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DEPARTMENT: PRECLINICAL SCIENCES

DISCIPLINE: MICROBIOLOGY

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MICROBIOLOGY-QUESTION AND ANSWER VARIANTS

1. Viruses are characterized by the following with an exception:
   a. have subcellular structure;
   b. have own metabolism;
   c. don't have exchanges with the environment;
   d. don't produce energy;
   e. have a protein capsid.

2. Bacteria:
   a. are prokaryotic organisms;
   b. are unicellular organisms;
   c. have exchanges with the environment;
   d. have their own metabolism;
   e. all variants are correct.

3. Fungi:
   a. are eukaryotic organisms;
   b. possess membrane-bound cell organelles;
   c. can be yeasts;
   d. can be filamentous fungi;
   e. all variants are correct.

4. Select a drop or flame shaped bacterium:
   a. Neisseria gonorrhoeae;
   b. Streptococcus pneumoniae;
   c. Corynebacterium;
   d. Helicobacter pylori;
   e. Leptospira.

5. Select a comma shaped bacterium:
   a. Neisseria gonorrhoeae;
   b. Streptococcus pneumoniae;

c. Corynebacterium;
d. Vibrio cholerae;
e. Leptospira.

6. Select a rod shaped bacterium:
a. Neisseria gonorrhoeae;
b. Streptococcus pneumoniae;
c. Bacillus anthracis;
d. Vibrio cholerae;
e. Leptospira.

7. Select a spirochete:
a. Neisseria gonorrhoeae;
b. Streptococcus pneumoniae;
c. Corynebacterium;
d. Vibrio cholerae;
e. Leptospira.

8. Select a bacterium shaped as a coffee bean:
a. Neisseria gonorrhoeae;
b. Streptococcus pneumoniae;
c. Bacillus anthracis;
d. Vibrio cholerae;
e. Bacillus cereus.

9. Select the smallest classic bacterium:
a. Clostridium tetani;
b. Clostridium botulinum;
c. Pasteurella multocida;
d. Salmonella;
e. Clostridium septicum.

10. Select the largest pathogen bacterium:
a. Clostridium septicum;
b. Pasteurella multocida;
c. Salmonella;
d. Brucella;
e. Escherichia coli.

11. Arrangement of bacterial cells in irregular clusters (bunch of grapes) is :
a. staphylo;
b. strepto;
c. chains;
d. tetrads;
e. diplo.

12. The occurrence of different shapes, sizes among the members of a population or a colony is:

a. conjugation;
b. synergism;
c. polymorphism;
d. transduction;
e. all variants are incorrect.

13. Using Gram staining method, Gram positive bacteria appear:

a. red;
b. blue;
c. violet;
d. green;
e. yellow.

14. Select the correct statement about the cytoplasm of bacteria:

a. contains mitochondria;
b. contains endoplasmic reticulum;
c. contains peptidoglycans;
d. does not have cytoplasmic currents;
e. all variants are correct.

15. Select the correct statement about the cytoplasm of fungi:

a. it does not contain mitochondria;
b. it does not contain endoplasmic reticulum;
c. it contains peptidoglycans;
d. it contains cytoplasmic currents;
e. all variants are correct.

16. Select the correct statement about the cytoplasm of bacteria:

a. it contains mitochondria;
b. it does not have endoplasmic reticulum;
c. it contains peptidoglycans;
d. it has cytoplasmic currents;
e. all variants are correct.

17. Select the correct statement about the bacterial nucleoid:

a. most bacteria have one chromosome;
b. it has nuclear membrane;
c. it has one nucleolus;
d. it has a fixed position in the cytoplasm;
e. all variants are correct.

18. The plasmids that have an independent existence and temporarily can integrate into chromosome are:

a. episomes;
b. ergosomes;

c. mesosoms;
d. ribosomes;
e. inclusions.

19. The most plasmids are:
a. supercoiled, circular double- stranded DNA molecules;
b. uncoiled, circular double- stranded DNA molecules;
c. supercoiled, circular single- stranded DNA molecules;
d. supercoiled, circular double- stranded RNA molecules;
e. supercoiled, circular single- stranded RNA molecules.

20. Which component of the bacterium has role in protein synthesis?
a. episomes;
b. ergosomes;
c. mesosoms;
d. ribosomes;
e. inclusions.

21. Select the incorrect statement about organic inclusions:
a. can be made of carbohydrates;
b. can be made of starch;
c. can be made of glycogen;
d. can be made of poli β-hydroxybutirate;
e. can be made of polymetaphosphate.

22. Which is true regarding bacterial vacuoles?
a. are compulsory intracytoplasmatic structures;
b. are more common in old cells;
c. can contains gas;
d. they can contains poly-metaphosphate;
e. all variants are correct.

23. Select the correct statement about cytoplasmic membrane:
a. it is a compulsory structure of vegetative cell;
b. it is located between the cytoplasm and bacterial wall;
c. it contains phospholipids and proteins;
d. cell membrane of bacteria, doesn't contain sterols (with exception of Mycoplasma);
e. all variants are correct.

24. The roles of cytoplasmic membrane are:
a. selective biological filter;
b. in replication of bacteria;
c. in respiratory processes of bacteria;
d. the place of enzymatic system;
e. all variants are correct.

25. Select the correct statement about the bacterial wall:
    a. it is not a compulsory structure of vegetative cell;
    b. both Gram positive and Gram negative bacteria contain peptidoglycan;
    c. mycoplasmas don't have cell wall;
    d. L forms of bacteria don't have cell wall;
    e. all variants are correct.

26. Select the correct statement about the bacterial wall:
    a. the wall of Gram positive bacteria contains an outer membrane:
    b. the wall of Gram negative bacteria contains theichoic acid;
    c. polysaccharide O has role for phages receptor;
    d. periplasmic space is present in Gram positive bacteria;
    e. the wall is a compulsory structure of bacteria.

27. Which component of the bacterium has role of endotoxin?
    a. polysaccharide O;
    b. LPS complex (lipid A);
    c. periplasmic space;
    d. leyer of peptidoglycan;
    e. cell membrane.

28. Defective wall bacteria include the following except:
    a. S forms of bacteria;
    b. L forms of bacteria;
    c. protoplasts;
    d. spheroplasts;
    e. Mycoplasma.

29. Protoplasts are obtained by treatment of which type of bacteria with lysozyme or penicillin?
    a. Gram positive bacteria;
    b. Gram negative bacteria;
    c. L forms of bacteria;
    d. S forms of bacteria;
    e. R forms of bacteria.

30. Which bacterial species synthesize a true capsule?
    a. Klebsiella pneumoniae;
    b. Bacillus anthracis;
    c. Pasteurella multocida;
    d. Escherichia coli;
    e. Staphylococcus aureus.

31. Which bacterial species synthesize a microcapsule?
    a. Klebsiella pneumoniae;
    b. Bacillus anthracis;
    c. Pasteurella multocida;

d. Escherichia coli;
e. Staphylococcus aureus.

32. Which bacterial species synthesize a mucous capsule?
a. Klebsiella pneumoniae;
b. Bacillus anthracis;
c. Pasteurella multocida;
d. Escherichia coli;
e. Staphylococcus aureus.

33. Which bacterial species synthesize a true capsule?
a. Klebsiella pneumoniae;
b. Streptococcus pneumoniae;
c. Pasteurella multocida;
d. Escherichia coli;
e. Staphylococcus aureus.

34. The bacterial capsule has the following roles with one exception:
a. capsule is an important protective factor against desiccation;
b. capsule is an important protective factor against specific bacteriophages;
c. capsule is an important protective factor against chemical substances;
d. the capsular substance represents the H antigen of bacteria;
e. the capsule is involved in the adhesion of bacteria to supports.

35. Which bacterial species synthesize a polypeptide capsule?
a. Klebsiella pneumoniae;
b. Bacillus anthracis;
c. Pasteurella multocida;
d. Escherichia coli;
e. Staphylococcus aureus.

36. The capsule is an important virulence determinant because:
a. it protects encapsulated cells against desiccation;
b. it protects encapsulated cells against the phages;
c. it protects encapsulated cells against chemical substances;
d. it protects bacteria from immune mechanisms such as phagocytes, complement or lysozyme;
e. the capsule is H antigenof bacteria..

37. The most capsulogenic bacteria synthesize a polysaccharidic capsule with one exception:
a. Klebsiella pneumoniae;
b. Bacillus anthracis;
c. Pasteurella multocida;
d. Escherichia coli;
e. Streptococcus pneumoniae.

38. Capsular substance represents:
    a. the antigen K;
    b. the antigen H;
    c. the antigen O;
    d. the somatic antigen;
    e. the flagellar antigen.

39. The type of arrangement of flagella over the entire surface cell is named:
    a. atrichous;
    b. monotrichous;
    c. lophotrichous;
    d. amphitrichous;
    e. peritrichous.

40. The type of arrangement of multiple polar flagella is named:
    a. atrichous;
    b. monotrichous;
    c. lophotrichous;
    d. amphitrichous;
    e. peritrichous.

41. The type of arrangement of single polar flagellum is named:
    a. atrichous;
    b. monotrichous;
    c. lophotrichous;
    d. amphitrichous;
    e. peritrichous.

42. The type of arrangement of one flagellum to each end of cell is named:
    a. atrichous;
    b. monotrichous;
    c. lophotrichous;
    d. amphitrichous;
    e. peritrichous.

43. Select correct statement about the bacterial flagella:
    a. in Gram positive bacteria the blepharoplast (basal corpuscle) is made from 2 discs;
    b. in Gram negative bacteria the blepharoplast (basal corpuscle) is made from 4 discs;
    c. M disc is placed in cytoplasmic membrane;
    d. P disc is placed in peptidoglycan leyer;
    e. all variants are correct.

44. Which bacterial genus has a high fat content?
    a. Staphylococcus;
    b. Mycoplasma;
    c. Mycobacterium;

d. Salmonella;
e. Leptospira.

45. The water content of vegetative cell is:
a. 75-85%;
b. 2-30%;
c. 60%;
d.1- 20%;
e. all variants are incorrect.

46. Which bacterial genus contains sterols?
a. Staphylococcus;
b. Mycoplasma;
c. Mycobacterium;
d. Salmonella;
e. Leptospira.

47. Select the most common way for replication of bacteria:
a. binary fission;
b. asexual spores;
c. budding;
d. sexual spores;
e. macroconidia (megaspores).

48. The generation time of Escherichia coli is:
a. 20-30 minutes;
b. 20 hours;
c. 20 days;
d. 24 hours;
e. a week.

49. The bacteria that grow only in absence of oxygen, are included in following respiratory type:
a. anaerobic- strict anaerobic subtype;
b. anaerobic- microaerophilic subtype;
c. anaerobic- aerotolerant subtype;
d. anaerobic- capnophilic subtype;
e. aerobic- strict aerobic subtype.

50. The bacteria that grow only in the presence of atmospheric oxygen, are included in respiratory type:
a. anaerobic- strict anaerobic subtype;
b.anaerobic- microaerophilic subtype;
c. anaerobic- aerotolerant subtype;
d. anaerobic- capnophilic subtype;
e. aerobic- strict aerobic subtype.

51. The bacteria that require increased CO_2 concentration, are included in respiratory type:

a. anaerobic- strict anaerobic subtype;
b. anaerobic- microaerophilic subtype;
c. anaerobic- aerotolerant subtype;
d. anaerobic- capnophilic subtype;
e. aerobic- strict aerobic subtype.

52. The bacteria that grow best in the presence of low oxygen levels, are included in respiratory type:

a. anaerobic- strict anaerobic subtype;
b. anaerobic- microaerophilic subtype;
c. anaerobic- aerotolerant subtype;
d. anaerobic- capnophilic subtype;
e. aerobic- strict aerobic subtype.

53. In which phase of bacterial growth curve the activity of cells is the most intense?

a. phase of decline;
b. lag phase;
c stationary phase;
d. exponential phase;
e. phase of adaptation of bacteria to growth condition.

54. In which phase of bacterial growth curve the sensitivity of the cells is the greatest?

a. phase of decline;
b. lag phase;
c. stationary phase;
d. exponential phase;
e. phase of adaptation of bacteria to growth condition.

55. Which is the main reason for installing of the stationary phase?

a. depletion of nutrients;
b. the density of bacteria;
c. depletion of oxygen;
d. the accumulation of metabolic products;
e. none of these factors.

56. Which are the reasons of decrease of bacterial population in decline phase?

a. the death of cells;
b. depletion of nutrients;
c. accumulation of toxic products;
d. accumulation of autolytic enzymes;
e. all these factors.

57. What is incorrect statement about a bacterial spore?

a. it is thick walled;
b. it is a dormant form of bacteria;
c. it is resistant form;

d. it is a form of reproduction of bacteria;
e. it is an endospore.

58. Which are the triggering factors for sporulation?
a. depletion of nitrogen;
b. exposure to suboptimal temperatures;
c. high cells density;
d. depletion of carbon;
e. all these factors.

59. Select a sporogenic bacterial genus:
a. Staphylococcus;
b. Salmonella;
c. Clostridium;
d. Corynebacterium;
e. all answers are wrong.

60. Select a sporogenic bacterial genus:
a. Staphylococcus;
b. Salmonella;
c. Pasteurella;
d. Corynebacterium;
e. all answers are incorrect.

61. Which is the inner most layer of the spore shell?
a. DNA;
b. sporoplasma;
c. sporal membrane;
d. sporal wall;
e. sporal coats.

62. Which is the protein that translocates the rest of chromosome (70%) from mother cell in forespore?
a. DNA transportor protein;
b. DNA polymerase;
c. RNA polymerase;
d. keratin like protein;
e. protease.

63. Which is the incorrect statement about a bacterial spore?
a. the ratio of sporulation is 60 to70%;
b. the spore contains calcium dipicolinate;
c. keratin like protein protects the spore from chemicals;
d. DNA is into the sporal protoplast;
e. the sporal membrane contains many sulphur aminoacids with disulphide bonds.

64. What happens in the first phase of sporulation?
    a. cortex formation;
    b. spore septum formation;
    c. engulfment of forespore;
    d. chromosome replication;
    e. spore maturation.

65. What happens in the last phase of sporulation?
    a. cortex formation;
    b. spore septum formation;
    c. lysis of mother cell;
    d. the chromosome replicates;
    e. spore maturation.

66. Which factors participate in the resistance of spore?
    a. keratin like protein;
    b. calcium dipicolinate;
    c. low free water content;
    d. impermeability of spore coat;
    e. all these factors.

67. Which are the triggering factors for endospore activation?
    a. the presence of glucose in medium;
    b. heat shock;
    c. the presence of aminoacids in medium;
    d. mercaptoetanol exposure;
    e. all these factors.

68. Which is the first visible change of endospore in outgrowth phase?
    a. synthesis of RNA starts;
    b. synthesis of DNA starts;
    c. synthesis of proteins starts;
    d. hydration of the cell;
    e. multiplication of cell.

69. When is the germination finished?
    a. when synthesis of RNA starts;
    b. when synthesis of DNA starts;
    c. when synthesis of proteins starts;
    d. on hydration of the cell;
    e. when multiplication of the cell begins.

70. In which phase of germination morphological changes do not take place?
    a. endospore activation;
    b. germination;
    c. outgrowth;

d. in all these phases morphological changes take place;
e. in none of these phases morphological changes take place.

71. Which are the elements of the sporal shell from inside to outside?
a. sporal membrane, cortex, sporal coats;
b. cortex, sporal membrane, sporal coats;
c. sporal coats, sporal membrane, cortex;
d. sporal coats, cortex, sporal membrane;
e. sporal membrane, sporal coats, cortex.

72. Which statement is correct for the spore of Clostridium tetani?
a. the diameter of spore is smaller than vegetative cell and it is central located;
b. the diameter of spore is larger than vegetative cell and it is central located;
c. the diameter of spore is smaller than vegetative cell and it is subterminal located;
d. the diameter of spore is smaller than vegetative cell and it is terminal located;
e. the diameter of spore is larger than vegetative cell and it is terminal located.

73. Which statement is correct for the spore of Bacillus spp.?
a. the diameter of spore is smaller than vegetative cell and it has a central location;
b. the diameter of spore is larger than vegetative cell and it has a central location;
c. the diameter of spore is smaller than vegetative cell and it has a subterminal location;
d. the diameter of spore is smaller than vegetative cell and it has a terminal location;
e. the diameter of spore is larger than vegetative cell and it has a terminal location.

74. The resistance of spore is due to the following properties, with one exception. Which is the exception?
a. low free water contents;
b. impermeability of spore coat;
c. dipicolinic acid;
d. keratin-lile protein;
e. sodium ions.

75. The statements regarding the features of the spore of Bacillus anthracis are correct with one exception.
Which is the the exception?
a. the shape is oval or spherical;
b. the diameter of the spore is larger than vegetative cell;
c. it is central located
d. the cell is nonbulged;
e. the spore is a resistance form of bacteria.

76. The features and the processes which take place during the germination of activated spore are:
a. it is an irrevesible process:
b. removal of the cortex of spore;
c. the calcium dipicolinic acid is released;
d. the spore loss its refractility;

e. all of these processes.

77. The chemoheterotrophic bacteria use the following substances as energy and carbon source, with one
exception. Which is the exception?

a. carbohydrates;
b. lipids;
c. proteins;
d. CO_2;
e. organic compounds.

78. In which nutritional type are the bacteria of interest for vererinary medicine grouped?

a. photoheterotrophs;
b. chemoautotrophs;
c. photoautotrophs;
d. chemoheterotrophs;
e. photolithotrophs.

79. Bacteria who parasitize animals obtain their nutrients from?

a. tissues of living organisms;
b. dead organic decaying substances;
c. decaying milk;
d. decaying fruits;
e. decaying vegetables.

80. Bacteria which use inorganic substances to synthesize their organic compounds are grouped in which nutritional type?

a. heterotrophs;
b. phototrophs;
c. autotrophs;
d. chemotrophs;
e. organotrophs.

81. Bacteria which use preformed organic compunds for synthesize their
organic compunds are grouped in which nutritional type?

a. heterotrophs;
b. phototrophs;
c. autotrophs;
d. chemotrophs;
e. lithotrophs.

82. Bacteria which obtain the energy from chemical reactions are grouped in which nutritional type?

a. heterotrophs;
b. phototrophs;
c. autotrophs;
d. chemotrophs;

e. lithotrophs.

83. Bacteria that obtain the energy from sun light are grouped in which nutritional type?

a. heterotrophs;
b. phototrophs;
c. autotrophs;
d. chemotrophs;
e. lithotrophs.

84. Bacteria that live in close association with other organisms are called:

a. parasitic bacteria;
b. saprophytic bacteria;
c. pathogenic bacteria;
d. symbiotic bacteria;
e. all the responses are wrong.

85. The correct order of the discs of blefaroplast of Gram negative bacteria from the inside to outside is:

a. M, S, P, L.
b. S, P, L,M.
c. L, P, S, M.
d. P, L, M, S.
e. M, P, S, L.

86. The flagellin (flagellar protein) represents the bacterial antigen:

a. O;
b. K;
c. H;
d. capsular;
e. somatic.

87. The polysaccharides of the LPS complex from the structure of the Gram negative bacteria wall represents antigen:

a. O;
b. K;
c. H;
d. capsular;
e. flagellar.

88. The capsular substance of encapsulated bacteria represents the antigen:

a. O;
b. K;
c. H;
d. somatic;
e. flagellar.

89. Which statement about the chromogenic bacteria is incorrect?

a. the pigment can be located at the place of shynthesis;
b. the carotenoid pigments protect the bacteria from light radiations;
c. the pigment can diffuse in the environment;
d. piocianin is a carotenoid pigment;
e. the pigment can be located in the bacterial wall.

90. Which statement about the bacterial enzymes is incorrect?

a. the adaptive enzymes arise from gene mutations;
b. all bacterial enzymes form the enzymatic equipment of a bacterium;
c. the endoenzymes remain in the bacterial cell;
c. the exoenzymes are released in the environment;
d. the constitutive enzymes are permanently produced by bacterial cells;
e. the enzymes are proteins.

91. Which statement about the microorganisms is incorrect?

a. the bacteria are prokaryotic cells;
b. the viruses contains both nucleic acids (DNA and RNA);
c. the fungi are eukaryotic microorganisms;
d. the bacteria do not have mitochondria;
e. the fungi contains more chromosomes.

92. Select the correct statement about fungi:

a. the fungi do not contain cellulose;
b. the fungi have a real nucleus:
c. they have mitochondria;
d. their walls contain chitin;
e. all responses are correct.

93. Select the correct statement about the viruses:

a. the viruses do not have own metabolism;
b. the viruses contain only one nucleic acid (DNA or RNA);
c. the viruses are compulsory parasites;
d. the viruses do not themselves multiply;
e. all responses are correct.

94. Select the correct statement about the mesosomes:

a. they are the place of protein synthesis;
b they are found in groups of 50 during protein synthesis;
c. in genetic recombination, the exogenous genetic material enters into the cell at the level of mesosomes;
d. they are composed from rRNA and proteins;
e. they are integrative plasmides.

95. The metabolic active form of a bacterium is:

a. spore;

b. vegetative cell;
c. vegetative cell and spore;
d. sporangium;
e. all these forms.

96. Which bacterial structure is compulsory for a bacterial cell?
a. cell wall;
b. cell membrane;
c. plasmids;
d. mesosomes;
e. flagella.

97. Using Gram staining method, Gram negative bacteria appearr:
a. red;
b. blue;
c. violet;
d. green;
e. yellow.

98. The Ziehl-Neelson staining method is used for highlight the bacteria from genus:
a. Salmonella;
b. Staphylococcus;
c. Bacillus;
d. Mycobacterium;
e. Escherichia.

99. Which structure of bacteria determines the Gram status of a bacterium?
a. cell wall;
b. membrane;
c. capsule;
d. flagella;
e. spore.

100. Which is the correct sequence of shell layers of an encapsullated bacterium, from outside to inside?
a. cell membrane, wall, capsule;
b. wall, cell membrane, capsule;
c. capsule, wall, cell membrane;
d. capsule, cell membrane, wall;
e. cell membrane, capsule, wall.

BIBLIOGRAPHY

Mimi Dobrea, Course notes, PPT., 2016-2017 E-mail mimidobrea@yahoo.com

Carter G.R., M.Chengappa – Essentials Veterinary Bacteriology and Mycology Ed. Lea&Febiger London,1999.

Mimi Dobrea, V.C. Dobrea- General Microbiology, Ed. Printech, Bucharest, 2018.