Unit Review: Cell Cycle, DNA, Protein Synthesis

AP Biology

**CELL CYCLE**

1. List in sequence the stages of the cell cycle. List the key event(s) of each
2. Do all cells complete the cycle? Explain.
3. Where are the checkpoints in the cell cycle? What is the purpose of each?
4. Explain how cyclin, CDK, and MPF regulate the cell cycle. In what respect is the cell cycle under negative feedback control?
5. What results when the checkpoints are missed, errors are not corrected, or the cycle regulators do not function properly?
6. Somatic cells undergo what cell division process? Summarize the changes to the chromosome number before, during, and after the division process.
7. List the other changes that happen to a cell in order for division to be successful?

**DNA**

1. Griffith, Avery et al, and Hershey & Chase, all performed experiments demonstrating what key understanding about DNA? Summarize the experiment preformed by each.
2. Describe the model of DNA proposed by Watson and Crick. Include a description of the monomers and how they are bond to form the polymer.
3. Which bases are purines and which are pyrimidines? Why do the purine and pyrimidine bases always pair together?
4. The DNA helices are described as both anti-parallel and complementary; explain.
5. DNA works as the genetic code because of the base pair rule. Explain.
6. Summarize the Meselson & Stahl experiment showing that DNA replication is semi-conservative.
7. DNA replication proceeds in both directions from the origin. How is the problem of the antiparallel strands solved?
8. Discuss the role of each enzyme in replication.

**PROTEIN SYNTHESIS**

1. What is the purpose of DNA? What are the coding segments called?
2. What cell machinery is needed to synthesize proteins? Why is the code copied from DNA into RNA, instead of used directly? What other advantage is there to using copies?
3. Distinguish between the 3 types of RNA involved in protein synthesis. How is the mRNA protected from cytoplasmic enzymes?
4. List in sequence the steps for synthesizing a protein.
5. Compare and contrast codons with anti-codons. Explain why codons are necessary to synthesize a protein.
6. Transcribe and translate the DNA segment 3’ AUG CCT AAA TAG CAT 5’
7. What are the types of mutations? How does each result in a changed protein?
8. The genetic code is redundant but not ambiguous – explain.