Bio I
Study Guide: Cell Origins and Structure

The Origin of Cells

1. Explain and provide an example of spontaneous generation.
2. Examine Francesco Redi's experiment on pg. 388. Answer the following questions:
   What was the control of the experiments? Explain.
   Explain Redi's reasoning for setting up the experimental group the way he did.
   How did the results differ in the two jars?
   What did Redi conclude from these results?
3. Examine Louis Pasteur's experiment on pg. 389. Answer the following questions:
   What was Pasteur trying to prove in this experiment?
   Why was the broth boiled before testing?
   Explain Pasteur's experiment.
4. Redi and Pasteur disproved the idea of spontaneous generation. What did they prove? Be sure to use the appropriate term.
5. Suppose that you discover an unidentified object on your way home from school one day. What characteristics would you study to determine whether the object is a living or nonliving thing? (pg. 6-10)
6. What is the difference between a stimulus and a response? Provide two examples.
7. Two characteristics of life are that living things adjust to their surroundings and that living things adapt and evolve. What is the difference between these two characteristics?
8. What gases did the "atmosphere" of early Earth contain?
9. What four components must be present in order to have evolution of a cell?
10. Examine Miller and Urey's experiment, Figure 14.12 on pg. 390 and Figure 14.13 on pg. 391. Discuss how Figure 14.13 relates to the Miller-Urey experiment. Be specific and detailed!
11. Mitochondria and chloroplasts possess their own DNA. Explain. (pg 392-393)
12. What is the difference between a prokaryotic and a eukaryotic cell?

Cell Structure I - Plasma Membrane

1. What is the function of the plasma membrane?
2. Describe in detail the basic structure of a phospholipid. Be sure to include the following terms: phosphate, hydrophobic, polar, lipid, nonpolar, hydrophilic. (pg 182-183)
3. When oil is added to water, the two never mix. How does this fact relate to the plasma membrane? Be sure to use the appropriate terms.
4. How are phospholipids oriented in the bilayer? Why are they arranged this way?
5. The plasma membrane is made up of several structures: protein, cholesterol, and carbohydrates. Explain the function of each of these components. (pg 183)
6. Suggest what might happen if cells grow and reproduce in an environment where no cholesterol is available.
7. The plasma membrane can also be called the fluid-mosaic model, semi-permeable, and selectively permeable. Explain how each of these are appropriate. (pg 184)
8. How is the function of the cell wall difference from that of the plasma membrane?
9. Several organisms possess a cell wall. List these organisms and the components found in their cell wall.

Cell Structure II - Organelles

1. Discuss the nucleus. Be sure to include the following terms: chromatin, nuclear membrane, and nucleolus.
2. Ribosomes are organelles that can be found in both prokaryotic and eukaryotic organisms

Structurally, how is this possible?

3. Explain in detail the relationship between the following organelles: ribosomes, Golgi apparatus, and rough ER. Be sure to include the following terms: protein, Golgi bodies, and vesicles.
4. Which organelle is responsible for making lipids? Explain some important functions of lipids within a cell.
5. The Golgi apparatus and smooth ER are similar in appearance. Explain how one could tell the difference between these two organelles if looking at a picture of a cell. (Hint: Think about location in the cell.)
6. Diagram and describe the function of mitochondria. Be sure to label the following structures: matrix, outer membrane, cristae, and inner membrane.
7. Explain why it is beneficial for mitochondria to have a highly folded inner membrane.
8. In comparing muscle cells and fat cells, which would have a higher concentration of mitochondria? Why?
9. Explain the function of a lysosome. What macromolecule does this organelle contain that allows it to perform this function?
10. Why are digestive enzymes in a cell enclosed inside a membrane-bound organelle?
11. Both animal and plant cells contain vacuoles. Explain some similarities and differences between both cells and this organelle.
12. Diagram and describe the function of a chloroplast. Be sure to label the following structure: stroma, grana, and thylakoid.
13. Relate the following words: cytoplasm and cytoskeleton. Be sure to include functions.