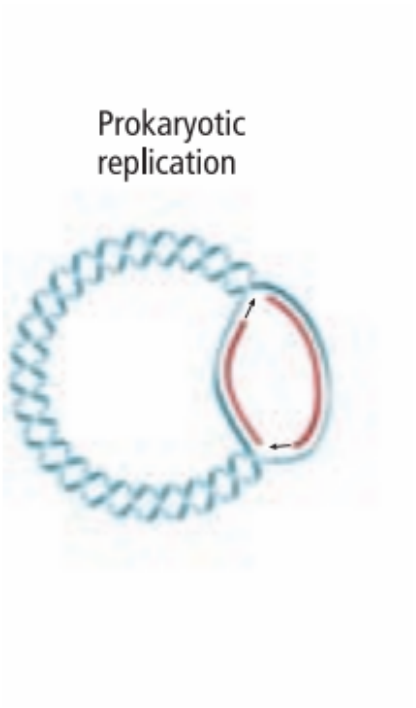


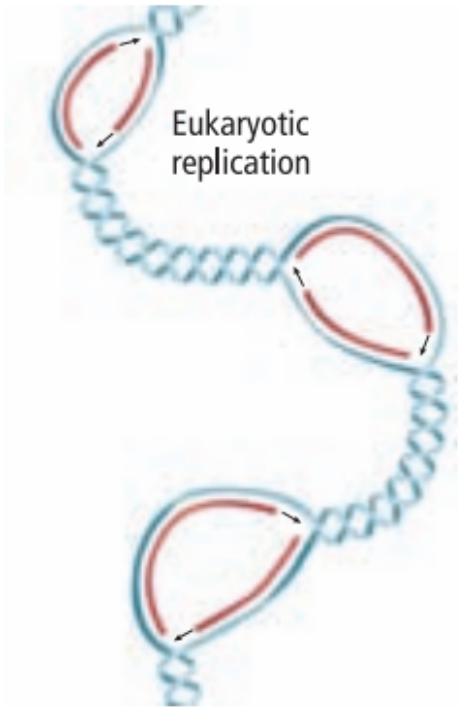
Joining

- **DNA Ligase** comes and **joins the multiple Okazaki Fragments**
  - Also joins mutliple sections together from **other points of origin**

Prokayotes vs Eukaryotes

Eukaryotes	Prokaryotes
One section is 10000 to 1mil base pairs	Much shorter sections
Multiple areas of replication at the same time	Replicates from one place only
Replication happens in both directions	Replication happens in both directions


Prokaryotic
replication


Eukaryotic
replication