

DNA History

Directions: For the following sections please reference the Knuffke's prezi Information 1: DNA: A History. <http://prezi.com/zkhjbh03vc/ri/ap-bio-information-1-dna-introduction/>

Questions to Answer:

1. How did the work of TH Morgan and company contribute to the eventual discovery that DNA was the genetic material in the cell?
2. Explain the transformation experiment conducted by Frederick Griffith. What did the results of the experiment suggest?
3. Explain how the work of Avery, McCarty, and McLeod expanded on the work done by Griffith. What did the results of their experiment suggest?
4. Explain the experiment conducted by Hershey and Chase. How did the results of their experiment demonstrate that DNA was the genetic material of bacteriophages?
5. What is important about the work done on DNA by Erwin Chargaff?
6. Explain how the work done by Rosalind Franklin and Maurice Wilkins helped inform Watson and Crick's model of the structure of DNA.
7. Briefly diagram the double helix structure of DNA. Include:
 - a. At least one A,T,C,G per strand.
 - b. Labeled phosphates, deoxyribose, phosphodiester bonds, and the correct number of hydrogen bonds per base pair.
 - c. Make sure to show the anti-parallel orientation of both strands.

Things to Understand:

1. The specific details of the experiments discussed in this presentation.
2. How to identify all major features of the double helix.

Central Dogma

Directions: For the following sections please reference the Knuffke's prezi Information 2: Central Dogma. <http://prezi.com/rjwxngctmq/p/ap-bio-information-2-the-central-dogma/>

Part I: DNA Replication

Questions to Answer:

1. Diagram the "Central Dogma" of molecular genetics. How does it allow for DNA to serve as both the heritable molecule and code for protein sequence?
2. Explain the experiment conducted by Meselson and Stahl. How did the results of their experiment demonstrate the semi-conservative model of DNA replication was the accurate model?

3. Explain how each of the following enzymes contributes to the process of DNA replication:
 - a. helicase
 - b. single-stranded binding proteins
 - c. DNA polymerase
 - d. primase
 - e. ligase
 - f. Topoisomerase/gyrase
4. How does replication of the leading strand differ from replication of the lagging strand? Why can't both strands of DNA be replicated in the same fashion?
5. Diagram the replication fork. Include:
 - a. the leading strand
 - b. the lagging strand
 - c. prime orientation of both parent strand and both daughter strands.
 - d. Replisome
 - e. Okazaki fragments
6. Why is telomerase necessary during the replication of eukaryotic chromosomes?

Things to Understand:

1. How to recognize the 5' and 3' ends of a DNA strand.
2. The structural differences between free nucleotides (nucleoside tri-phosphates), and nucleotides in a nucleic acid.
3. Why replication is necessary for cells, where it happens, its inputs and its outputs.
4. The specific details of the process of replication.
5. The mechanisms in replication that reduce the error rate.
6. The major differences in replication between prokaryotes and eukaryotes.