



Note: Answer all the flowing



Q1 : Choose the correct answer : (150 M) .

Virology

1. Which of the followings is TRUE with regard to the viruses?

- A) The viruses are too small to be seen with an electron microscope.
- B) They can be seen with a light microscope.
- C) They are obligate intracellular parasite.
- D) Viruses replicate by binary fission.

2. The virion of the virus particle consists of a:

- A) Nucleic acid genome packaged into a protein coat.
- B) Nucleic acid genome packaged into a lipid coat.
- C) Nucleic acid genome packaged into a carbohydrate coat.
- D) Only nucleic acid genome.

3. Which of the followings is NOT TRUE with regard to virion:

- A) It is a complete, fully developed infectious viral particle.
- B) It is non-infectious viral particle.
- C) The virion may be enveloped or may be non-enveloped.
- D) The virion may contain essential or accessory enzymes.

4. Capsomeres composed of

- A) Polypeptides. B) Lipids. C) Polysaccharides. D) All of the above.

5. Which of the followings is NOT a function of viral capsids:

- A) It facilitates entry of viral genome into the host cells by adsorbing readily to cell surfaces.
- B) The capsid of the virus protects its nucleic acid from the activity of nuclease enzymes.
- C) It facilitates attachment of virus to target cells in the host.
- D) Symmetrically arranged polypeptide molecules of capsid form a penetrable shell around the nucleic acid core.

6. What is the meaning of enveloped virus?

- A) The viral capsids covered by a lipid.
- B) The viral capsids covered by a protein.
- C) The viral capsids covered by polypeptides.

- D) The viral capsids covered by polysaccharides.
7. **With regard to viral susceptibility to physical and chemical agents, which of the followings is TRUE:**
- A) The viruses are usually more sensitive than bacteria to chemical disinfectants.
 - B) The chlorination of drinking water is not useful for killing most of the common viruses.
 - C) The oxidizing agents, such as hydrogen peroxide and hypochlorite are active antiviral disinfectants.
 - D) All of the above
8. **According to viral attachment, rabies virus binds specifically to:**
- A) CD4 glycoprotein on the surface of mature T lymphocytes.
 - B) Sialic acid residue of glycoprotein receptor on the surface of epithelium cells.
 - C) Acetylcholine receptors found on neural cells.
 - D) CD8 glycoprotein on the surface of mature T lymphocytes.
9. **In DNA viruses, which of the followings is TRUE:**
- A) The DNA may be negative sense (-).
 - B) The DNA may be positive sense (+).
 - C) The DNA can be single stranded or double stranded.
 - D) In some DNA viruses, such as the influenza virus, the genome is segmented.
10. **The sequence of events in viral replication is as follows:**
- A) Attachment, uncoating, penetration, transcription of mRNA, translation, assembly, and release.
 - B) Attachment, uncoating, penetration, translation, transcription of mRNA, assembly, and release.
 - C) Attachment, penetration, uncoating, transcription of mRNA, translation, assembly, and release.
 - D) Uncoating, attachment, , penetration, transcription of mRNA, translation, assembly, and release.
11. **The enveloped viruses enter the cell by a method called:**
- A) Endocytosis.
 - B) Viropexis.
 - C) Exocytosis.
 - D) Fusion.
12. **The process of the separation of viral nucleic acid from its protein core called:**
- A) Separation.
 - B) Transcription.
 - C) Uncoating.
 - D) Budding.

13. Which of the following statement is TRUE:

- A) DNA viruses replicate their DNA in the host cell's nucleus using viral enzymes.
- B) DNA viruses replicate their DNA in the host cell's nucleus using host enzymes.
- C) DNA viruses replicate their DNA in the host cell's cytoplasm using viral enzymes.
- D) DNA viruses replicate their DNA in the host cell's cytoplasm using host enzymes.

14. When the viral RNA itself acts as the mRNA, this type of viruses contains which type of RNA?

- A) Positive-strand (+ strand) RNA virus.
- B) Negative-stranded (- stranded) RNA virus.
- C) Negative sense RNA virus.
- D) None of the above.

15. Which type of viruses has their own RNA polymerases for mRNA transcription?

- A) Negative-sense RNA like orthomyxoviruses.
- B) Single-stranded DNA viruses like parvoviruses.
- C) Double stranded DNA viruses like papovaviruses.
- D) None of the above.

16. The envelope of enveloped viruses is derived from:

- A) Host cell cytoplasmic membrane or nuclear membrane.
- B) Host cell wall.
- C) The virus particle itself.
- D) Viral DNA or RNA.

17. The time taken for a single replication cycle of virus is about 15–30 h.

- A) 15–30 hours.
- B) 15–30 minutes.
- C) 15–30 seconds.
- D) 15–30 days.

18. The receptor for Human immunodeficiency virus is:

- A) ICAM-1.
- B) CD4 molecule.
- C) Acetylcholine.
- D) Sialic acid.

19. Occasionally, Viruses enclose host cell nucleic acid instead of viral nucleic acid know as. This is known as:

- A) Pseudovirions.
- B) Defectovirion.
- C) Abortivevirion.
- D) Hostvirion.

20. Which of the following would be the first step in the biosynthesis of a virus with reverse transcriptase?

- A) A complementary strand of RNA must be synthesized.
- B) Double-stranded RNA must be synthesized.
- C) A complementary strand of DNA must be synthesized from an RNA template.
- D) A complementary strand of DNA must be synthesized from a DNA template.

21. When the nucleic acid and the capsomeres are wound together to form a spherical or spiral tube, this type of symmetry is known as:
A) Cubical symmetry. B) Complex. C) Icosahedral. D) Helical symmetry.
22. What was the first antiviral drug used clinically to treat poxvirus infections in the 1960s?
A) Acyclovir. B) Amantadine. C) Methisazone D) Idoxuridine.
23. Acyclovir (ACV) selectively inhibits herpes virus replication primarily because it is activated by which viral enzyme?
A) Viral DNA polymerase. B) Viral reverse transcriptase.
C) Viral thymidine kinase. D) Viral neuraminidase.
24. Unlike nucleoside analogues, non-nucleoside polymerase inhibitors like foscarnet work by:
A) Incorporating into viral DNA as chain terminators.
B) Binding to the pyrophosphate-binding site of DNA polymerase.
C) Inhibiting viral uncoating via M2 channel blockade.
D) Blocking the attachment of the virus to host cell receptors
25. Which of the following antiviral drugs inhibit replication of viruses by binding to the pyrophosphate binding site of the DNA polymerase to block binding of nucleotides.
A) dideoxyinosine. B) Foscarnet. C) Idoxuridine. D) Acyclovir.
26. Interferons are produced by leukocytes and many other cells in response to:
A) Bacterial endotoxin. B) Mutagenic and antigenic stimuli.
C) Viruses. D) All of the above
27. Which of the following drugs acts by blocking the M2 ion channel of the influenza A virus?
A) Oseltamivir. B) Zanamivir. C) Amantadine. D) Ribavirin
28. Conformational changes in the reverse transcriptase domain of the Hepatitis B virus polymerase can lead to resistance against which class of drugs?
A) Neuraminidase inhibitors. B) Nucleotide and nucleoside analogues.
C) Protease inhibitors. D) Fusion inhibitors.
29. IFN- γ is commonly known as "immune interferon" and has immunoregulatory functions including:
A) Directly lysing virus-infected cells via a perforin mechanism.
B) Enhancing MHC antigen expression and activating macrophages.

- C) Blocking viral DNA replication by binding to the viral core.
- D) Neutralizing extracellular virus particles in the bloodstream.

30. Ribavirin's mechanism of action includes all of the following EXCEPT:

- A) Inhibition of inosine monophosphate dehydrogenase.
- B) Interference with mRNA capping.
- C) Direct inhibition of viral DNA polymerase.
- D) Inhibition of nucleotide biosynthesis.

31. Zanamivir (Relenza) and oseltamivir (Tamiflu) are neuraminidase inhibitors (NAIs). What is the critical consequence of neuraminidase inhibition?

- A) The virus cannot bind to sialic acid receptors on host cells.
- B) The viral envelope cannot fuse with the host cell membrane.
- C) The virus cannot be released from infected cells.
- D) Viral RNA replication is halted in the nucleus.

32. Which of the followings is a potent stimulator of interferon?

- A) ssRNA. B) ssDNA. C) dsDNA. D) dsRNA

33. IFN- γ differs from other interferons in being released as lymphokines from activated:

- A) T cells. B) Natural killer cells. C) Macrophages. D) All of the above.

34. According to viral susceptibility to temperature, which of the followings is NOT TRUE:

- A) Most of the viruses are highly heat-stable.
- B) Viruses, such as polio and hepatitis may survive for many days, weeks or even months in the environment.
- C) Hepatitis B shows resistance to heating at 60 C° for 60 min.
- D) Slow viruses, such as scrapie virus, are resistant to autoclaving at 121 C° for 15 min.

35. Which type of viruses released from the host cells by budding?

- A) Enveloped. B) Non-enveloped. C) Both A and B. D) None of them.

Bacteriology

36. Which medium is selective for isolating *S. aureus* from clinical specimens?

- A) MacConkey agar B) Mannitol salt agar
C) Chocolate agar D) Sabouraud agar

37. Which factor is NOT a virulence factor of *S. aureus*?

- A) Coagulase B) Protein A C) Hemolysins D) Flagella

38. The function of the bacterial cell wall includes all EXCEPT:

- A) DNA replication B) Providing shape
C) Rigidity D) Environmental protection

39. The outer membrane of Gram-negative bacteria is:

- A) Single-layered B) Absent
C) Bilayered D) Made entirely of protein

40. What type of agar is used to differentiate *Escherichia coli* based on its metallic sheen?

- A) MacConkey agar B) Eosin-methylene blue (EMB) agar
C) Xylose-lysine-deoxycholate (XLD) agar D) Brilliant green agar

41. Which of the following is a key characteristic of Enterobacteriaceae?

- A) Gram-positive rods B) Catalase-negative
C) Facultative anaerobes D) Non-motile

42. Which of the following is a common virulence factor in pathogenic *Escherichia coli*?

- A) Endotoxin (LPS) B) Coagulase C) Exotoxin D) Capsule formation

43. What is the primary habitat of Enterobacteriaceae bacteria?

- A) Bloodstream of animals B) Soil and water only
C) Intestinal tract of animals and humans D) Respiratory system of animals

44. What is the typical colony appearance of *Klebsiella* on agar?

- A) Swarming colonies B) Pink, mucoid colonies
C) Red, flat colonies D) Green colonies with metallic sheen

45. Which of the following is true for *Yersinia* species?

- A) They are lactose fermenters B) They are oxidase-positive
C) They produce H₂S in TSI agar D) They are responsible for bubonic plague

46. Which component is unique to Gram-negative bacteria?
A) Peptidoglycan B) Lipopolysaccharide
C) Teichoic acid D) Capsule
47. Which function is NOT associated with the bacterial cell membrane?
A) Protein secretion B) ATP synthesis
C) Peptidoglycan synthesis D) Phagocytosis
48. Which model describes the bacterial cell membrane structure?
A) Rigid Model B) Hydrophilic Model
C) Fluid Mosaic Model D) Lipid Raft Model
49. The bacterial cell membrane is composed mostly of:
A) DNA B) Carbohydrates C) Proteins and lipids D) RNA
50. Which of the following is NOT a toxin-mediated disease caused by *S. aureus*?
A) Food poisoning B) Toxic shock syndrome
C) Staphylococcal scalded skin syndrome D) Tuberculosis
51. The optimal temperature for the growth of *Staphylococcus* is:
A) 25°C B) 37°C C) 45°C D) 10°C
52. What is the characteristic pigment produced by *S. aureus* on nutrient agar?
A) Red B) Golden-yellow C) Green D) Blue
53. Which of the following is NOT typical for *S. aureus*?
A) Gram-positive cocci B) Arrangement in clusters
C) Motility D) Beta-hemolysis
54. A major component of *S. aureus* cell wall that mediates mucosal attachment is:
A) Capsule B) Teichoic acid C) Protein A D) Lipase
55. Which test can be used to differentiate between *Salmonella* species and other enteropathogens?
A) IMViC test B) MacConkey agar test C) Brilliant green agar D) TSI agar
56. Which antigen is responsible for the motility of *Escherichia coli*?
A) O antigen B) H antigen C) K antigen D) F antigen
57. Which of the following virulence factors contributes to *E. coli*'s ability to cause urinary tract infections?
A) Capsule production B) Endotoxin C) Fimbrial adhesions D) Enterotoxins

58. Salmonella typhi can be diagnosed by:

- A) Blood culture (first week) B) Stool culture (second week)
C) Widal test (after first week) D) All of the above

59. The best specimen for Salmonella diagnosis in the first week is:

- A) Stool B) Blood C) Urine D) Sputum

60. The most important prevention for typhoid is:

- A) Vaccination and improved sanitation B) Quarantine
C) Prophylactic antibiotics D) Handwashing only

61. Which of the following Enterobacteriaceae species is non-motile at 30°C?

- A) Klebsiella pneumoniae B) Escherichia coli
C) Enterobacter aerogenes D) Salmonella serotypes

62. What is the result of Escherichia coli on MacConkey agar?

- A) Pale colonies B) Pink colonies C) No growth D) Green colonies

63. The vector of Yersinia pestis is:

- A) Tick B) Flea C) Mosquito D) Louse

64. Yersinia pestis has which virulence factor?

- A) Capsule B) Toxins C) Plasminogen activator D) All of the above

65. The bacterial cell wall is primarily composed of:

- A) Phospholipids B) DNA and RNA C) Peptidoglycan D) Cellulose.

66. Which part of the LPS is responsible for its toxicity?

- A) Core oligosaccharide B) O-antigen C) Lipid A D) Polysaccharide

67. Yersinia pestis is:

- A) Non-motile B) Motile C) Acid-fast D) Spore-forming

68. What is a characteristic feature of Enterobacter aerogenes colonies?

- A) Swarming on blood agar B) Mucoid appearance
C) Red pigment production D) Metallic sheen on EMB agar

69. Which of the following is an important enzyme produced by S. aureus that inactivates penicillin?

- A) Coagulase B) Hyaluronidase C) Penicillinase D) Catalase

70. Which of the following biochemical tests is used to differentiate Escherichia coli from other Enterobacteriaceae?

- A) Citrate utilization test B) Indole production test
C) Urease activity test D) Voges-Proskauer test

Mycology

71. Which fungal cell wall component is the primary target of echinocandin antifungal drugs?

- A) Chitin B) Ergosterol C) β -(1,3)-D-glucan D) Mannoprotein

72. The major sterol present in the fungal cell membrane is:

- A) Cholesterol B) Ergosterol C) Lanosterol D) Sitosterol

73. Fungi are classified as:

- A) Prokaryotic autotrophs B) Prokaryotic heterotrophs
C) Eukaryotic chemoheterotrophs D) Eukaryotic photoautotrophs

74. Which of the following is a characteristic component of the fungal cell wall but not the bacterial cell wall?

- A) Peptidoglycan B) Lipopolysaccharide C) Chitin D) Teichoic acid

75. Which statement best distinguishes fungi from bacteria?

- A) Fungi are prokaryotic organisms.
B) Fungi contain peptidoglycan in their cell wall.
C) Fungi possess a true nucleus and membrane-bound organelles.
D) Fungi lack a plasma membrane.

76. Which of the following thermally dimorphic fungi is capable of causing infection in immunocompetent individuals?

- A) *Candida albicans* B) *Histoplasma capsulatum*
C) *Aspergillus fumigatus* D) *Rhizopus arrhizus*

77. Ascospores are characteristically produced within a sac-like structure called:

- A) Basidium B) Ascus C) Sporangium D) Conidiophore

78. Fungi that were historically classified as (Fungi imperfecti) are characterized by:

- A) Absence of a cell wall B) Lack of sexual spore production
C) Absence of hyphae D) Production of only zygospores

79. Which of the following is considered an opportunistic fungal pathogen?

- A) *Histoplasma capsulatum* in a healthy host
B) *Candida albicans* in an AIDS patient
C) *Coccidioides immitis* in a healthy host
D) *Blastomyces dermatitidis* in a healthy host

80. Which of the following is NOT a sexual spore?
A) Ascospore B) Basidiospore C) Zygosporangium D) Blastospore
81. Which statement best explains the selective toxicity of amphotericin B?
A) It inhibits peptidoglycan synthesis. B) It binds fungal ergosterol preferentially.
C) It inhibits fungal ribosomes. D) It targets fungal DNA polymerase.
82. In the dimorphic fungi shown, the parasitic phase generally occurs at:
A) 4°C B) 25°C C) 30°C D) 37°C
83. A mold possesses broad, ribbon-like, non-septate hyphae. Which characteristic is most likely?
A) Hyphae are uninucleate B) Hyphae are multinucleate
C) Organism is a yeast D) Organism reproduces only sexually
84. A laboratory identifies a eukaryotic microorganism with ergosterol-containing membranes and chitinous cell walls. The organism is most likely:
A) Mycoplasma B) Protozoan C) Fungus D) Actinomycete
85. Which genus is a well-recognized cause of mucormycosis?
A) Candida B) Aspergillus C) Rhizopus D) Histoplasma
86. Conidia are generally produced through:
A) Mitosis B) Binary fission C) Meiosis D) Conjugation
87. Which of the following fungal structures is commonly used for morphological identification?
A) Capsule thickness only B. Conidial shape and arrangement
C) Mitochondrial DNA only D. Cell membrane composition only
88. Arthroconidia are formed by:
A. Budding of yeast cells B. Fragmentation of hyphae following septation
C. Fusion of gametes D. Germination of spores
89. Blastospores are produced by:
A. Budding of yeast cells B. Sexual reproduction
C. Fragmentation of hyphae D. Sporangial rupture
90. The saprobic (environmental) phase of dimorphic fungi is usually found at:
A. 10° B. 25° C. 37°C D. 42°C

Immunology

91. A laboratory test shows that a molecule binds specifically to an antibody without necessarily causing a strong immune response. This molecule is best described as:
A) Antigen B) Cytokine C) Hormone D) Complement
92. A researcher compares two molecules: one is small and simple, while the other is large, complex, and foreign. The second molecule is more likely to be:
A) Tolerogenic B) Immunogenic C) Self-reactive D) Nonreactive
93. A small chemical fails to induce antibodies by itself, but becomes immunogenic after attachment to a larger protein. This small chemical is a:
A) Hapten B) Epitope C) Cytokine D) Complement
94. A purified vaccine antigen gives a weak response unless another substance is added to enhance immune activation. The added substance is acting as a:
A) Carrier B) Adjuvant C) Hapten D) Tolerogen
95. A bacterial product activates an unusually large proportion of T cells by bypassing conventional antigen recognition. This product is most likely a:
A) Hapten B) Superantigen C) Complement factor D) Mucosal antibody
96. A virus-infected nucleated cell presents an endogenous peptide on its surface. The responding T cell is most likely:
A) CD4⁺ cell B) B cell C) CD8⁺ cell D) Mast cell
97. An antigen-presenting cell processes an extracellular bacterial antigen and displays it for helper T-cell activation. The responding cell is most likely:
A) CD4⁺ cell B) NK cell C) CD8⁺ cell D) Platelet
98. The major actions of histamine include:
A) Vasoconstriction, low permeability, relaxation
B) Vasodilation, low permeability, contraction
C) Vasodilation, high permeability, contraction D) Vasoconstriction, high permeability, relaxation
99. Serum collected after exposure to a complex antigen contains antibodies from many B-cell clones. These antibodies are expected to recognize:
A) One epitope B) Many epitopes C) No antigen D) One clone

100. An antibody binds antigen through the region located at the tips of its arms.

This region is the:

- A) Fc B) Hinge C) Fab D) Tail

101. A serum sample is tested for the most dominant antibody class in circulation.

The expected major class is:

- A) IgM B) IgA C) IgE D) IgG

102. An early antibody response produces a large molecule with strong complement-fixing ability. This antibody is usually arranged as a:

- A) Dimer B) Pentamer C) Monomer D) Trimer

103. Protection is required mainly on mucosal surfaces such as the intestine and respiratory tract. The antibody class most associated with this site is:

- A) IgA B) IgM C) IgE D) IgD

104. After first exposure to an antigen, the earliest dominant antibody response is expected to involve:

- A) IgG B) IgE C) IgM D) IgA

105. A second exposure to the same antigen produces a faster and stronger antibody response. This is mainly due to:

- A) Tolerance B) Memory C) Mutation D) Deletion

106. Antibody coating of bacteria makes them more easily recognized by phagocytes. This mechanism is called:

- A) Neutralization B) Opsonization C) Sensitization D) Tolerance

107. A virus fails to enter host cells because antibodies block its binding site. This protective effect is best described as:

- A) Neutralization B) Opsonization C) Agglutination D) Chemotaxis

108. An antibody binds antigen with one region and interacts with complement or phagocytes through another region. The effector region is the:

- A) Fab B) Fc C) Epitope D) Variable site

109. Complement proteins are present in blood but become active only after sequential cleavage. They mainly circulate as:

- A) Proenzymes B) Antibodies C) Hormones D) Antigens

110. A complement pathway ends with insertion of a complex into the microbial membrane, causing destruction of the target cell. This complex is the:

- A) BCR B) MAC C) MHC D) TCR

111. A complement pathway starts when a plasma protein recognizes carbohydrate patterns on a pathogen surface. The initiating molecule is:
A) C1q B) MBL C) IgE D) C9
112. Neutrophils are strongly attracted to an infected tissue after complement activation. The fragment most responsible is:
A) C1q B) C3b C) C5a D) C9
113. In the classical complement pathway, activation of C1 leads to cleavage of two components that form C3 convertase. These components are:
A) C3 and C5 B) C4 and C2 C) C8 and C9 D) IgA and IgE
114. A patient develops rapid itching, edema, and bronchoconstriction shortly after allergen exposure. The reaction mainly involves:
A) Mast cells B) T cells C) Immune complexes D) Red cells
115. Tissue injury occurs because antibodies bind antigens located on cell surfaces. This mechanism is typical of:
A) Type I B) Type II C) Type III D) Type IV
116. Inflammation develops after soluble antigen-antibody complexes deposit in tissues. This pattern is typical of:
A) Type I B) Type II C) Type III D) Type IV
117. A skin reaction appears 48–72 hours after antigen exposure and is driven mainly by sensitized T cells. This reaction is:
A) Type I B) Type II C) Type III D) Type IV
118. A complement fragment binds to a microbial surface and makes it easier for phagocytes to attach. This fragment is most closely related to:
A) C3b B) C1q C) C9 D) C5a
119. A newborn receives protective antibodies from its mother without producing them itself. This is an example of:
A) Active immunity B) Passive immunity
C) Cell-mediated immunity D) Delayed immunity
120. A molecule is recognized by an antibody only at a small specific part of its structure. This recognized part is called:
A) Epitope B) Hapten C) Fc region D) Adjuvant

121. A hypersensitivity reaction is linked to an antibody class that binds strongly to mast cells and triggers mediator release after allergen exposure. This antibody is:
A) IgA B) IgG C) IgE D) IgD
122. A lymphocyte displays a surface immunoglobulin that helps recognize antigen, but this immunoglobulin is rarely found in high amounts in body fluids. This molecule is most likely:
A) IgD B) IgA C) IgG D) IgE
123. An immunoglobulin structure is being examined, and a small polypeptide is found to help stabilize polymeric antibody forms in secretions and early serum responses. This component is :
A) Fc chain B) J chain C) Hinge region D) Variable region
124. A cell line derived from fusion technology continuously secretes antibodies with identical specificity against one epitope. These antibodies are:
A) Polyclonal B) Natural C) Monoclonal D) Wild type
125. A leukocyte surface molecule is used for cell identification and may also function in adhesion, signaling, or cytokine response. This molecule is best described as:
A) Complement factor B) CD antigen C) Free antibody D) Serum antigen

Protozoa

126. Which developmental stage of *Eimeria* is responsible for the formation of numerous daughter merozoites through endogenous nuclear division followed by cytokinesis?
A) Gamont B) Schizont C) Sporocyst D) Oocyst
127. The characteristic configuration of a sporulated *Eimeria* oocyst is:
A) 2 sporocysts × 4 sporozoites B) 1 sporocyst × 8 sporozoites
C) 4 sporocysts × 2 sporozoites D) 8 sporocysts × 1 sporozoite
128. Which feature best distinguishes the macrogamont stage of *Eimeria*?
A) Multinucleate basophilic cell producing biflagellated gametes
B) Uninucleate eosinophilic cell with a single ovoid nucleus
C) Membrane-bound cluster of merozoites
D) Stage containing four sporocysts

129. Which of the following clinical signs is most characteristic of infection with *Eimeria tenella* in young chickens?
- A) Bloody droppings (hemorrhagic diarrhea)
 - B) Respiratory distress and coughing
 - C) Nervous manifestations and paralysis
 - D) Enlargement of the liver without intestinal lesions
130. The sexual stages of *Eimeria necatrix* are mainly found in the:
- A) Crop B) Proventriculus C) Cecum D) Liver
131. Which *Babesia* species is considered more virulent in cattle?
- A) *Babesia bovis* B) *Babesia divergens* C) *Babesia major* D) *Babesia ovata*
132. The principal vector of *Babesia bigemina* and *Babesia bovis* is:
- A) Mosquitoes B) Tsetse flies C) Sand flies D) *Rhipicephalus (Boophilus)* ticks
133. A characteristic clinical feature that may occur in acute *Babesia bovis* infection but is minimal or absent in *Babesia bigemina* infection is:
- A) Hemoglobinuria B) Fever
 - C) Nervous signs due to sequestration of infected erythrocytes in cerebral capillaries
 - D) Anemia
134. In acute infections, parasitemia in circulating blood often exceeds 10% and may reach 30% in:
- A) *Babesia bigemina* B) *Babesia bovis* C) Both species equally D) Neither species
135. Which lesion is particularly associated with babesiosis, especially that caused by *Babesia bovis*?
- A) Atrophied spleen and pale kidneys
 - B) Fibrotic liver and contracted gallbladder
 - C) Enlarged lungs with emphysema
 - D) Enlarged friable spleen with congested dark-colored kidneys
136. Which statement best distinguishes *Theileria* from *Babesia* in mammalian hosts?
- A) *Theileria* infects only RBCs
 - B) *Babesia* infects WBCs before RBCs
 - C) *Theileria* successively infects WBCs and RBCs
 - D) Both parasites infect only leukocytes

137. Unlike babesiosis, the transmission of *Theileria* in ticks occurs mainly through:

- A) Trans-stadial transmission
- B) Transovarial transmission
- C) Mechanical transmission
- D) Vertical transmission

138. Following invasion of leukocytes by *Theileria* sporozoites, the next developmental stage formed is:

- A) Piroplasm
- B) Gametocyte
- C) Merozoite
- D) Schizont

139. Which of the following is considered the most striking postmortem lesion in severe theileriosis?

- A) Massive hemoglobinuria
- B) Severe hepatic cirrhosis
- C) Lymph node enlargement and pulmonary edema
- D) Renal calculi formation

140. Why is anemia not considered a major diagnostic sign in theileriosis?

- A) RBCs are not infected at all
- B) There is minimal multiplication of parasites in RBCs and limited erythrocyte destruction
- C) Destruction of RBCs is prevented by host immunity
- D) Parasites remain confined to lymph nodes

Mycoplasma

141. Mycoplasma genome has:

- A) High GC
- B) Low GC
- C) High uracil
- D) No nucleic acid

142. Mycoplasma differs from viruses by:

- A) RNA only
- B) DNA & RNA + growth in media
- C) Intracellular only
- D) No antibiotic effect

143. Which organism is considered the smallest prokaryotic organism that lacks a cell wall?

- A) Fungi
- B) Viruses
- C) Mycoplasma
- D) Cyanobacteria

144. Which species is responsible for upper and lower respiratory tract infections in humans?

- A) *M. pneumoniae*
- B) *M. bovis*
- C) *M. canis*
- D) *M. gallisepticum*

145. Which vitamins and coenzymes are often required by Mycoplasma for enzymatic reactions?

- A) Biotin, riboflavin, and thiamine B) Heavy metals
C) Antibiotics D) Cholesterol only

146. Which mineral do some Mycoplasma species acquire from host proteins because it is essential for cellular processes?

- A) Copper B) Zinc C) Iron D) Calcium

147. Most Mycoplasma species are considered (facultative anaerobes) which means:

- A) They live only without oxygen
B) They live only in the presence of oxygen
C) They can generate energy through both aerobic respiration and fermentation
D) They never utilize oxygen even when present

148. Which antibiotic is added to PPLO broth to inhibit contamination with fungi?

- A) Penicillin B) Ampicillin C) Amphotericin B D) Polymyxin B

149. Why is direct microscopic examination useless for diagnosing Mycoplasma?

- A) They move too fast B) They stain poorly because they lack a cell wall
C) They glow under normal light D) They are always intracellular

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