Cowan Microbiology Fundamentals, 3/e, Answers to Visual Connections

Chapter 1

Figure 1.2. Look at the red bar (the time that bacteria have been on earth) and at the time that humans appeared. Speculate on the probability that we will be able to completely eliminate all bacteria from our planet, and discuss whether or not this would even be a beneficial action.

ANSWER:

The probability that our planet can be completely eliminated of all bacteria would be very, very, small. Bacteria have been in Earth’s environment for a long time, much longer than humans, with bacterial cells preceding the first animal cells by more than 2 billion years.

This speaks to the adaptability and survivability of bacteria. Bacteria are ubiquitous organisms, capable of living in diverse environments. They exist on and inside most other life forms and can live and reproduce in very inhospitable conditions. In addition, bacteria are constantly adapting and changing to any means introduced to control them. For example, many bacteria now carry antibiotic-resistance genes that counter the medications designed to destroy them.

Given the adaptation of bacteria, our ability to completely eliminate them is not likely, nor would we want to eliminate bacteria entirely. Bacteria are essential players in maintaining life on Earth, through the development of such processes as photosynthesis and through their relationship with plants and animals. Humans have also utilized bacteria for beneficial purposes, as exemplified by genetic engineering and bioremediation. And as we are continuing to learn, bacteria play an essential role in both human disease and human health.

Chapter 2

Figure 2.9*a*. If you were using the quadrant streak plate method to plate a very dilute broth culture (with many fewer bacteria than the broth used for the plate pictured here), would you expect to see single, isolated colonies in quadrant 4 or quadrant 3? Explain your answer.

ANSWER:

In using the quadrant streak plate method to isolate bacteria from a very dilute broth culture, one would expect to see isolated colonies in quadrant 3, since a regular culture will show isolation in quadrant 4. A very dilute broth would show isolation sooner. Extremely dilute cultures may even form isolated colonies in quadrant 2.