

**Active Reading****Section: Bacteria**

Read the passage below. Then answer the questions that follow.

Bacteria, which outnumber all eukaryotes combined, differ from eukaryotes in at least seven ways.

**Internal compartmentalization:** Bacteria are prokaryotes. Unlike eukaryotes, prokaryotes lack a cell nucleus. Bacterial cells have no internal compartments or membrane systems.

**Cell size:** Most bacterial cells are about 1  $\mu\text{m}$  in diameter; most eukaryotic cells are more than 10 times that size.

**Multicellularity:** All bacteria are single cells. Some bacteria may stick together or may form strands. However, these formations are not truly multicellular because the cytoplasm in the cells does not directly interconnect, as is the case with many multicellular eukaryotes. Also, the activities of the cells are not specialized.

**Chromosomes:** Bacterial chromosomes consist of a single circular piece of DNA. Eukaryotic chromosomes are linear pieces of DNA that are associated with proteins.

**Reproduction:** Bacteria reproduce by binary fission, a process in which one cell pinches into two cells. In eukaryotes, however, microtubules pull chromosomes to opposite poles of the cell during mitosis. Afterward, the cytoplasm of the eukaryotic cell divides in half, forming two cells.

**Flagella:** Bacterial flagella are simple structures composed of a single fiber of protein that spins like a corkscrew to move the cell. Eukaryotic flagella are more complex structures made of microtubules that whip back and forth rather than spin. Some bacteria also have shorter, thicker outgrowths called pili that attach to surfaces or to other cells.

**Metabolic diversity:** Bacteria have many metabolic abilities that eukaryotes lack. For example, bacteria perform several different kinds of anaerobic and aerobic processes, while eukaryotes are mostly aerobic organisms.

**SKILL: ORGANIZING INFORMATION**

Write *B* if the phrase describes bacteria or *E* if the phrase describes eukaryotes.

- \_\_\_\_\_ 1. reproduce by binary fission
- \_\_\_\_\_ 2. lack a cell nucleus
- \_\_\_\_\_ 3. chromosomes are linear pieces of DNA
- \_\_\_\_\_ 4. activities of the cell are specialized
- \_\_\_\_\_ 5. cytoplasm lacks membrane systems
- \_\_\_\_\_ 6. mostly aerobic organisms
- \_\_\_\_\_ 7. most cells are about 1  $\mu\text{m}$  in diameter
- \_\_\_\_\_ 8. single cells
- \_\_\_\_\_ 9. cytoplasm contains internal compartments
- \_\_\_\_\_ 10. single fiber flagella spin like a corkscrew
- \_\_\_\_\_ 11. activities of the cell are not specialized
- \_\_\_\_\_ 12. flagella are complex structures made of microtubules
- \_\_\_\_\_ 13. multicellular
- \_\_\_\_\_ 14. during cell division, microtubules pull chromosomes to opposite poles
- \_\_\_\_\_ 15. cytoplasm lacks internal compartments
- \_\_\_\_\_ 16. cytoplasm of cells forming a strand does not directly interconnect
- \_\_\_\_\_ 17. perform different kinds of anaerobic and aerobic respiration
- \_\_\_\_\_ 18. two new cells form when cytoplasm divides in half
- \_\_\_\_\_ 19. may have pili
- \_\_\_\_\_ 20. chromosomes consist of a single circular piece of DNA

In the space provided, write the letter of the phrase that best completes the statement.

- \_\_\_\_\_ 21. Most bacterial cells are
  - a. more than 10 times larger than an average eukaryotic cell.
  - b. as large as an average eukaryotic cell.
  - c. one-tenth the size of an average eukaryotic cell.
  - d. double the size of an average eukaryotic cell.