

Chapter 16 – Molecular Basis of Inheritance**DNA as Genetic Material**

1. Explain why researchers originally thought protein was the genetic material.
2. Summarize the experiments performed by the following scientists which provided evidence that DNA is the genetic material
 - a. Frederick Griffith
 - b. Oswald Avery, Maclyn McCarty, and Colin MacLeod
 - c. Alfred Hersey and Martha Chase
 - d. Edwin Chargaff
3. Explain how Watson and Crick deduced the structure of DNA and describe the evidence they used. Explain the significance of the research of Rosalind Franklin
4. Describe the structure of DNA. Explain the base pairing rule, why the bases pair as they do, and describe its significance

DNA Replication and Repair

5. Describe the semiconservative model of replication and the significance of the experiments of Matthew Meselson and Franklin Stahl
6. Describe the process of DNA replication, including the role of the origins of replication and the replication forks.
7. Explain the role of DNA polymerases in replication.
8. Explain what energy source drives the polymerization of DNA.
9. Define antiparallel and explain why continuous synthesis of both DNA strands is not possible
10. Distinguish between the leading strand and the lagging strand of DNA
11. Explain how the lagging strand is synthesized even though DNA polymerase can add nucleotides only to the 3' end. Describe the significance of Okazaki fragments.
12. Explain the roles of DNA ligase, primase, helicase, topoisomerase, and single-strand binding proteins
13. Explain why an analogy can be made comparing DNA replication to a locomotive made of DNA polymerase moving along a railroad track of DNA.
14. Explain the roles of DNA polymerase mismatch repair enzymes and nuclease in DNA proofreading and repair.
15. Describe the structure and function of telomeres.
16. Explain the possible significance of telomerase in germ cells and cancerous cells.