

hey

DNA Replication and Recombination

What are the 3 modes of DNA replication? Draw/describe each. Which one did Watson and Crick say was the most likely scenario?

conservative	semi conservative	dispersive
1 New strand 1 old strand	each strand is 1/2 old 1/2 new	The 2 new strands are mixes of new and old.
	This is the most likely	

Where does replication begin? What direction does it proceed?

ORI (or *oriC* in bacteria)

It is bidirectional and goes both ways.

What is a replicon?

a unit of length to measure replicated DNA

Describe bacterial replication.

- single, circular DNA
- *oriC* (only spot)
- more simple due to less DNA

What 4 things are required for DNA replication?

DNA Poly I

DNA template

A Primer

All 4 dNTPs

Describe chain elongation.

- occurs 5'-3'
- 5' carbon connects to P_o4 and 3' of other carbon connects to other end of P_o4

What is the role of DNA poly I, II, and III? Which one is the only capable of doing exonuclease activity from 5-3?

- create/elongate DNA (All need primers)
- Only DNA Poly I

What is the role of DNA poly I, II, IV, and V?

DNA repair

Describe DNA poly II and its active form.

Holoenzyme - made of subunits

alpha-5'-3' Poly epsilon-3'-5' EXO

θ - core assembly

What are the 7 key issues to be resolved during DNA replication?

Unwind helix

reduce supercoiling

Primers

Lagging strand

Remove RNA primers

Join primer gaps

Proof reading

What does DNAa do? binds to ORI and begin to open

Describe DNA helicase and its job.

enters the hole made by DNAa and
opens DNA to recruit holoenzyme

What do SSBPs do?

stabilizes strand and prevents rebinding
(holds open the "door")

What is the role of DNA gyrase and Topoisomerase?

gyrase: relieves supercoiling

TOP: cut DNA

What are Okazaki fragments?

fragments created by lagging strand

need to remove primers and ligate gaps

What does DNA poly I do to primers? What does DNA ligase do after?

Removes them

ligase: glues the "holes" to create 1 strand

Describe DNA's ability to proofread and do error corrections.

Not Perfect

DNA poly exo 3'-5' to remove errors &

Prevent mutations

How is Eukaryal DNA synthesis different than bacterial?

- more complex
- many ORI's
- have a pre-RC to tag ORI as initiation spot
- have DNA Poly alpha, epsilon, and delta