Immune System

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

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

7. 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

8. A(n) ______ is a protein produced in response to an antigen.
   a. antibody  
   b. complement  
   c. macrophage  
   d. phagocyte

9. A reaction by tissues to any type of injury by swelling, pain, heat, and redness is called ______.
   a. phagocytosis  
   b. physical defense  
   c. inflammation  
   d. infection

10. Saliva and tears contain ______, an enzyme that destroys many bacteria.
    a. lysozyme  
    b. toxin  
    c. histamine  
    d. complement

11. The ______ of malaria is a mosquito.
    a. antibody  
    b. pathogen  
    c. antigen  
    d. vector

12. A pathogen that passes from one host to another is said to be ______.
    a. infectious  
    b. toxic  
    c. nonspecific  
    d. specific
13. Which of the following statements is one of Koch's postulates?
   a. Pathogens must be found in the host in every case of the disease.
   b. Pathogens must be grown in a pure culture.
   c. When pathogens that are grown in a pure culture are placed in a healthy host, the pathogens must produce symptoms of the disease.
   d. all of these

14. Many pathogens injure the host by producing _____.
   a. antibodies
   b. toxins
   c. pus
   d. lysozyme

15. Active immunity is obtained when a person is exposed to _____.
   a. antigens
   b. injected antibodies
   c. macrophages
   d. antibiotics

16. A person with AIDS is susceptible to all kinds of infectious diseases because HIV _____.
   a. destroys pathogens
   b. weakens the immune system
   c. causes an increase of antigens
   d. causes antibody production

17. HIV can be transmitted by _____.
   a. intimate sexual contact
   b. contaminated food
   c. air
   d. shaking hands

18. Immunity occurs when the system recognizes a foreign substance and responds by producing _____.
   a. lymphocytes that make antibodies
   b. antigens
   c. toxins
   d. all of these

19. Interferons are a body cell's defense against _____.
   a. all pathogens
   b. bacteria
   c. viruses
   d. lymphocytes

20. A fever may be helpful in curing a disease because a body temperature higher than normal _____.
   a. makes the patient feel better
   b. keeps the patient awake
   c. keeps the patient from chills
   d. interferes with the metabolism of pathogens

21. A bacterial disease becomes difficult to cure when the bacteria _____.
   a. die off
   b. make interferons
   c. develop resistance to antibiotics
   d. produce antibodies

22. Which of the following is part of acquired immunity?
   a. complement
   b. interferon
   c. antibodies
   d. lysozyme
Penicillin Treatment

<table>
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<th>Day</th>
<th>Dose</th>
<th>% of Pathogen Survival</th>
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<td>1</td>
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<tr>
<td>10</td>
<td>500 mg</td>
<td>65%</td>
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**Figure 39-1**

23. According to the data in Figure 39-1, hypothesize how the pathogen at Day 10 is different than at Day 1.
   a. Day 1 is resistant to antibiotics  
   b. Day 10 is resistant to antibiotics 
   c. Day 1 is lethal 
   d. Day 10 is no longer lethal

24. Based on the data in Figure 39-1, why do doctors recommend taking all of a medication even if you see symptoms disappear after only a few days of treatment.
   a. you could get a brand new infection 
   b. you will be more susceptible to other infections 
   c. you could incubate resistant pathogens 
   d. you could ultimately die

25. Based on the data in Figure 39-1, how are resistant pathogens killed in your body if you had continued treatment?
   a. antibiotics 
   b. vaccinations 
   c. red blood cells 
   d. innate immunity

26. According to the data in Figure 39-1, what microorganism has caused the infection?
   a. bacteria 
   b. virus 
   c. fungi 
   d. protist

27. Use the data in Figure 39-1 to predict the outcome if the antibiotic was switched from penicillin to another antibiotic and used for an entire treatment.
   a. The infection would continue. 
   b. The infection would get worse. 
   c. The infection would be destroyed. 
   d. Other infections would occur.
28. Which cell in Figure 39-4 has a nucleus?
   a. A  b. B  c. both  d. neither

29. Which cell in Figure 39-4 destroys invaders by consuming them?
   a. A  b. B  c. both  d. neither

30. Which cell in Figure 39-4 causes swelling?
   a. A  b. B  c. both  d. neither

31. Which cell in Figure 39-4 causes pus?
   a. A  b. B  c. both  d. neither

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

32. enzyme injected into a host cell, which copies viral RNA into DNA
33. cell in which a virus reproduces
34. process by which bacteria reproduce asexually
35. virus that infects bacteria
36. nonliving particle that can reproduce when in a living cell
37. poison produced by some bacteria

Match each item with the correct statement below.

a. pathogens  b. lymph node  c. vaccine  d. antibiotic  e. lymphocyte  
   f. infectious disease  g. Koch's postulates  h. immunity

38. Weakened, dead, or parts of pathogens or antigens that, when injected into the body, cause immunity
39. Procedure used to determine which pathogen causes a specific disease
40. Small mass of tissue that filters lymph
41. Defense against a specific pathogen by building up resistance to it
42. Disease-producing agents such as bacteria, protozoa, fungi, and viruses
43. Type of white blood cell that defends the body against foreign substances
44. Substance produced by a microorganism that kills or inhibits the growth and reproduction of other microorganisms
45. Disease caused by pathogens

**Short Answer**

46. Why aren't viruses named according to the rules of binomial nomenclature?
47. Why is penicillin ineffective in destroying viruses or animal cells?
48. Compare and contrast $T$ cell and $B$ cell.
49. What causes a fever?
50. Why is AIDS considered a disease of the immune system?
51. Organ-transplant patients are given a drug called cyclosporine to suppress the body's defenses against the transplanted organ. Why is this necessary?

Vincent Fischetti is a professor of bacterial pathogenesis and immunology at New York's Rockefeller University. His team of researchers has been studying why some Group A streptococcal bacteria manage to slip by the defenses of the human body. Group A streptococci cause strep throat, which often leads to acute rheumatic fever, a disease that damages heart valves.

First, Fischetti's team looked at Group A streptococci under an electron microscope. They noticed that some of these bacteria have long, hairlike filaments on their surfaces. The filaments were found to consist of a protein called M protein. They decided to find out whether the M protein has anything to do with Group A's ability to resist ingestion by human phagocytes. They placed streptococci in a drop of human blood on a microscope slide. The phagocytes in the blood moved away from the bacteria that had M proteins on their surfaces. The phagocytes attacked any streptococci that lacked M-protein filaments.

52. How does natural selection play a role in resistance to antibiotics?