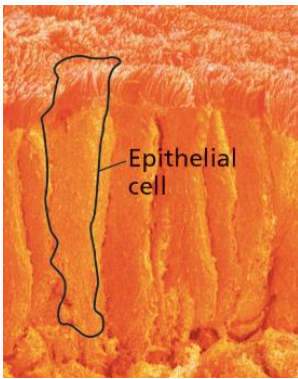


A Tour of the Cell Review

Chapter 6

1. Identify the key difference between prokaryotic and eukaryotic cells that is the basis of the name of the two types of cells. (Prokaryotic cells lack a nucleus.)
2. Describe the meaning of the word cytoplasm as it applies to both prokaryotic and eukaryotic cells. (The cytoplasm refers to the interior of either type of cell. In eukaryotes, the term excludes the nucleus.)
3. Describe the function of the nucleus, the mitochondrion, the chloroplast, and the endoplasmic reticulum. (Nucleus: contains the DNA; mitochondrion: produces ATP using cellular respiration; chloroplast: produces sugar via photosynthesis using solar energy; endoplasmic reticulum: a network of membrane that synthesizes new membrane and export of protein.)
4. Your friend says that plant cells don't have mitochondria because they get their energy from photosynthesis. Provide reasoning to refute the statement. (Photosynthesis is used to produce glucose. The energy for cellular work comes from cellular respiration in which the energy in glucose is converted to ATP.)



5. The cells in this SEM are epithelial cells in the small intestine. Describe how their structure contributes to their specialized function of nutrient absorption. (The cells are elongate in shape. This creates a large surface area:volume ratio, making the cells efficient at absorption.)

6. Describe the role of the ribosome in the expression of genetic information. (Ribosomes in the cytoplasm translate the information, carried from the DNA in the nucleus by mRNA, into a polypeptide chain.)
7. Use the example of the lysosome to explain the importance of compartmentalization to cells. (The lysosome is a digestive organelle where macromolecules are hydrolyzed. If the enzymes inside the lysosome were not contained within it, they could digest the cell itself.)
8. Imagine a protein is to be exported from the cell and requires modification in the Golgi before it is functional. Trace the path of the protein through the cell starting with the mRNA in the nucleus. (The mRNA is synthesized in the nucleus and then passes out through a nuclear pore to the cytoplasm, where it is translated on a bound ribosome, attached to the rough ER. The protein is synthesized into the lumen of the ER and perhaps modified there. A transport vesicle carries the protein to the Golgi apparatus. After further modification in the Golgi, another transport vesicle carries it back to the ER, where it will perform its cellular function.)
9. Describe how the mitochondrion and chloroplast provide evidence for the endosymbiont theory. (Mitochondria and chloroplasts both have characteristics similar to bacterial cells. The presence of these characteristics suggests they are descended from autonomous cells.)