

Cytology

Part A - Multiple Choice Questions

1. B
2. D
3. B
4. D
5. A
6. B
7. C
8. D
9. B
10. D
11. C
12. C
13. B
14. B
15. A
16. B
17. D
18. D
19. B
20. D
21. B
22. D
23. C
24. D
25. A
26. C
27. A
28. B
29. C
30. D
31. C
32. D
33. D
34. C
35. A

Part B. Written Answer Questions

Note: The answers provided here are correct, but they may NOT be the only possible answers.

1. Steroid hormones are produced in the interior of the SER. From here, they follow the regular secretory pathway. They are put into vesicles (transport vesicles) through the process of blebbing. Once in the vesicle they are moved through the cytoplasm to the Golgi apparatus. The steroids are modified (sometimes chemically) into a final product form. The Golgi apparatus produces a new vesicle with the steroids. This vesicle is called a secretory vesicle. It is moved to the cell membrane where it uses in such a way as to allow the exocytosis of the steroids.
2.
 - a. Lysosomes contain enzymes for hydrolytic reactions in cells. These enzymes (proteins) are manufactured at the ribosomes.
 - b. Transport vesicles fuse with the Golgi apparatus so the contents of the vesicles can be modified as required and prepared for secretion. The Golgi apparatus then produces secretory vesicles containing the final products so they can be transported to the cell membrane for secretion.
 - c. Secretory vesicles fuse with the cell membrane and exocytosis follows. The cell membrane is also capable of forming vesicles (e.g., food vacuoles) containing materials from the cell's environment (endocytosis).
 - d. Ribosomes are the location of protein synthesis. If the proteins being synthesized have to be transported through the cytoplasm (such as those for exocytosis), the ribosomes are embedded in the rough endoplasmic reticulum. The ER makes vesicles for the transport of the proteins. The proteins may also be able to move directly from the RER to the SER as with the case of enzymes for steroid synthesis.
3. Intracellular digestion is the way cells enzymatically digest materials (by hydrolytic reactions) that have been taken into the cell by endocytosis. The process involves food vacuoles, which contain the food materials. These vacuoles (or vesicles, depending on size) are made from the cell membrane. The vacuoles fuse with lysosomes, which contain the hydrolytic enzymes. The digestive products enter the cytoplasm and are used by the cell.
4.
 - a. (Basis of contrast = location) Chloroplasts are found in plant (and some protist cells), through never in animal cells. Mitochondria can be found in both plant and animal cells.
 - b. (Basis of contrast = process) Endocytosis is the process cells use to take in materials that cannot pass through the membrane in any other way. Exocytosis is the process that cells use to release large product materials, like proteins or steroids that the cell has produced.
 - c. (Basis of contrast = structure) SER does not have ribosomes associated with it, whereas RER does. The ribosomes embedded in RER are used for the synthesis of specific proteins.
 - d. (Basis of contrast = function) A vesicle is a membranous container used for transporting materials in a cell, such as a transition or a secretory vesicle. A lysosome is a membranous container that contains hydrolytic enzymes used for intracellular digestion.
5.

Diagram A is most likely SER, which is described as a set of interconnected membranous channels that extend through sections of the cytoplasm. One function of SER is the detoxification of the cytoplasm.

Diagram B is most likely RER, which looks somewhat similar to SER, but it has ribosomes associated with it. One function of RER is to receive the proteins that are made by the ribosomes and either put them into vesicles or send them to the SER.

Diagram C is most likely a mitochondrion. Mitochondria make ATP through the process of cellular respiration.

Diagram D is most likely a vesicle (though it is hard to tell). Vesicles are membranous containers that cells use to transport materials.

Diagram E is most likely Golgi apparatus. It appears similar to SER, though the saccules are discrete and not interconnected. One function of Golgi apparatus is the final preparation (modification) of cell products to prepare them for secretion.