

CHAPTER 27 Questions A - Prokaryotes

Campbell 7

PART I

1. Explain why it might be said that the history of life on Earth is one long “age of prokaryot
2. Explain why prokaryotes are unable to grow in very salty or sugary foods, such as cured meats or jam.
3. State the function(s) of each of the following prokaryotic features:
 - a. capsule
 - b. fimbria
 - c. sex pilus
 - d. nucleoid
 - e. plasmid
 - f. endospore
4. Describe how prokaryotes carry out cellular respiration when they lack compartmentalized organelles such as mitochondria.
5. List the three domains of life.
6. Describe the structure, composition, and functions of prokaryotic cell walls.
7. Distinguish the structure and staining properties of gram-positive bacteria from those of gram-negative bacteria.
8. Explain why disease-causing gram-negative bacterial species are generally more deadly than disease-causing gram-positive bacteria.
9. Explain how the organization of prokaryotic genomes differs from that of eukaryotic genome
10. Describe the evidence of parallel adaptive evolution found in Lenski’s experiments on *E. coli*.

PART II:

11. Distinguish, with prokaryotic examples, among photoautotrophs, chemoautotrophs, photoheterotrophs, and chemoheterotrophs.
12. Distinguish among obligate aerobes, facultative anaerobes, and obligate anaerobes.
13. Explain the importance of nitrogen fixation to life on Earth.
14. Describe the specializations for nitrogen fixation in the cyanobacterium *Anabaena*.
15. Explain why new assays for prokaryotic diversity that do not require researchers to culture microbes have been so fruitful.
16. Explain why some archaea are known as extremophiles. Describe the distinguishing features of methanogens, extreme halophiles, and extreme thermophiles.
17. In general terms, describe the role of chemoheterotrophic and autotrophic prokaryotes in the cycling of chemical elements between the biological and chemical components of ecosystems.
18. Describe the mutualistic interaction between humans and *Bacteroides thetaiotaomicron*.
19. Distinguish among mutualism, commensalism, and parasitism. Provide an example of a prokaryote partner in each type of symbiosis.
20. Distinguish between exotoxins and endotoxins and give an example of each.
21. Describe the evidence that suggests that the dangerous *E. coli* strain O157:H7 arose through horizontal gene transfer.
22. Define bioremediation. Describe two examples of bioremediation involving prokaryotes.