Review for Unit 04: Viruses, Bacteria and the Immune System

1. A virus is:
a) a non-cellular living organism
b) one of the smallest bacteria known
c) a member of the kingdom Virusae
d) a biological entity made of nucleic acid and protein

2. Which of these diseases should NOT be treated with antibiotics?
a) typhoid fever caused by Salmonella typhii
b) bubonic plague caused by Yersinia pestis
c) pneumonia caused by Respiratory Syncytial virus
d) hemolytic uremic syndrome caused by E.coli 0157:H7

3. Archaea and bacteria are similar because they both have:
a) the same type of ribosomes
b) the same type of cell walls
c) nuclei containing one circular loop of DNA
d) all of the above

4. The capsid of a virus is made of:
a) cellulose b) peptidoglycan c) protein d) a phospholipid bilayer

5. Retroviruses contain:
a) RNA instead of DNA
b) DNA instead of RNA
c) both RNA and DNA
d) neither RNA nor DNA

6. Viruses can only infect cells which have:
a) DNA instead of RNA
b) the specific receptor for that virus
c) an outer envelope
d) an endospore within them

7. When viral DNA is integrated into the host cell's DNA, it is:
a) extremely active and dangerous to the cell
b) a 'provirus' which is relatively inactive
c) part of the viral 'lytic cycle'
d) all of the above

8. Some, but not all, viruses contain _____, as their outer surface.
a) a membranous envelope
b) both DNA and RNA
c) a protein capsid
d) a protein spore coat

9. In order to infect a cell, a virus must:
a) inject its protein into the cell while the nucleic acid remains attached to the host cell surface
b) have a special protein on its surface that can interact with a protein on the surface of the host cell
c) actively burrow through the cell wall or cell membrane of the host cell to reach the cell's nucleus
d) form a conjugation tube to pass its DNA plasmid to the recipient cell

10. The viral infection cycle that will most rapidly cause cell destruction is called the:
a) lysogenic cycle b) lytic cycle c) lysosomal cycle d) lysozymic cycle

11. Which statement is NOT true about retroviruses?
a) they may cause cancer or AIDS
b) they are not known to cause disease in humans
c) they must contain the enzyme reverse transcriptase
d) they can produce DNA from viral RNA

12. Bacteria reproduce by:
a) mitosis or meiosis
b) mitosis or binary fission
c) binary fission or conjugation
d) asexually but not sexually

13. Prokaryotes:
a) contain a nucleus
b) usually lack a cell wall
c) lack ribosomes
d) contain a loop of DNA as their genetic material

14. Methanogens and halophiles are:
a) members of the Domain bacteria
b) members of the Domain Archaea
c) immunoviruses
d) eukaryotic

15. Endosymbiosis Theory suggests that mitochondria originated as:
a) simple viruses
b) photosynthetic algae
c) RNA retroviruses
d) simple, aerobic bacteria

16. Which of the following is/are examples of genetic recombination?
a) genetic engineering of the human insulin gene into E. coli
b) viruses integrating their DNA into host DNA during the lysogenic cycle
c) conjugation between E. coli and shigella bacteria to produce E. coli 0157:H7
d) all of the above

17. Mutualistic relationships are a type of symbiosis in which both organisms benefit. Which of the following relationships are mutually beneficial to both species?
a) nitrogen-fixing bacteria in root nodules of plants
b) Archaea in the stomachs of cows break down grass
c) bacteria in the intestines of humans make vitamins B12 & K
d) all of the above

18. Variation in a strain of bacteria:
a) does not occur, since bacteria are asexual
b) is mainly provided by endospores
c) happens primarily through crossing-over
d) happens due to mutations

19. Bacteria inherit one loop of DNA from their mother cell. Bacteria are:
a) polyploid b) diploid c) haploid d) nucleoid

20. Prokaryotes which can produce their own energy using light from the sun are called:
a) chemoautotrophs b) obligate anaerobes c) photoautotrophs d) heterotrophs

21. Heterotrophs are also called:
a) consumers b) producers c) thermophiles d) halophiles

22. Prokaryotes are now divided into:
a) Archaea and cyanobacteria
b) autotrophs and heterotrophs
c) pathogenic and non-pathogenic bacteria
d) Archaea and bacteria

23. Medical equipment is sterilized using steam under high temperatures and pressure. This is the only way to destroy:
a) prions b) viruses c) bacterial endospores d) halophiles

24. To which of the following domains do viruses belong?
a) Cnidaria b) Archaea c) Protista d) none of these

25. Viruses are:
a) capable of rapidly mutating
b) specific and able to infect only certain cell types
c) only able to reproduce inside a host cell
d) all of the above

26. Prions:
a) are simply protein molecules
b) are the pathogen that causes Mad Cow disease
c) can cause normal proteins to change shape
d) all of the above

27. Archaea and bacteria differ because:
a) Archaea are not known to be pathogenic
b) Archaea have ribosomes and bacteria do not
c) Archaea are prokaryotes and bacteria are eukaryotes
d) bacteria are prokaryotes and Archaea are eukaryotes

28. Which of the following has the biological entities arranged correctly from smallest to largest?
a) prions < viruses < bacteria < eukaryotes
b) viruses < prions < bacteria < eukaryotes
c) bacteria < eukaryotes < viruses < prions
d) eukaryotes < bacteria < viruses < prions

29. A single-celled microorganism that lacks a nucleus is a(n):
a) protist b) eukaryote c) prokaryote d) virus

30. Which of the following is/are NOT considered to be alive?
I) mitochondria
II) viruses
III) prions
IV) antibodies
V) Archaea

a) I, II and III only b) II, III and IV only c) I and II only d) I, II, III and IV only

31. Viruses can infect:
a) bacteria b) plant cells c) eukaryotic cells d) all of the above

32. An example of a virus that alternates between the lytic and lysogenic cycle is:
a) rhinovirus that causes colds
b) influenza virus
c) herpes simplex virus which causes cold sores
d) Ebola virus

33. Reverse transcriptase is:
a) an enzyme b) a protein c) found in retroviruses d) all of the above

34. What are the three domains used to organize and categorize all living things?
a) bacteria, moulds and fungi
b) Archaea, bacteria and eukaryota
c) animalia, plantae and fungi
d) prokaryota, eukaryota and viruses

35. What substance is unique to the cell walls of bacteria?
a) amino acids b) cellulose c) chitin d) peptidoglycan

36. A rod-shaped prokaryote is called a:
a) bacillus b) spirillum c) coccus d) pilus

37. The arrangement of bacteria shown to the right is best described as:
a) streptobacillus b) diplococcus c) staphylococcus d) diplodocus

38. Gram negative bacteria have:
a) thick peptidoglycan cell walls that stain purple
b) thick peptidoglycan cell walls that stain pink
c) thin peptidoglycan cell walls that stain purple
d) thin peptidoglycan cell walls that stain pink

39. Another name for an autotroph is a(n):
a) producer b) consumer c) decomposer d) anaerobe

40. A prokaryote that carries out photosynthesis in a manner similar to that of plants is called a:
a) photoautotroph b) chemoautotroph c) photoheterotroph d) chloroplast

41. A prokaryote that obtains chemical energy directly from inorganic molecules such as H_2S is a:
a) photochemotroph b) chemoautotroph c) chemoheterotroph d) photoautotroph

42. Endospores are:
a) formed by viruses during adverse conditions
b) resistant to radiation, dryness, heat and cold
c) a means of survival for algae during the dry season
d) an important type of reproduction in bacteria

43. Nitrogen-fixing bacteria convert:
a) ammonia/ammonium to nitrates
b) nitrates to ammonia/ammonium
c) nitrogen gas to ammonia/ammonium
d) nitrates to nitrogen gas

44. Antibiotics work by blocking bacteria from synthesizing:
a) peptidoglycan for their cell walls
b) proteins for cellular functions
c) nucleic acids for reproduction
d) all of the above

45. Which of the following could be a fomite?
a) a mosquito b) a sterile swab c) a door handle d) all of the above

46. Which of the following is/are can be pathogenic?
a) Archaea b) cigarette smoke c) prions d) all of the above

47. Antiseptics are used to:
a) completely sterilize non-living objects
b) kill bacteria on the surface of living things
c) destroy viruses within living things
d) kill bacteria within living things

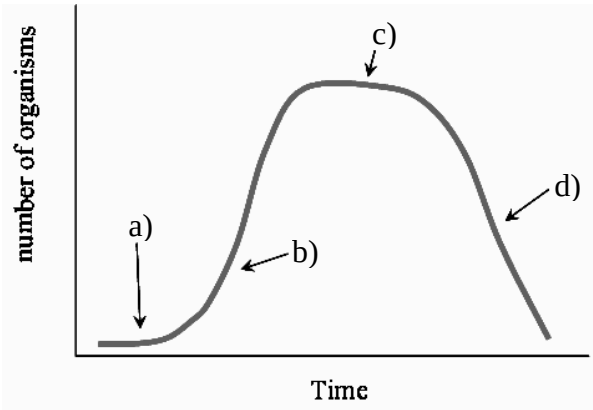
48. Viruses are not considered to be alive because they are unable to:
a) reproduce independently
b) utilize energy
c) metabolize
d) all of the above

49. Harsh chemicals or extreme heat and pressure can destroy viruses, bacteria and endospores. This is called:
a) lytic disinfection b) sanitization c) disinfection d) sterilization

50. Which of the following could be a vector?
a) a mosquito b) an antibiotic c) a toilet seat d) all of the above

51. Endospores are formed by bacteria during:
a) adverse conditions
b) sexual reproduction
c) asexual reproduction
d) all of the above

Answer questions 52 – 56 about the bacterial population curve shown to the right:



52. The part of the graph labeled "a" is called the:
a) slow growth phase
b) inhibition phase
c) lag phase
d) log phase

53. Phase "c" of a population graph is referred to as the 'stationary phase' or 'steady state'. During this phase, the bacteria are:
a) dividing at their maximum rate
b) infecting and killing their host at a constant rate
c) reproducing and dying at equal rates
d) reproducing by sexual means only

54. During which part of the population graph are the bacteria dividing most quickly: a, b, c or d?

55. During which part of the population graph are the bacteria most likely to form endospores: a, b, c or d?

56. In part "d" of the population graph, bacteria are dying because:
a) food and resources are unlimited
b) wastes are accumulating
c) there are not enough mates for sexual reproduction
d) all of the above

57. Antibodies are:
a) made by T-cells
b) only produced in response to infection
c) produced by red blood cells
d) none of the above

58. Which of the following is/are examples of passive immunity?
a) hydrochloric acid in the stomach
b) immunoglobulins in breast milk
c) tears containing lysozyme
d) all of the above

59. The inflammatory response:
a) is non-specific
b) causes redness, heat and swelling
c) helps WBCs to move into the affected area
d) all of the above

60. Phagocytes and macrophages are:
a) types of white blood cells
b) able to engulf and destroy pathogens
c) attracted to histamine released by damaged cells
d) all of the above

61. Your body has millions of different types of antibodies for millions of different antigens because:
a) humans have millions of different genes for antibodies
b) white blood cells can make antibodies for specific antigens
c) we inherit the antibodies from our parents
d) all of the above

62. The Human Microbiome Project is studying the:
a) human genome
b) E. coli in the human gut
c) Archaea and bacteria in a healthy human body
d) very small white blood cells in the human body

63. Which blood cells are not involved in the immune response?
a) macrophages b) red blood cells c) phagocytes d) white blood cells

64. Cilia are:
a) short hair-like projections on cells lining the respiratory tract that sweep mucus along
b) long whip-like structures on bacterial cells that are used for locomotion
c) short tube-like structures on bacterial cells that are used for attachment and sexual reproduction
d) chemicals that attract white blood cells to areas of infected or damaged cells

65. Physical barriers to infection include:
a) the skin b) acidic sweat c) stomach acid d) all of the above

66. Immunity means that an organism is:
a) free of bacteria b) free of infection c) free of disease d) not pathogenic

67. A foreign molecule which can trigger an immune response is called a(n):
a) antigen b) antibody c) immunoglobulin d) carcinogen

68. Which of the following is an example of passive immunity?
a) B-cells created in response to a viral infection
b) antibodies that pass through the placenta
c) vaccination
d) redness, swelling and heat produced in an injured or infected area

69. T-cells are responsible for:
a) non-specific phagocytosis of pathogens
b) making antibodies
c) recognizing and remembering specific antigens
d) carrying oxygen to injured or infected areas

70. Antibodies are produced in cells called:
a) macrophages b) phagocytes c) B-cells d) helper cells

71. Lysozyme is:
a) an enzyme found in stomach acid
b) found in tears and saliva
c) a chemical which attracts white blood cells to an area
d) all of the above

72. Antibodies can neutralize antigens by:
a) agglutination b) sedimentation c) phagocytosis d) lysosomal digestion

73. Which of the following chemicals is involved in the inflammatory response?
a) histamine b) collagen c) keratin d) heparin

74. If the immune system starts to flag and attack proteins which belong to the organism itself, it may trigger a(n):
a) allergy b) autoimmune disorder c) non-disjunction disorder d) mutation

75. Which of the following is a non-specific barrier that acts as a first line of defense?
a) mucous membranes b) antibodies c) macrophages d) all of the above

76. Inflammation is:
a) characterized by heat, redness and swelling
b) part of the non-specific immune response
c) able to slow the reproduction and spread of pathogens
d) all of the above

77. Active immunity may be produced by:
a) immunoglobulins in breast milk
b) vaccination
c) being given immunoglobulins from an immune person
d) all of the above

78. Cells that make and secrete antibodies will have large amounts of:
a) rough endoplasmic reticulum
b) cytoplasm
c) lysosomes
d) mitochondria

79. The advantage of vaccination is that the:
a) first exposure to the antigen will immediately cause antibodies to be released
b) first exposure to the antigen will prevent antibodies from being released
c) second and subsequent exposures to the antigen will trigger a rapid immune response
d) second and subsequent exposures to the antigen will prevent antibodies from being released

80. Vaccinations are given to stimulate (bring about):
a) passive, non-specific immunity
b) active, non-specific immunity
c) passive, specific immunity
d) active, specific immunity

81. Disinfectants kill bacteria:
a) on the surface of living things
b) within living things
c) on the surface of non-living things
d) all of the above

82. AIDS is caused by viruses that specifically invade the:
a) liver b) kidneys c) white blood cells d) red blood cells

83. Which of the following may increase the development of resistant bacteria?
I) using anti-bacterial soaps
II) not finishing the full course of antibiotics
III) using antibiotics to treat viral infections
IV) using antibiotics to increase the rate of growth of farm animals

a) I and II only b) II and III only c) III and IV only d) I, II, III and IV

84. Tissues swell during inflammation because the affected area has:
a) so many bacteria present
b) so many white blood cells present
c) blood vessels that dilate and leak fluid
d) large amounts of pus accumulating

85. Where in the body should bacteria NOT be found?
a) the stomach b) the intestines c) the outer ear d) the blood

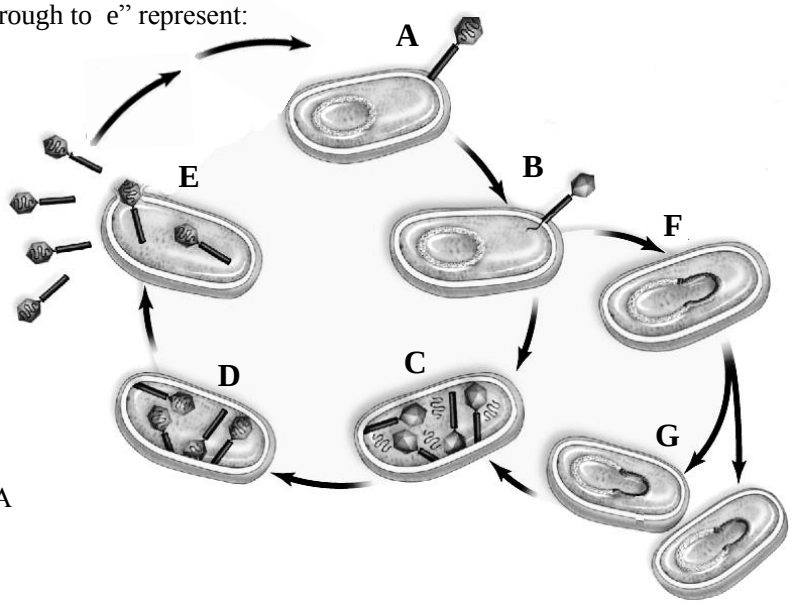
86. "Super-bugs" refer to bacteria that:
a) are so large they can not be engulfed by macrophages
b) produce endospores that can not be killed by the human immune system
c) secrete strong chemicals that kill all white blood cells
d) are resistant to one or more types of antibiotics

87. A healthy gut flora can be restored by:
a) strong doses of antibiotics
b) a fecal transplant from a healthy donor
c) taking fish oil capsules every day
d) all of the above

88. Antibiotics should be taken:
a) only until you start to feel better
b) immediately, as soon as you feel sick
c) for viral, bacterial and parasitic infections
d) only when absolutely necessary

89. What is the best protection against infections with pathogens?
a) using anti-bacterial soaps and wipes regularly
b) staying at home where it is clean and safe
c) regular hand-washing with soap and warm water
d) taking vitamins and protein drinks every day

90. Referring to the diagram to the right, letters "a through to e" represent:
a) the lysogenic cycle
b) the process of binary fission
c) the lytic cycle
d) conjugation



91. The diagram labelled "A" represents a:
a) bacteriophage on a bacterial cell receptor
b) prophage on a bacterial capsid
c) retrovirus on a eukaryotic cell
d) plasmid on an Archaea cell

92. Between letters B and F the viral:
a) DNA was integrated into the bacteria's DNA
b) capsid was integrated into the bacteria's DNA
c) RNA formed a ribosome with the bacteria's DNA
d) RNA was transcribed into mRNA

Answers to multiple choice:

1. d	11. b	21. a	31. d	41. b	51. a	61. b	71. b	81. c	91. a
2. c	12. c	22. d	32. c	42. b	52. c	62. c	72. a	82. c	92. a
3. c	13. d	23. c	33. d	43. c	53. c	63. b	73. a	83. d	
4. c	14. b	24. d	34. b	44. d	54. b	64. a	74. b	84. c	
5. a	15. d	25. d	35. d	45. c	55. d	65. a	75. a	85. d	
6. b	16. d	26. d	36. a	46. c	56. b	66. b	76. d	86. d	
7. b	17. d	27. a	37. b	47. b	57. d	67. a	77. b	87. b	
8. a	18. d	28. a	38. d	48. d	58. b	68. b	78. a	88. d	
9. b	19. c	29. c	39. a	49. d	59. d	69. c	79. c	89. c	
10. b	20. c	30. d	40. a	50. a	60. d	70. c	80. d	90. c	