Unit Review: Common Design Unit

AP Biology

1. What are the key similarities and differences of prokaryotic and eukaryotic cells?\
2. Identify the importance of surface area to volume ratios in cells. Practice calculating same: a cube with all sides of 48μm; a sphere with diameter of 48μm; a cylinder (column) with a diameter of 18μm and a height of 48μm.
3. Differentiate between vacuoles and golgi vesicles.
4. Which organelles employ highly folded membranes, and for what purposes?
5. Which organelles are used to transform energy? In what processes?
6. Which organelles are involved in protein synthesis?
7. How does a cell maintain its shape and structure?
8. What strategies/structures does a cell employ for movement?
9. Discuss the various forms DNA takes in both pro-and eukaryotic cells.
10. Why do we call the plasma membrane a fluid mosaic bilayer?
11. Describe the various functions of membrane proteins.
12. What factors contribute to the selective permeability of the cell membrane?
13. How do molecules become evenly distributed throughout a system?
14. Osmosis is diffusion, but diffusion is not osmosis – explain.
15. Define the terms hypotonic, hypertonic and isotonic. Explain the effect of each on plant & animal cells, including plasmolysis & turgor pressure.
16. What structures/processes do organism employ to be able to tolerate a hypotonic environment?
17. What is facilitated diffusion? Compare/contrast with active transport.
18. Why do cells sometimes need active transport?
19. How do cells transport molecules that cannot cross the plasma membrane?
20. What are the components of water potential?
21. How can a plant cell reach equilibrium in a distilled water environment?
22. What variables determine solute potential?
23. Why is solute potential always negative?
24. A cell has a solute potential of -0.2 bars and is placed in an open environment with a solute potential of -.4 bars. Which direction will water diffuse? Which direction will solutes diffuse? What is the pressure potential of the cell?
25. What is the solute potential of a .2M NaCl solution at 22C?

**~~Communication~~**

~~Distinguish between endocrine, autocrine, and paracrine communication~~

~~List examples of signal molecules. What do we call the group, collectively?~~

~~Outline the stages of a signal transduction pathway. What molecules are the key players at each stage?~~

~~What are two ways communication occurs in nerve transmission?~~

~~Compare and contrast membrane potential with action potential.~~

~~Sequence the events in an action potential, and the effect of each on polarization~~

~~Describe the role of feedback in regulating biochemical pathways.~~

~~Cite/explain an illustrative example of endocrine communication, paracrine communication, positive feedback, negative feedback, a signal transduction pathway.~~

**Cell Cycle**

1. DNA is described as anti-parallel, complementary, and semi-conservative. Explain each.
2. Describe, in order, the stages of the cell cycle, including checkpoints
3. Compare the cells produced in mitosis with the parent cell and each other.
4. What cell cycle enzymes are present in the cell at all times in inactive forms? How does each become activated?
5. How and why does MPF act as a signal for both starting and stopping cell division?
6. Describe, in order, the enzymes that facilitate DNA replication.
7. Why are Okazaki fragments created in replication?

**Gene Expression**

1. Compare and contrast protein and nucleic acid structure
2. DNA works as the genetic code because of the base pair rule. Explain.
3. Distinguish between the different RNA involved in protein synthesis.
4. List in sequence the steps for synthesizing a protein.
5. Compare and contrast codon and anti-codon.
6. Transcribe and translate the DNA segment 3’ AUG CCT AAA TAG CAT 5’
7. What are the classes of mutations? How does each create a changed protein?
8. The genetic code is redundant but not ambiguous – explain.
9. Describe protein design
10. How do prokaryotes control gene expression?
11. Compare and contrast inducible and repressible operons