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**2022 Test 2: Cell Structure and Function**

**SHORT ANSWER QUESTIONS: (choose 2 of the 3 options) 10 pts each.**

16. Draw a model of the sequence that a secreted protein typically uses for its production and modification. Start with the DNA molecule to the secretion of the protein outside of the cell. Briefly describe each transition/cell structure which is used and what occurs in that cell structure.

17. Sometimes cells need to die. This “self-destruct” mechanism is called apoptosis. It

can be used to kill cells when they are supposed to be destroyed. Describe how this process can kill a cell. Provide 3 examples of how cell death is an important part of an organism’s development.

18. The endosymbiosis theory has been suggested as an evolutionary step in the development of a complex cell. Explain what the endosymbiosis theory is. Describe what an endosymbiont is. Provide 4 evidences which support the theory.

**LONG RESPONSE QUESTIONS: Choose 1 of the 2 options (10 pts).**

19. The plasma membrane is a combination of lipids, proteins, and carbohydrates which serve as a selectively permeable barrier.

a) Describe the structure of the phospholipid bilayer. Include the parts which are polar and nonpolar. You can draw it if it helps.

b) Describe which parts are hydrophilic and hydrophobic.

c) Describe how the bilayer can form naturally and why.

d) Lastly, explain how proteins are held in place in the bilayer.

20. The selectively permeable plasma membrane is composed of phospholipids and protein, which allow for its unique functions.

(a) Describe the structure and properties of phospholipids and explain the important roles of phospholipids in the plasma membrane.

(b) Explain why proteins are an important component of the cell membrane, based on their structure and properties.

(c) Proteins are an important component of the cell membrane. Describe two specific functions of proteins in the membrane.

(d) Explain the role of each type of protein you select for part (c) based on the structure and properties of a protein.