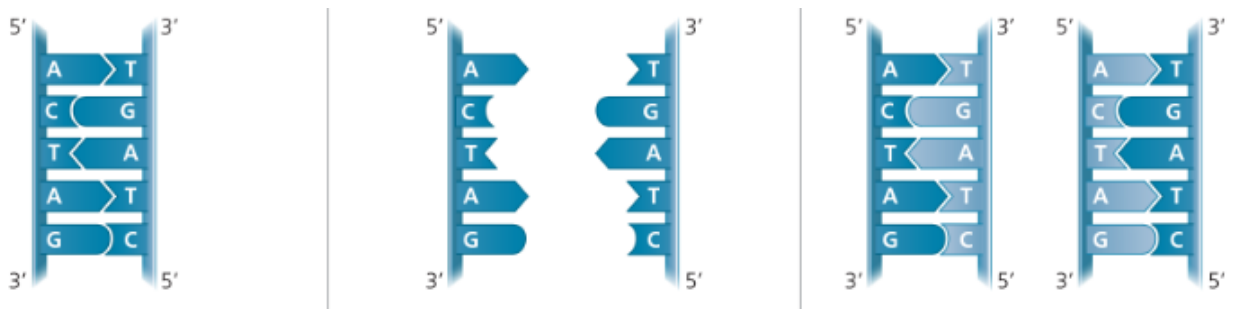


The Molecular Basis of Inheritance

Chapter 16

- a) Describe the model of DNA proposed by Watson and Crick.
b) DNA has a negative charge. Identify the characteristic of a nucleotide that is the cause of this negative charge.
c) Explain what is meant by the term antiparallel.
- Given the polynucleotide sequence GAATTC, identify what further information you would need in order to determine which is the 5' end. (You would need to know which end has a phosphate group on carbon 5 (the 5' end) or which end has a hydroxyl group (the 3' end).)
- If a species has 35% adenine in its DNA, determine the percent of the other three bases.



- Use the diagram above to describe the process of DNA replication.
- Explain the importance of complimentary base pairing in DNA replication. (Complementary base pairing ensures that the two daughter molecules are exact copies of the parental molecule. When the two strands of the parental molecule separate, each serves as a template on which nucleotides are arranged, by the base-pairing rules, into new complementary strands.)
- a) Describe the effect on a bacterial cell of inhibiting DNA pol III. (DNA pol III adds new nucleotides to a growing strand. If the enzyme were inhibited, DNA replication would be impossible. The cell would be unable to divide.)
b) Describe the leading and lagging daughter DNA strands you would expect to see in a bacterial cell in which DNA pol I were inhibited. (DNA pol I replaces RNA primers with DNA. If the enzyme were inhibited, the daughter DNA would contain RNA nucleotides.)
c) Describe the effect on DNA replication if RNA primase were inhibited. (DNA replication would not be possible because DNA pol III is unable to work de novo. The enzyme works by adding the first DNA nucleotide to the RNA primer.)
- Describe how errors are corrected during DNA replication. Explain the importance of DNA proofreading and repair.
- Explain why natural selection would not be possible if all errors made during DNA replication were corrected. (Mutations are the original source of all genetic variation.)
- Explain the importance of telomeres.