

Chapter 2: Characteristics of Microorganisms

Test Bank

MULTIPLE CHOICE

1. Regular bacteria, excluding *Rickettsia* and *Chlamydia*, multiply:
- in the absence of nutrients.
 - only when they are inside of living cells.
 - when they are outside of living cells.
 - only when the temperature is below 7° C.

ANS: C

	Feedback
A	Nothing can grow in the absence of nutrients.
B	<i>Rickettsia</i> and <i>Chlamydia</i> are the only bacteria that can grow inside living cells.
C	Regular bacteria do not need to be inside living cells to grow. They can obtain their nutrients from the environment.
D	Only the special bacteria called psychrophiles can grow at these low temperatures.

REF: Culturing Bacteria, page 13 OBJ: 2

2. Viruses multiply:
- in the absence of nutrients.
 - only when they are inside of living cells.
 - when they are outside of living cells.
 - only when the temperature is below 7° C.

ANS: B

	Feedback
A	Nothing can grow in the absence of nutrients.
B	Viruses need the nutrients and metabolic machinery of living cells to multiply.
C	Viruses cannot obtain their nutrients from the environment.
D	Only the special bacteria called psychrophiles can grow at these low temperatures.

REF: Life Cycle, page 15 OBJ: 5

3. Which of the following microbes is a yeast?
- Streptococcus mutans*
 - Trichomonas vaginalis*
 - Candida albicans*
 - Staphylococcus aureus*

ANS: C

	Feedback
A	This is a bacterium.

B	This is a protozoan.
C	<i>Candida albicans</i> can exist as a yeast, which is a special fungus.
D	This is a bacterium.

REF: Fungi, page 16

OBJ: 6

4. Which of the following microbes is a type of fungus?
- A. Influenzae
 - B. *Candida albicans*
 - C. *Trichomonas vaginalis*
 - D. *Streptococcus mutans*

ANS: B

	Feedback
A	This is a virus.
B	<i>Candida albicans</i> can exist as a yeast or filamentous fungus.
C	This is a protozoan.
D	This is a bacterium.

REF: Fungi, page 16

OBJ: 6

5. A yeast is what type of microorganism?
- A. Bacterium
 - B. Fungus
 - C. Virus
 - D. Protozoan

ANS: B

	Feedback
A	Bacteria cannot form yeast.
B	A yeast is a special type of fungus.
C	A virus cannot form yeasts.
D	Protozoa cannot form yeasts.

REF: Fungi, page 16

OBJ: 6

6. Thrush is caused by:
- A. *Candida albicans*.
 - B. *Streptococcus mutans*.
 - C. *Staphylococcus aureus*.
 - D. human herpesvirus 1.

ANS: A

	Feedback
A	Oral candidiasis (e.g., thrush or denture stomatitis) is caused by the fungus <i>Candida albicans</i> , which may exist as a yeast cell or as a filamentous fungus (mold).
B	Oral candidiasis (e.g., thrush or denture stomatitis) is caused by the fungus

	<i>Candida albicans</i> , which may exist as a yeast cell or as a filamentous fungus (mold).
C	Oral candidiasis (e.g., thrush or denture stomatitis) is caused by the fungus <i>Candida albicans</i> , which may exist as a yeast cell or as a filamentous fungus (mold).
D	Oral candidiasis (e.g., thrush or denture stomatitis) is caused by the fungus <i>Candida albicans</i> , which may exist as a yeast cell or as a filamentous fungus (mold).

REF: Fungi, page 16

OBJ: 6

7. Bacilli are shaped like:
- spheres.
 - cylinders or rods.
 - curved or spiral forms.
 - flat disks.

ANS: B

	Feedback
A	Spheres are not bacilli.
B	Bacilli are bacterial cells shaped like rods or cylinders.
C	Spirilla are curved or spiral forms.
D	There are no microbes shaped like a flat disk.

REF: Size and Shape, page 8

OBJ: 1

8. Cocci are shaped like:
- spheres.
 - cylinders or rods.
 - curved or spiral forms.
 - flat disks.

ANS: A

	Feedback
A	Spherical cells are called cocci.
B	Rod-shaped cells are called bacilli.
C	Curved or spiral cells are called spirilla.
D	This is not a shape associated with bacteria.

REF: Size and Shape, page 8

OBJ: 1

9. Which of the following bacterial structures controls the flow of nutrients and waste into and out of the cell?
- Cell wall
 - Flagellum
 - Cytoplasmic membrane
 - Capsule

ANS: C

	Feedback
A	The cell wall protects the cell from being crushed.
B	The flagellum provides locomotion.
C	One of the functions of the cytoplasmic membrane is to regulate the entrance and exit of nutrient materials and waste products.
D	The capsule keeps the cell from drying out and is antiphagocytic.

REF: Cytoplasmic Membrane, page 8 OBJ: 1

10. Which of the following bacterial structures interferes with phagocytosis?
- Cell wall
 - Flagellum
 - Cytoplasmic membrane
 - Capsule

ANS: D

	Feedback
A	The cell wall protects the cell from being crushed.
B	The flagellum provides locomotion.
C	One of the functions of the cytoplasmic membrane is to regulate the entrance and exit of nutrient materials and waste products.
D	The capsule's "slimy" nature interferes with phagocytosis.

REF: Capsule, page 10 OBJ: 1

11. Which of the following bacterial structures helps the cell to attach to surfaces?
- Cell wall
 - Capsule
 - Cytoplasmic membrane
 - Fimbriae

ANS: D

	Feedback
A	The cell wall protects cell from being crushed.
B	The capsule keeps the cell from drying out and is antiphagocytic.
C	One of the functions of the cytoplasmic membrane is to regulate the entrance and exit of nutrient materials and waste products.
D	Fimbriae serve as a mechanism by which cells can attach to other cells or other environmental surfaces.

REF: Fimbriae and Pili, page 10 OBJ: 1

12. The main function of the bacterial cell wall is to:
- protect against drying.
 - protect against crushing.
 - to control the exit of wastes from the cell.
 - provide the cell with locomotion.

ANS: B

	Feedback
A	This is a function of the capsule.
B	The basic components of the cell wall (peptidoglycan) protect the cell from being crushed.
C	This is a function of the cytoplasmic membrane.
D	This is a function of the flagellum.

REF: Cell Wall, page 9

OBJ: 1

13. The main function of bacterial fimbriae is to:
- A. control the exit of wastes from the cell.
 - B. protect against crushing.
 - C. allow the cell to attach to surfaces.
 - D. protect against drying.

ANS: C

	Feedback
A	This is a function of the cytoplasmic membrane.
B	This is a function of the cell wall.
C	Fimbriae serve as a mechanism by which cells can attach to other cells or other environmental surfaces.
D	This is a function of the capsule.

REF: Fimbriae and Pili, page 10

OBJ: 1

14. Psychrophilic bacteria grow best under which of the following conditions?
- A. In the human body
 - B. In hot water heaters
 - C. Anywhere the temperature is 37° C
 - D. In the refrigerator

ANS: D

	Feedback
A	The human body is too warm for the growth of psychrophiles.
B	Hot water is too warm for the growth of psychrophiles.
C	This temperature is too warm for the growth of psychrophiles.
D	The optimal temperature for psychrophiles to grow is 7° C, typical refrigerator temperature.

REF: Temperature, page 11

OBJ: 2

15. Which of the following groups of bacteria grow best inside your refrigerator?
- A. Psychrophiles
 - B. Thermophiles
 - C. Mesophiles
 - D. Acidophils

ANS: A

	Feedback
A	Psychrophiles are “cold-loving” and optimal growth is refrigerator temperature.
B	Thermophiles love high temperatures.
C	Mesophiles love medium (e.g., body) temperatures.
D	Acidophils produce acids and are unrelated to temperature.

REF: Temperature, page 11

OBJ: 2

16. Obligate anaerobes grow best in the _____ of oxygen.
- A. presence of large amounts
 - B. presence of medium amounts
 - C. presence of small amounts
 - D. absence

ANS: D

	Feedback
A	Any amount of oxygen can limit the growth of anaerobes.
B	Any amount of oxygen can limit the growth of anaerobes.
C	Any amount of oxygen can limit the growth of anaerobes.
D	Anaerobes cannot tolerate oxygen and only grow in its absence.

REF: Oxygen Metabolism, page 12

OBJ: 2

17. Those bacteria that die in the presence of oxygen are called:
- A. aerobes.
 - B. mesophiles.
 - C. acidogens.
 - D. anaerobes.

ANS: D

	Feedback
A	Aerobes need oxygen for growth.
B	Mesophiles grow at medium temperatures and most are aerobes.
C	Acidogens produce acids during growth and some are aerobes and some anaerobes.
D	Anaerobes cannot tolerate oxygen.

REF: Oxygen Metabolism, page 12

OBJ: 2

18. Acidogenic bacteria are noted for producing large amounts of:
- A. acids.
 - B. vitamins.
 - C. proteins.
 - D. carbohydrates.

ANS: A

	Feedback
A	Acidogenic bacteria produce large amounts of acid.
B	Vitamins may also be produced but do not relate to being acidogenic.
C	Proteins are also produced but do not relate to being acidogenic.
D	Carbohydrates are also produced but do not relate to being acidogenic.

REF: Acidity, page 12

OBJ: 4

19. Probably the surest way to kill bacteria (or any other type of microorganisms) in the shortest amount of time is to expose them to _____ temperatures.
- sterilizing
 - freezing
 - fluctuating
 - refrigerator

ANS: A

	Feedback
A	Probably the surest way to kill bacteria (or any other type of microorganisms) in the shortest amount of time is to expose them to high temperatures, such as those achieved in a steam, dry heat, or unsaturated chemical vapor sterilizer.
B	Freezing will not kill all microbes.
C	Fluctuating temperatures cannot be relied upon to kill all microbes.
D	Refrigeration will not kill all microbes.

REF: Killing Bacteria, page 15

OBJ: 3

20. Anaerobes are bacteria that:
- require oxygen for growth.
 - grow only in the absence of oxygen.
 - can multiply in the presence or absence of oxygen.
 - are killed in the presence or absence of oxygen.

ANS: B

	Feedback
A	Aerobes require oxygen for growth.
B	Anaerobes cannot tolerate oxygen and only grow in its absence.
C	Facultative anaerobes grow in the presence or absence of oxygen.
D	Anaerobes cannot tolerate oxygen but grow in its absence.

REF: Oxygen Metabolism, page 12

OBJ: 2

21. Agar is a polysaccharide from seaweed that is used to:
- kill bacteria.
 - grow viruses.
 - kill viruses.
 - culture bacteria.

ANS: D

	Feedback
A	Agar is not lethal to bacteria.
B	Viruses require living cells to grow.
C	Agar will not kill viruses.
D	Agar can provide a semisolid surface on which bacteria can grow if adequate nutrients are available.

REF: Culturing Bacteria, page 12 OBJ: 3

22. A bacterium that survives at low pH is called:
- A. acidic.
 - B. anaerobic.
 - C. aciduric.
 - D. acidogenic.

ANS: C

	Feedback
A	Acidic is property of an acid.
B	Anaerobic refers to bacteria that grow in the absence of oxygen.
C	Aciduric bacteria can survive in an acidic environment (usually below pH 5.5).
D	Acidogenic refers to bacteria that produce acids.

REF: Acidity, page 12 OBJ: 4

23. Which type of microbe is the most difficult to kill?
- A. Endospores
 - B. Vegetative bacteria
 - C. Viruses
 - D. Chlamydiae

ANS: A

	Feedback
A	An endospore is one of the most resistant forms of life against heat, drying, and chemicals due to its thickened cell wall, dense cytoplasm, and dormant state.
B	Vegetative bacteria can be killed by exposing it to high heat or chemicals.
C	Viruses can be killed when outside the body by exposure to high heat or chemicals.
D	Chlamydiae are a type of bacterium that can be killed by exposure to high heat or chemicals.

REF: Endospores, page 10 OBJ: 1

24. Which of the following are special cells that form during adverse conditions and are highly resistant to killing by heat and chemicals?
- A. Aerobes
 - B. Endospores
 - C. Viruses
 - D. Psychrophiles

ANS: B

	Feedback
A	Aerobes are not formed during adverse conditions.
B	An endospore is one of the most resistant forms of life against heat, drying, and chemicals due to its thickened cell wall, dense cytoplasm, and dormant state.
C	Viruses are not cells and are not resistant to heat.
D	Psychrophiles are resistant to cold, not heat.

REF: Endospores, page 10

OBJ: 2

25. Which of the following bacteria can change into special forms that are dormant and are highly resistant to heat, chemicals, and drying?
- A. *Rickettsia*
 - B. Endospores
 - C. Mold
 - D. Vegetative cells

ANS: B

	Feedback
A	<i>Rickettsia</i> are not resistant to heat.
B	An endospore is one of the most resistant forms of life against heat, drying, and chemicals due to its thickened cell wall, dense cytoplasm, and dormant state.
C	Molds are not bacteria; they are fungi.
D	Vegetative cells are bacteria that can grow (multiply) and are not dormant.

REF: Endospores, page 10

OBJ: 2

26. *Chlamydia* and *Rickettsia* are examples of:
- A. viruses.
 - B. fungi.
 - C. bacteria.
 - D. protozoa.

ANS: C

	Feedback
A	Viruses are not bacteria.
B	Fungi are not bacteria.
C	<i>Chlamydia</i> and <i>Rickettsia</i> are special bacteria called obligate intracellular parasites, which multiply only inside living cells.
D	Protozoa are not bacteria.

REF: Culturing Bacteria, page 13

OBJ: 2

27. Which of the following microbes cannot be killed with antibiotics?
- A. *Streptococcus mutans*
 - B. *Staphylococcus aureus*
 - C. Human herpes virus type 1
 - D. *Mycobacterium tuberculosis*

ANS: C

	Feedback
A	<i>Streptococcus mutans</i> can be killed with certain antibiotics.
B	<i>Staphylococcus aureus</i> can be killed with certain antibiotics.
C	Antibiotics are not effective against viruses, such as human herpes virus type 1.
D	<i>Mycobacterium tuberculosis</i> can be killed with certain antibiotics.

REF: Persistent Infection, page 16 OBJ: 5

28. Before a virus multiplies inside of our body cells, what must it do?
- A. Uncoat (shed its capsid).
 - B. Assemble the capsid and nucleic acid to make a whole virus.
 - C. Adsorb (attach) to the host cell.
 - D. Kill the host cell.

ANS: C

	Feedback
A	Uncoating is the third step in the virus life cycle.
B	Assembling is the fifth step in the virus life cycle.
C	The first step in the virus life cycle is to adsorb (attach) to the host cell.
D	Host cell death happens at the end of the virus life cycle.

REF: Life Cycle of a Virus, Table 2-3, page 16 OBJ: 5

29. Which of the following diseases is a bacterial disease?
- A. Influenza
 - B. Hepatitis B
 - C. Mumps
 - D. Dental caries

ANS: D

	Feedback
A	Influenza is a viral disease.
B	Hepatitis B is a viral disease.
C	Mumps is a viral disease.
D	Dental caries are caused by bacteria.

REF: Enzymes, page 14 OBJ: 4

30. What is the result of a virus invading a host cell?
- A. There is no effect on the cell.
 - B. The virus always dies.
 - C. The host cell always dies.
 - D. The host cell may die or be damaged.

ANS: D

	Feedback
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A	If a virus invades a cell, there is always some effect.
B	The virus may survive and kill or damage the cell.
C	Sometimes the host cell survives with minor damage or permanent changes.
D	Depending upon the virus, the cell may be killed or it may survive with minor damage.

REF: Host Cell Transformation, page 16 OBJ: 5

31. Viruses cause diseases in humans because they:
- A. produce exotoxins.
 - B. produce endotoxins.
 - C. invade and kill or damage cells in our body.
 - D. “swim” away from phagocytes using their flagella.

ANS: C

	Feedback
A	Exotoxins are involved in some bacterial or fungal diseases.
B	Endotoxins are involved in some bacterial diseases.
C	Viruses cause disease by entering and multiplying in our body cells and killing or changing them.
D	Viruses do not have flagella.

REF: Controlling Virus Replication, page 16

OBJ: 4

32. During the life cycle of a virus, what is the next step after the virus attaches to the host cell?
- A. Uncoating
 - B. Release
 - C. Replication
 - D. Enters the cell

ANS: D

	Feedback
A	Uncoating is the third step in the life cycle of a virus.
B	Release is the sixth and final step in the life cycle of a virus.
C	Replication is the fourth step in the life cycle of a virus.
D	In the second step of the life cycle of a virus (penetration), the virus enters the host cell.

REF: Life Cycle of a Virus, Table 2-3, page 16

OBJ: 5

33. The genes of a virus are in the:
- A. capsid.
 - B. nucleic acid core.
 - C. envelope.
 - D. capsid and envelope.

ANS: B

	Feedback
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A	The capsid is the protein coating of virus that protects the nucleic acid core and determines the shape of the virus.
B	The DNA or RNA genes of a virus are contained in the nucleic acid core.
C	The envelope is the outer lipid-rich layer found in some viruses that is derived from the host cell membrane on release of the virus from the host cell.
D	The capsid and envelope refer to the outer protein coating (capsid) and the outer lipid-rich layer found in some viruses (envelope).

REF: Structure, page 15

OBJ: 1

34. _____ acid is the final product from the bacterial fermentation of sugar (e.g., glucose).
- A. Nucleic
 - B. Lactic
 - C. Hydrochloric
 - D. Pyruvic acid

ANS: B

	Feedback
A	Nucleic acid is DNA or RNA, neither of which are direct products of fermentation.
B	Lactic acid is the final product.
C	Hydrochloric acid is stomach acid.
D	Pyruvic acid is the second to the last fermentation product.

REF: Fermentation, page 14

OBJ: 4

35. Which of the following substances is a component of some bacterial outer membranes and, when released in the human body, contributes to the causes of periodontal disease?
- A. Lysozyme
 - B. Mesosome
 - C. Capsid
 - D. Endotoxin

ANS: D

	Feedback
A	Lysozyme is an enzyme in saliva produced by the human body.
B	Mesosomes are part of the bacterial structure but are not directly involved in periodontal diseases.
C	The capsid is the protein coat of viruses.
D	The action of endotoxin is thought to play a role in many infectious diseases, including periodontal diseases.

REF: Outer Membrane, page 10

OBJ: 1

36. Agents that prevent bacterial growth without killing them are referred to as _____ agents.
- A. bacteriostatic
 - B. sterilant
 - C. disinfectant

D. nucleic acid

ANS: A

	Feedback
A	These agents prevent or slow down bacterial growth, which resumes when, and if, the agents are removed or degraded.
B	These kill bacteria.
C	These kill bacteria.
D	These do not directly affect the growth of bacteria.

REF: Preventing Growth, page 14 OBJ: 2

37. Colony-forming units (CFUs) are defined as:
- A. measurements of the diameter of colonies that develop on an agar medium.
 - B. individual bacterial cells or a small group of cells, each of which can form a colony on agar media.
 - C. units used to estimate the distance a bacterial cell can move away from its colony on agar media.
 - D. highly resistant forms of certain bacteria.

ANS: B

	Feedback
A	Colony diameter is measured in millimeters.
B	One or a small number of bacterial cells deposited on an appropriate agar medium will develop into a single colony (clone) of cells, referred to as a colony-forming unit.
C	This distance is seldom measured but is expressed in millimeters.
D	Highly resistant forms of bacteria are referred to as endospores.

REF: Culturing Bacteria, page 13 OBJ: 3

38. How are bacterial spores important in dental infection control?
- A. They cause periodontal disease.
 - B. They are used to monitor surface disinfection.
 - C. They are used to test the functioning and use of sterilizers.
 - D. They cause thrush.

ANS: C

	Feedback
A	Periodontal diseases are caused by non-spore-forming bacteria.
B	There is not an easy test for surface disinfection.
C	Because bacterial spores are highly resistant to heat, they are used to monitor heat sterilization in steam, dry heat, and other sterilizers.
D	Thrush is caused by a yeast.

REF: Endospores, page 10 OBJ: 1

39. Which of the following bacteria are important in metabolizing sugar to acids that cause dental caries?
- Geobacillus stearothermophilus*
 - Bacillus atrophaeus*
 - Clostridium sporogenes*
 - Streptococcus mutans*

ANS: D

	Feedback
A	This bacterium is a spore-former used to monitor steam sterilizers.
B	This bacterium is a spore-former used to monitor dry heat sterilizers.
C	This bacterium is a spore-former that is used to test the effectiveness of liquid sterilants.
D	This bacterium forms plaque and metabolizes dietary sugar to acids causing demineralization of tooth enamel.

REF: Fermentation, page 14

OBJ: 4

40. Which of the following represents the pH values of acid?
- 0 to 7
 - 7 to 14
 - 8 to 10
 - 10 to 12

ANS: A

	Feedback
A	Acids have a pH from 0 to 7.
B	These values are alkaline.
C	These values are alkaline.
D	These values are alkaline.

REF: Acidity, page 12

OBJ: 4

COMPLETION

1. For growth, all bacteria need the proper nutrients, temperature, pH, atmosphere, and _____.

ANS: water

REF: Growth Requirements, page 11

OBJ: 3

TRUE/FALSE

1. Bacteria are larger than viruses.

ANS: T

Bacteria average about 1.0 μm in diameter, and human viruses are smaller than bacteria, ranging from 0.02 to 0.3 μm .

REF: Structure, page 15

OBJ: 1

2. Bacterial growth is defined as an increase in cell numbers.

ANS: T

When bacteria grow, they double their numbers with each generation.

REF: Growth and Control, page 10

OBJ: 2

3. Human viruses are smaller than bacteria.

ANS: T

Bacteria average 1.0 μm in diameter. Human viruses are smaller than bacteria, ranging from 0.02 to 0.3 μm .

REF: Structure, page 15

OBJ: 1

4. If bacteria grow in a broth culture, the broth remains clear.

ANS: F

If bacteria grow in broth culture, the broth becomes turbid (cloudy).

REF: Culturing Bacteria, page 13

OBJ: 3

5. Unlike bacterial diseases, most viral diseases cannot be successfully treated.

ANS: T

Because viruses use the metabolic machinery of the host cell to replicate, chemicals such as antibiotics used against bacteria may damage the host cells and cannot be used to treat viral diseases.

REF: Controlling Virus Replication, page 16

OBJ: 5