

Chapter Three Study Guide – Part B / Tortora & Derrickson  
Cell Division and Genetics

1. What is the function of deoxyribonucleic acid (DNA)?
2. Where is DNA found inside of a cell?
3. What four nucleotides are DNA's monomers?
4. What is complementary base pairing?
5. What is semi-conservative replication?
6. How many genes are in the human chromosomes?
7. What is a gene?
8. What is a "nick name" used to describe a gene?
9. What is the only type of molecule which can be made by the encoded information in the DNA molecule?
10. How does a cell make sugar or lipid molecule? How? Explain
11. DNA is a "double helix" molecule. DNA maybe described as being either "chromatin" or chromosomes. Where in the cell cycle would you use these terms to describe the DNA molecule?
12. When a cell prepares to undergo mitosis, what must happen to the chromatin of the cell?
13. How is RNA similar to DNA?
14. How is RNA different than DNA?
15. What three forms of RNA play a role in protein synthesis? Explain
16. There are 20 amino acids (the monomers) which are used to construct all the different proteins (over 100,000) in our cells. How many nucleotides in a DNA molecule are required to "code for" a single amino acid?
17. What is a base triplet? Where is it located?
18. What is a codon? Where is it located?
19. What is an anticodon? Where is it located?
20. What happens when a gene is "activated"?
21. What is transcription? Where does it take place?
22. What is translation? Where does it take place?
23. Explain the process of Protein Synthesis: You should be able to explain the process of protein synthesis from gene to protein.
24. How is protein synthesis different for "domestic and export" proteins?
25. What is a polyribosome?
26. Why are polyribosomes important?
27. What is the function of a "chaperone" protein?
28. What two types of ribosomes are found inside of our cells?
29. Where does protein post-translational modification occur for proteins that will be exported outside of our cells?
30. In the process of making a protein to be exported outside the cell, what is the difference between the transport and secretory vesicles?
31. What happens to protein in the Golgi apparatus?
32. In DNA replication, before a cell can divide, it must make a complete copy of its DNA so each "new cell" has an identical set of 46 chromosomes (the DNA). This process is known as "semi-conservative replication" and it is possible because of

- complementary base pairing. Define the function of these molecules in cell division: a) DNA helicase, b) the replication fork, c) DNA polymerase.
33. What is a mutation?
  34. What is the Cell Cycle?
  35. What are the four phases of the cell cycle? What are the key events in each of the four phases?
  36. What is G zero? What cell types are “locked” in G zero?
  37. What is mitosis? What types of cells undergo mitosis?
  38. What is meiosis? What type of cell undergo meiosis?
  39. What are the five stages of mitosis?
  40. How many chromosomes are in the human nucleus?
  41. How many chromosomes are in a diploid cell? What do we call these cells?
  42. How many chromosomes are in a haploid cell? What do we call these cells? Where are they found?

#### Hot List Questions

1-2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-21-22-23-25-28-29-31-32-34-36-37-38-40-41