Bio.10-Q2W4-Qs.Bank-Bacteria and Viruses

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which of the bacteria is the cause of pneumonia?
a. staphylococci
b. rickettsia
c. Treponema pallidum
d. streptococcus pneumoniae

____ 2. Bacteria are used in _____.
a. farming
b. the medical industry
c. the food industry
d. all of these

____ 3. A structure in some bacteria that is resistant to adverse environmental factors is a(n) _____.
a. prophage
b. endospore
c. autotroph
d. coccus

____ 4. Which of the following is NOT an evolutionary adaptation in bacteria?
a. They reproduce rapidly.
b. They have a high rate of mutation.
c. They cannot exist under adverse conditions.
d. They can utilize substances harmful to other organisms.

____ 5. Which of the following processes brings about an exchange of genetic information between bacterial cells?
a. binary fission
b. mutualism
c. conjugation
d. replication

____ 6. A(n) _____ is a virus that infects a bacterial cell.
a. endospore
b. decomposer
c. plasmid
d. bacteriophage

____ 7. Viruses are found in _____.
a. air
b. water
c. soil
d. all of these

____ 8. Viruses are _____.
a. producers
b. consumers
c. parasites
d. decomposers

____ 9. Penicillin kills bacteria by _____.
a. consuming them
b. causing holes to develop in their cell walls
c. imprisoning them
d. depriving them of nutrients

____ 10. The name streptococcus tells you that the bacteria are arranged as _____.
a. pairs of round cells
b. long chains of round cells
c. groups of spirals
d. chains of rods

____ 11. Cyanobacteria are _____.
a. eubacterial heterotrophs
b. photosynthetic autotrophs
c. salt-loving archaebacteria
d. chemosynthetic autotrophs

Completion
Complete each statement.

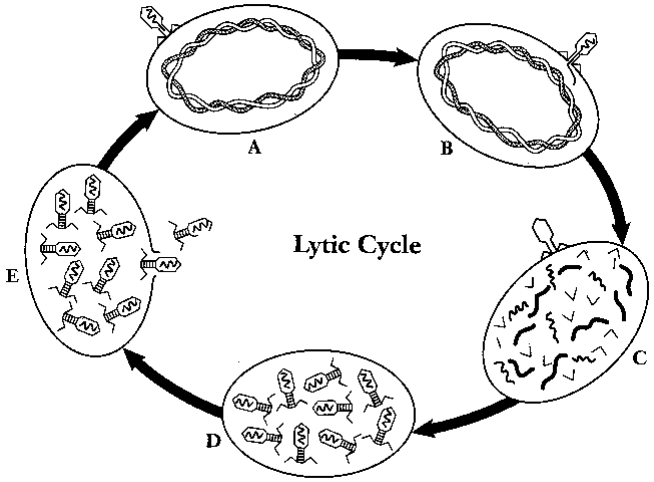

Figure 18-1

12. The virus attaching to a host cell is shown in stage _____ of Figure 18-1.
13. New virus particles are assembled in stage _____ of Figure 18-1.
14. Virus injecting its nucleic acid into the host cell is shown in stage _____ of Figure 18-1.
15. The host cell breaks open, and the new virus particles are released, as shown in stage _____ of Figure 18-1.
16. The host DNA is destroyed, and the viral genes are copied as shown in stage _____ of Figure 18-1.

Matching

Match each item with the correct statement below.

a. conjugation
b. reverse transcriptase
c. bacteriophage
d. nitrogen fixation
e. endospore
f. binary fission
g. toxin
h. virus
i. host cell

____ 17. enzyme injected into a host cell, which copies viral RNA into DNA
____ 18. cell in which a virus reproduces
____ 19. bacterial form that is in a state of slow metabolism and that does not reproduce
____ 20. process by which bacteria reproduce asexually
____ 21. simple form of sexual reproduction
____ 22. virus that infects bacteria
____ 23. process by which some bacteria convert N_2 gas into ammonia
____ 24. nonliving particle that can reproduce when in a living cell
____ 25. poison produced by some bacteria

Short Answer

26. Compare and contrast *provirus* and *retrovirus*.

27. Compare and contrast *lytic cycle* and *lysogenic cycle*.
28. Describe the adaptations bacteria might have to live in an extreme habitat.
29. Discuss how bacteria have adapted to their diverse habitats.
30. Why aren't viruses named according to the rules of binomial nomenclature?
31. How are viruses classified according to nucleic acid? Give an example of a virus from each type.
32. Why is penicillin ineffective in destroying viruses or animal cells?
33. How does a virus recognize its host?
34. Why are viruses not considered to be living things?
35. Explain in your own words what happens in parts 1, 2, and 3 of the lysogenic cycle shown in the diagram in Figure 18-2.

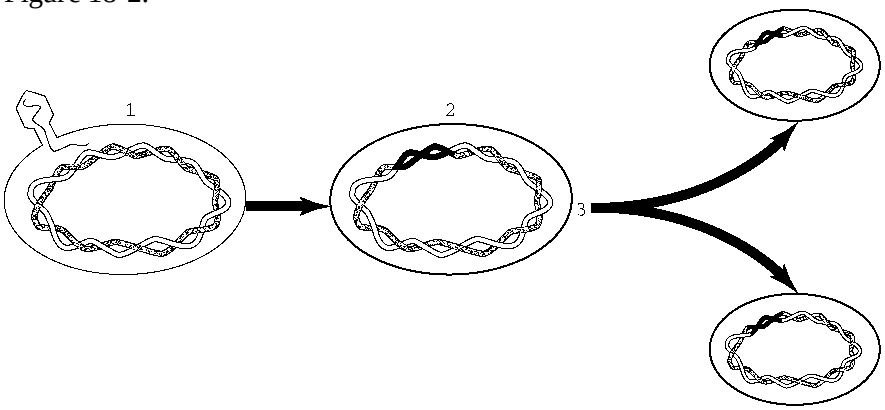

Figure 18-2

36. For a period of time, bacteria were classified as plants. Why do you think bacteria were classified this way? Give at least two reasons why bacteria should not be classified as plants.
37. Why do physicians sometimes advise patients who are taking antibiotics to eat yogurt?
38. What conditions in developed countries may check the spread of bacteria that cause disease?
39. According to Table 18-1, what is the chief cause of death in developing countries? In developed countries? How does Table 18-1 reflect the fact that the availability of antibiotics affects the number of deaths due to infectious diseases?

Percentage of Deaths						
Causes of death	**Developed countries**		**Developing countries**			
	Americas	**Europe**	**Americas**	**Southeast Asia**	**Africa**	**Eastern Mediterranean**
Infectious disease	3.6	8.6	31.1	43.9	49.8	44.5
Cancer	21.5	18.1	9.0	4.4	2.9	4.2
Circulatory diseases	54.5	53.8	24.5	15.6	11.7	14.1
Accidents	8.4	5.6	6.3	4.3	3.8	4.1

Table 18-1

In 1957, Heinz Fraenkel-Conrat and his coworkers were studying two viruses that infect tobacco plants. One of the disease-causing viruses was called TMV and the other, HRV. Both viruses were similar in structure. (See the diagrams in Figure 18-3.) It was easy to tell which virus had caused a disease because the lesions on the tobacco leaf differed, according to which virus was present. Fraenkel-Conrat knew that TMV and HRV are RNA viruses. He wanted to find out which part of the virus—the protein coat or the RNA—was carrying the genetic information needed to specify the reproduction of these viruses. He decided that he would find the answer by producing hybrids of the viruses. A hybrid has the RNA of one virus and the protein coat of another virus. In this case, the two hybrids are denoted H-T and T-H, where the first letter indicates the virus from which RNA was used.

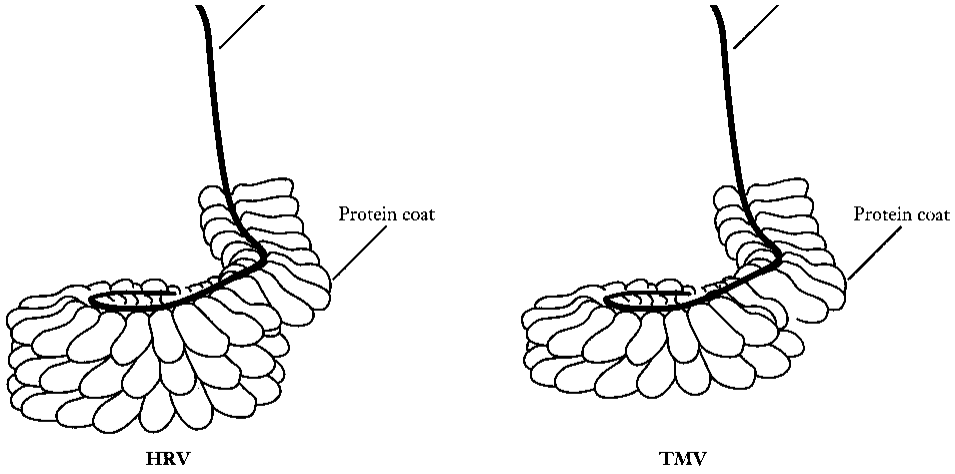

Figure 18-3

40. What evidence in this experiment would show which part of the virus carried the genetic information? Refer to Figure 18-3.
41. What were the variables in the experiment? Refer to Figure 18-3.
42. What control would be used in this experiment? Refer to Figure 18-3.
43. Hypothesize what kind of lesions the T-H hybrid will cause. Explain. Refer to Figure 18-3.
44. In lesions caused by the H-T hybrid on tobacco leaves, the new viruses produced were not hybrids. They were all HRV. Why would this be so? Refer to Figure 18-3.
45. How might he determine whether the RNA or the protein coat of the H-T hybrid carried the genetic information of the virus? Refer to Figure 18-3.
46. Suggest how Fraenkel-Conrat might produce two hybrids. Refer to Figure 18-3.

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Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: B OBJ: 18-3
   NAT: C1 | C4 | C5
2. ANS: D PTS: 1 DIF: B OBJ: 18-5
   NAT: C1 | C4 | C5
3. ANS: B PTS: 1 DIF: B OBJ: 18-4
   NAT: C1 | C4 | C5
4. ANS: C PTS: 1 DIF: B OBJ: 18-4
   NAT: C1 | C4 | C5
5. ANS: C PTS: 1 DIF: B OBJ: 18-4
   NAT: C1 | C4 | C5
6. ANS: D PTS: 1 DIF: B OBJ: 18-1
   NAT: A1 | C3 | C5
7. ANS: D PTS: 1 DIF: B OBJ: 18-1
   NAT: A1 | C3 | C5
8. ANS: C PTS: 1 DIF: B OBJ: 18-1
   NAT: A1 | C3 | C5
9. ANS: B PTS: 1 DIF: B OBJ: 18-4
   NAT: C1 | C4 | C5
10. ANS: B PTS: 1 DIF: B OBJ: 18-4
    NAT: C1 | C4 | C5
11. ANS: B PTS: 1 DIF: B OBJ: 18-3
    NAT: C1 | C4 | C5

COMPLETION

12. ANS: A

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5
13. ANS: D

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5
14. ANS: B

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5
15. ANS: E

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5
16. ANS: C

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5

MATCHING

17. ANS: B PTS: 1 DIF: B OBJ: 18-2
    NAT: A1 | C3 | C5
18. ANS: I PTS: 1 DIF: B OBJ: 18-2
    NAT: A1 | C3 | C5
19. ANS: E PTS: 1 DIF: B OBJ: 18-4
    NAT: C1 | C4 | C5
20. ANS: F PTS: 1 DIF: B OBJ: 18-4
    NAT: C1 | C4 | C5
21. ANS: A PTS: 1 DIF: B OBJ: 18-4
    NAT: C1 | C4 | C5
22. ANS: C PTS: 1 DIF: B OBJ: 18-1
    NAT: A1 | C3 | C5
23. ANS: D PTS: 1 DIF: B OBJ: 18-5
    NAT: C1 | C4 | C5
24. ANS: H PTS: 1 DIF: B OBJ: 18-2
    NAT: A1 | C3 | C5
25. ANS: G PTS: 1 DIF: B OBJ: 18-4
    NAT: C1 | C4 | C5

SHORT ANSWER

26. ANS:
    A provirus is a DNA virus that has been inserted into a host cell chromosome. A retrovirus is an RNA virus that contains the enzyme reverse transcriptase, which copies viral RNA into DNA.

    PTS: 1 DIF: B OBJ: 18-1 NAT: A1 | C3 | C5
27. ANS:
    Both are viral reproductive cycles. In a lytic cycle, the virus causes the destruction of the host cell. In the lysogenic cycle, the viral DNA becomes integrated into the host cell's chromosome, after which it is passed on to future generations of the host cell.

    PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5
28. ANS:
    Answers may include: The bacteria should be able to reproduce quickly and live in the environment. The bacteria may also utilize substances that other organisms cannot use. They may have protective structures, such as capsules or endospores.

    PTS: 1 DIF: A OBJ: 18-4 NAT: C1 | C4 | C5
29. ANS:
    Rapid reproduction and simplicity of the cell have allowed bacteria to adapt to extreme environmental conditions. They may utilize poisonous substances, be anaerobic, and live in low pH environments.

    PTS: 1 DIF: A OBJ: 18-4 NAT: C1 | C4 | C5
30. ANS:
    Viruses are not living things.

    PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

31. ANS:
DNA viruses—chicken pox, warts; RNA viruses—HIV

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

32. ANS:
Penicillin interferes with the enzyme that links the sugar chains in the bacterial cell wall. Because neither viruses nor animal cells have cell walls, penicillin has no effect on them.

PTS: 1 DIF: A OBJ: 18-4 NAT: C1 | C4 | C5

33. ANS:
A protein on the surface of a virus has a shape that matches a molecule in the plasma membrane of its host, allowing the virus to lock onto the host cell.

PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5

34. ANS:
Viruses do not carry out respiration, grow, or move. They can reproduce, but only when they are inside a living cell.

PTS: 1 DIF: B OBJ: 18-1 NAT: A1 | C3 | C5

35. ANS:
1. A virus injects its DNA into a bacterium.
2. The viral DNA becomes part of the host chromosome as a provirus.
3. The provirus is inactive but is replicated when the host cell chromosome replicates.

PTS: 1 DIF: B OBJ: 18-2 NAT: A1 | C3 | C5

36. ANS:
Like plants, bacteria have cell walls and lack typical animal characteristics. Unlike plants, bacteria are prokaryotic and their cell walls lack cellulose.

PTS: 1 DIF: A OBJ: 18-4 NAT: C1 | C4 | C5

37. ANS:
The antibiotics kill beneficial, as well as harmful, bacteria in the body. Because yogurt contains some of these beneficial bacteria, eating yogurt can help to replace them in the patient's body.

PTS: 1 DIF: A OBJ: 18-5 NAT: C1 | C4 | C5

38. ANS:
Water purification and sanitary waste disposal help prevent the spread of disease-causing bacteria in developed countries.

PTS: 1 DIF: A OBJ: 18-5 NAT: C1 | C4 | C5

39. ANS:
In developing countries, the chief cause of death is infectious diseases; in developed countries, it is circulatory diseases. Developed countries have better access to doctors and antibiotics for curing infectious diseases than do developing countries. That's why fewer deaths from infectious diseases occur in developed countries.

PTS: 1 DIF: A OBJ: 18-5 NAT: C1 | C4 | C5

40. ANS:
The H-T virus produces only HRV viruses that would convince researchers that the RNA of the HRV was controlling the reproduction of the viruses.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

41. ANS:
The two kinds of hybrids were the variables.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

42. ANS:
infecting tobacco plants with the pure TMV and HRV; using plants with no viruses

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

43. ANS:
The T-H hybrid will cause the same kind of lesions as the TMV because it has the RNA of the TMV.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

44. ANS:
Because the RNA of the HRV was providing the genetic message, only HRV copies could be made.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

45. ANS:
Answers will vary but may include that he could inject the H-T hybrid into a healthy tobacco plant. If the hybrid causes the same kind of lesions that HRV typically causes, he would know that RNA provides the genetic information because the hybrid has the RNA of HRV, and that is the information that was specified.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5

46. ANS:
Answers may vary but may include that he would have to separate the RNA from the protein coat of each virus. Then he would mix the RNA of the HRV with the TMV protein coat to produce the H-T hybrid. He would mix the TMV RNA with the HRV protein coat to produce the T-H hybrid.

PTS: 1 DIF: A OBJ: 18-1 NAT: A1 | C3 | C5