

Guided Reading Questions

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Chapter 4 A Tour of the Cell

- (essay) Define micrograph. What did Anton van Leeuwenhoek and Robert Hooke see under the microscope? From what is the word “cell” derived? Why are drawings useful alongside micrographs?
- (4.1) How does a light microscope work? Define magnification and resolving power. What does cell theory state? How does an electron microscope differ from a light microscope? Contrast a scanning electron microscope from a transmission electron microscope.
- (4.2) What is the size of the smallest, largest and longest cells? What factor determines the smallest size possible for a cell? What factor determines the maximum size?
- (4.3) What are the two types of cells? What do all cells have in common? Define cytoplasm. What is the function of the ribosomes? What distinguishes the two types of cells? How large are prokaryotic cells? Where is the DNA in prokaryotic cells? What are the functions of the cell wall, capsule, pili and flagella?
- (4.4) What encloses most of the organelles in eukaryotic cells? What are the four basic functions of the structures in a cell? What are the benefits of the internal structures? Which of these structures are present only in animals – lysosomes, centrioles, flagella, cell wall, chloroplast, central vacuole? Which are found only in plants?
- (4.5) Where is the plasma membrane of a cell found? What is the structure of a phospholipid? How do phospholipids arrange themselves in membranes? Where are the proteins found in a membrane? How do nonpolar molecules pass through a membrane? How do proteins help objects cross a membrane?
- (4.6) What is the function of the nucleus? What is the strand of DNA and protein called? What is the nuclear envelope? What is the nucleolus made of? What is the function of the nucleolus?
- (4.7) What is the function of a ribosome? What are the two locations where ribosomes are found? What are the locations of their products?
- (4.8) What is the endomembrane system? What are the two types of endoplasmic reticulum? Which type of endoplasmic reticulum is continuous with the nuclear envelope? What is the function of the endomembrane system?
- (4.9) How does the smooth endoplasmic reticulum (SER) differ from the rough endoplasmic reticulum (RER)? What are three functions of the SER? What happens in the SER in liver cells when poisons are detoxified? What are the two functions of the RER? Define secretory protein, glycoprotein, and transport vesicle.
- (4.10) What does the Golgi apparatus look like? What are the functions of the Golgi apparatus? Where do the finished products of the Golgi apparatus end up?
- (4.11) What do lysosomes carry? From what organelles are lysosomes derived? How are lysosomes used within a cell? What happens in cells of individuals with lysosomal storage diseases?
- (4.12) What is a vacuole? What is the function of the central vacuole in plants? What type of vacuole is found in *Paramecium*? What is the function of the contractile vacuole?
- (4.13) How do products made in the endoplasmic reticulum leave the cell without crossing the

- plasma membrane? What is the function of a peroxisome? What are the roles of the chloroplasts and mitochondria?
- (4.14) What is the function of mitochondria? How many membranes does a mitochondrion have? Define intermembrane space, mitochondrial matrix, and cristae. What is the purpose of the cristae?
- (4.15) What is photosynthesis? What is the function of chloroplasts? Define stroma and granum. How many membranes does a chloroplast have?
- (4.16) How are mitochondria and chloroplasts similar to prokaryotes? What is the endosymbiosis hypothesis?
- (4.17) What is the cytoskeleton? What are two functions of the cytoskeleton? What are the three types of fibers in the cytoskeleton? What proteins are microfilaments and microtubules made of? What are other functions of microtubules? What roles do centrioles have in the production of the cytoskeleton?
- (4.18) Contrast cilia and flagella. What is the function of cilia and flagella? What fiber makes the core of cilia and flagella? How are these fibers arranged? What structure is at the base of the flagellum? How do the dynein arms move the flagellum?
- (4.19) What environmental factors are suspected to lower sperm counts and sperm quality? What are sperm missing from someone with primary ciliary dyskinesia?
- (4.20) What is the extracellular matrix of animals made of and what is its function? Define integrins.
- (4.21) Contrast tight junctions, anchoring junctions and communicating junctions.
- (4.22) What is the function of plant cell walls? What are plant cell walls made of? What are plasmodesmata and cell junctions.
- (4.23) What are the four main categories that the text classifies the eukaryotic organelles? Which of the categories contains membranes? What is the common theme in the fourth category? What characteristics do all life forms from earth share?