

## **Learning Module 10**

### **Learning Outcomes for Chapter 16 & 17 - Molecular Inheritance & function.**

1. Describe the scientific experiments that lead to our understanding of what DNA is and how it works. Especially pay attention to Fred Griffith's *Streptococcus* experiments, Hershey & Chase's bacteriophage experiments, and Rosalind Franklin's xray crystallography experiments..
2. Diagram the structure of DNA and label the different parts. Understand how the nucleotides pair together.
3. Connect the DNA replication enzymes to their role in DNA replication.
4. Explain how DNA replication is semiconservative.
5. Compare gene expression to protein synthesis.
6. Describe the process of transcription and translation.
7. Illustrate how RNA is modified in the eukaryotic cell.
8. Use the genetic code to transcribe and translate a DNA sequence.
9. Correlate the the different types of RNA to their function in protein synthesis.
10. Define the concept of a gene.

### **Learning Tasks**

- 1) Read chapter 16 & 17.
- 2) Review these figures in chapter 16 that describe the experiments that have led to our understanding of DNA: Fig 16.2, 16.4 and 16.6 . Be able to identify the parts of DNA and describe how it is replicated.
- 3) Review these figures in chapter 16 to become familiar with the structure of DNA: Fig 16.5 and 16.7.
- 4) Review these figures in chapter 16 to understand the mechanisms of DNA replication: Fig. 16.14, 16.15, 16.16 and 16.17.
- 5) Review these figures in chapter 17 to describe the process of transcription and explain what happens to eukaryotic RNA before it can be translated: 17.7, 17.8 and 17.10.
- 6) Review these figures in chapter 17: Fig 17.17, 17.18 and 17.19. Describe what happens during translation. Be sure to identify the roles of the different RNAs.
- 7) Go to Masteringbio.com to complete the exercises and tutorials that I have posted.
- 8) Define the following, important biological terms.
  - A. DNA, RNA, protein, mutation
  - B. Bacteriophage, Transformation
  - C. Nucleotide, adenine, guanine, cytosine, thymine, base pairing
  - D. Helicase, DNA polymerase, DNA ligase, RNA primase, Telomerase
  - E. Leading strand, Lagging strand, Okazaki fragments
  - F. Semiconservative DNA replication
  - G. Transcription, translation
  - H. RNA polymerase, promoter, exon, intron, alternative splicing
  - I. mRNA, tRNA, rRNA, Ribosomes
  - J. Genetic code, codons, amino acids, anticodon
  - K. Initiation, elongation and termination of translation
  - L. Point mutation, base-pair mutation, missense mutation, nonsense mutation, frameshift mutation
- 8) **Question # 9 will be handed out in class on Tuesday, November 25<sup>th</sup> and is due on the following Tuesday, December 2nd.**