

THE EUKARYOTIC CELL

Flagella and Cilia

1. Flagella are few and long in relation to cell size; cilia are numerous and short.
2. Flagella and cilia are used for motility, and cilia also move substances along the surface of the cells.
3. Both flagella and cilia consist of an arrangement of nine pairs and two single microtubules.

The Cell Wall and Glycocalyx

1. The cell walls of many algae and some fungi contain cellulose.
2. The main material of fungal cell walls is chitin.
3. Yeast cell walls consist of glucan and mannan.
4. Animal cells are surrounded by a glycocalyx, which strengthens the cell and provides a means of attachment to other cells.

The Plasma (Cytoplasmic) Membrane

1. Like the prokaryotic plasma membrane, the eukaryotic plasma membrane is a phospholipid bilayer containing proteins.
2. Eukaryotic plasma membranes contain carbohydrates attached to the proteins and sterols not found in prokaryotic cells (except *Mycoplasma* bacteria).
5. The Golgi complex consists of flattened sacs called cisterns. It functions in membrane formation and protein secretion.
6. Lysosomes are formed from Golgi complexes. They store digestive enzymes.
7. Vacuoles are membrane-enclosed cavities derived from the Golgi complex or endocytosis. They are usually found in plant cells that store various substances, increase cell size, and provide rigidity to leaves and stems.
8. Mitochondria are the primary sites of ATP production. They contain 70S ribosomes and DNA, and they multiply by binary fission.
9. Chloroplasts contain chlorophyll and enzymes for photosynthesis. Like mitochondria, they contain 70S ribosomes and DNA

- and multiply by binary fission.
10. A variety of organic compounds are oxidized in peroxisomes. Catalase in peroxisomes destroys H₂O₂.
- 11 . The centrosome consists of the pericentriolar material and centrioles. Centrioles are 9 triplet microtubules involved in formation of the mitotic spindle and microtubules.

The Evolution of Eukaryotes

1. According to the endosymbiotic theory, eukaryotic cells evolved from symbiotic prokaryotes living inside other prokaryotic cells.

Q1/ 1- Why is an endospore called a resting structure? Of what advantage is an endospore to a bacterial cell?

- 2- Compare and contrast the following:
- simple diffusion and facilitated diffusion
 - active transport and facilitated diffusion
 - active transport and group translocation

Q2/ Match the structures in column A to their functions in column B?

- | (Column A) | (Column B) |
|---------------------------------|----------------------------------|
| a.Cell wall | 1. Attachment to surfaces |
| b. Endospore | 2. Cell wall formation |
| c. Fimbriae | 3. Motility |
| d. Flagella | 4. Protection from osmotic lysis |
| e. Glycocalyx | 5 . Protection from phagocytes |
| l. Pili | 6. Resting |
| g. Plasma membrane | 7. Protein synthesis |
| h. Ribosomes | 8. Selective permeability |
| 9. Transfer of genetic material | |

Q2/ Match the characteristics of eukaryotic cells in column A with their functions in column?

- | (Column A) | (Column B) |
|------------------------------|-----------------------------|
| a... Pericentriolar material | 1. Digestive enzyme storage |
| b... Chloroplasts | 2.oxidation of fatty acids |
| c.... Golgi complex | 3. Microtubule formation |
| d.... Lysosomes | 4. Photosynthesis |
| e... Mitochondria | 5 . Protein synthesis |
| f... Respiration | 6- Respiration |
| g.... Rough ER | 7. Secretion |

References': 1- Microbiology an introduction TENTH EDITION. Gerard. Tortora.2010.

2- Microbiology an introduction TWELFTH EDITION. Gerard. Tortora.2016.