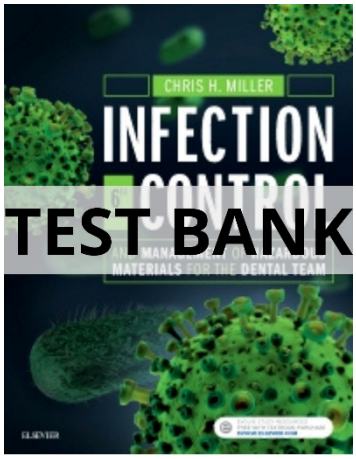
Chapter 01: Scope of Microbiology and Infection Control
Miller: Infection Control and Management of Hazardous Materials for the Dental Team, 6th Edition



MULTIPLE CHOICE

1. Who is reported to have first observed microbes?
   a. Pasteur
   b. Oliver Wendell Holmes
   c. Lister
   d. Leeuwenhoek

   ANS: D
   Pasteur, Oliver Wendell Holmes, and Lister made other important contributions to microbiology. Leeumenhoek first observed microbes and called them "animalcules."

   PTS: 1 DIF: Recall REF: p. 2 OBJ: 2
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

2. What year were microbes first observed?
   a. 1667
   b. 1880
   c. 1956
   d. 1975

   ANS: A
   Leeuwenhoek first observed microbes and called them "animalcules" in 1667, 1880, 1956, and 1975 are all too recent.

   PTS: 1 DIF: Recall REF: p. 2 OBJ: 2
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

3. Choose the microbial killing method referred to as pasteurization.
   a. 121°C for 20 minutes
   b. 212°F for 5 minutes
   c. 63°C for 30 minutes
   d. 37°C for 10 minutes

   ANS: C
   121°C for 20 minutes achieves sterilization. 212°F for 5 minutes is the temperature of boiling water. 63°C for 30 minutes achieves pasteurization which kills harmful microbes in liquids such as milk. 37°C for 10 minutes is body temperature.

   PTS: 1 DIF: Application REF: p. 2 OBJ: 2
   TOP: CDA, Infection Control, II.D. Demonstrate an understanding of asepsis procedures

4. When was the "Golden Age of Microbiology"?
   a. Mid to late 1600s

b. Mid to late 1700s
c. Mid to late 1800s
d. Mid to late 1900s

ANS: C
Mid to late 1600s and mid to late 1700s were too early. Mid to late 1800s was the time when many new discoveries in microbiology were made. Mid to late 1900s was too late.

PTS: 1 DIF: Recall REF: p. 2 OBJ: 2
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

5. What microbes are used to make vinegar, vitamins, drain cleaners, enzymes, and other products?
a. Fungi
b. Viruses
c. Protozoa
d. Bacteria

ANS: D
Fungi can make antibiotics but not these products. Viruses grow inside living cells and do not make such products. Protozoa are not very efficient in making such products. Bacteria make these and others products when they are grown in large vats.

PTS: 1 DIF: Recall REF: p. 3 OBJ: 3
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

6. Which microbes are used to make pickles out of cucumbers?
a. Bacteria or fungi
b. Fungi or viruses
c. Viruses or yeasts
d. Bacteria of viruses

ANS: A
Bacteria or fungi make certain extracellular products that change cucumbers into pickles. Viruses do not produce products that affect cucumbers.

PTS: 1 DIF: Recall REF: p. 3 OBJ: 3
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

7. What microbe is used to make bread dough rise?
a. Bacteria
b. Yeasts
c. Viruses
d. Protozoa

ANS: B
Bacteria do not produce enough carbon dioxide (CO_2) to make the dough rise. Yeasts metabolize carbohydrates to produce the gas bubbles of CO_2 which causes the dough to rise. Viruses only grow inside of living cells and do not have a regular metabolism. Protozoa do not produce enough carbon dioxide (CO_2) to make the dough rise.

PTS: 1 DIF: Recall REF: p. 3 OBJ: 3
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

COMPLETION

1. Louie Pasteur and John Tyndall first recognized the use of _____ to destroy bacteria and resistant spores.

   ANS: heat

   PTS: 1 DIF: Recall REF: p. 2 OBJ: 2
   TOP: CDA, Infection Control, II.D. Demonstrate an understanding of asepsis procedures

2. In 1915 it was discovered that bacteria can be infected with viruses called _____.

   ANS: bacteriophage

   PTS: 1 DIF: Recall REF: p. 3 OBJ: 1
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

TRUE/FALSE

1. The disease of smallpox was involved in the discovery of immunizations in the 1790s by Edward Jenner.

   ANS: T
   Edward Jenner is credited with recognizing the concept of immunization when he realized in the 1790s that milkmaids who caught cowpox, a mild disease, were protected from the more serious disease of smallpox.

   PTS: 1 DIF: Recall REF: p. 3 OBJ: 2
   TOP: CDA, Infection Control, I.C. Demonstrate an understanding of the need for immunization against infectious diseases (e.g., hepatitis B)

Chapter 02: Characteristics of Microorganisms
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MULTIPLE CHOICE

1. Under what conditions do regular bacteria, excluding *Richettsia* and *Chlamydia*, multiply:
   a. in the absence of nutrients.
   b. only when they are inside of living cells.
   c. when they are outside of living cells.
   d. only when the temperature is below 7°C.

   ANS: C

Nothing can grow in the absence of nutrients. *Rickettsia* and *Chlamydia* are the only bacteria that can grow inside living cells. Regular bacteria do not need to be inside living cells to grow. They can obtain their nutrients from the environment. Only the special bacteria called psychrophiles can grow at these low temperatures.

PTS: 1 DIF: Application REF: p. 12 OBJ: 1
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

2. Select an environment in which viruses can multiply.
   a. Only in the absence of nutrients
   b. Only when they are inside of living cells
   c. Only when they are outside of living cells
   d. Only when the temperature is below 7°C

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

   PTS: 1 DIF: Application REF: p. 14 OBJ: 2
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

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

   ANS: C
   Streptococcus mutans is a bacterium. *Trichomonas vaginalis* is a protozoan. *Candida albicans* can exist as a yeast which is a special fungus. *Staphylococcus aureus* is a bacterium.

   PTS: 1 DIF: Recall REF: p. 15 OBJ: 3
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

4. Which of the following microbes is a type of fungus?
   a. Influenzae
   b. *Candida albicans*
   c. *Trichomonas vaginalis*
   d. *Streptococcus mutans*

   ANS: B
   Influenzae is a virus. *Candida albicans* can exist as a yeast or filamentous fungus. *Trichomonas vaginalis* is a protozoan. *Streptococcus mutans* is a bacterium.

   PTS: 1 DIF: Recall REF: p. 15 OBJ: 3
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

5. A yeast is what type of microorganism?
   a. Bacterium
   b. Fungus
   c. Virus
   d. Protozoan

   ANS: B
   Bacteria cannot form yeast. A yeast is a special type of fungus. Viruses and protozoa cannot form yeasts.

   PTS: 1 DIF: Recall REF: p. 15 OBJ: 3
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

6. Thrush is caused by:
   a. *Candida albicans.*
   b. *Streptococcus mutans.*
   c. *Staphylococcus aureus.*
   d. human herpesvirus 1.

   ANS: A
   Candida albicans causes thrush (e.g., oral candidiasis or denture stomatitis) and is a fungus that may exist as a yeast cell or as a filamentous fungus (mold). *Streptococcus mutans, Staphylococcus aureus*, and human herpesvirus 1 do not cause thrush.

   PTS: 1 DIF: Recall REF: p. 15 OBJ: 3
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

7. Bacilli are shaped like:
   a. spheres.
   b. cylinders or rods.
   c. curved or spiral forms.
   d. flat disks.

   ANS: B
   Spheres are not bacilli. Bacilli are bacterial cells shaped like a rod or cylinder. Spirilla are curved or spiral forms. There are no microbes shaped like a flat disk.

   PTS: 1 DIF: Recall REF: p. 7 | Figure 2.2
   OBJ: 1
   TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

8. Cocci are shaped like _____.
   a. spheres
   b. cyclinders or rods
   c. curved or spiral forms
   d. flat disks

   ANS: A
   Spherical cells are called cocci. Rod-shaped cells are called bacilli. Curved or spiral cells are called spirilla. This is not a shape associated with bacteria.

PTS: 1 DIF: Recall REF: p. 7 | Figure 2.2
OBJ: 1
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

9. Choose the bacterial structure that controls the flow of nutrients and waste into and out of the cell?
   a. Cell wall
   b. Flagellum
   c. Cytoplasmic membrane
   d. Capsule

   ANS: C
   The cell wall protects the cell from being crushed. The flagellum provides locomotion. The cytoplasmic membrane has a function to regulate the entrance and exit of nutrient materials and waste products. The capsule keeps the cell from drying out and is antiphygocytic.

   PTS: 1 DIF: Recall REF: p. 8 OBJ: 1
   TOP: CDA, Does not apply

10. Which of the following bacterial structures interferes with phagocytosis?
    a. Cell wall
    b. Flagellum
    c. Cytoplasmic membrane
    d. Capsule

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

    PTS: 1 DIF: Recall REF: p. 9 OBJ: 1
    TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

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

    ANS: D
    The cell wall protects the cell from being crushed. The capsule keeps the cell from drying out and is antiphygocytic. One of the functions of the cytoplasmic membrane is to regulate the entrance and exit of nutrient materials and waste products. Fimbriae serve as mechanisms by which cells can attach to other cells or other environmental surfaces.

    PTS: 1 DIF: Recall REF: p. 9 OBJ: 1
    TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

12. The main function of the bacterial cell wall is to:
    a. protect against drying.

b. protect against crushing.
c. to control the exit of wastes from the cell.
d. provide the cell with locomotion.

ANS: B
Protect against drying is a function of the capsule. The basic components of the cell wall (peptidoglycan) protect the cell from being crushed. Controlling the flow of nutrients and waste is a function of the cytoplasmic membrane. Providing the cell with locomotion is a function of the flagellum.

PTS: 1 DIF: Recall REF: p. 9 OBJ: 1
TOP: CDA, Does not apply

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
Controlling the exit of wastes from the cell is a function of the cytoplasmic membrane. Protection against crushing is a function of the cell wall. Fimbriae serve as mechanisms by which cells can attach to other cells or other environmental surfaces. Protection against drying is a function of the capsule.

PTS: 1 DIF: Recall REF: p. 9 OBJ: 1
TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

14. Choose an environment in which psychrophilic bacteria grow best.
a. In the human body
b. In hot water heaters
c. Anywhere the temperature is 37°C
d. In the refrigerator

ANS: D
The human body, hot water, and 37°C are all too warm for the growth of psychrophiles. The refrigerator at 7°C provides the optimal grow temperature for psychrophiles.

PTS: 1 DIF: Application REF: p. 10 OBJ: 1
TOP: CDA, Does not apply

15. Which of the following groups of bacteria grow best inside your refrigerator?
a. Psychrophiles
b. Thermophils
c. Mesophils
d. Acidophils

ANS: A
Psychrophiles are “cold-loving” and optimal growth is refrigerator temperature. Thermophils love high temperatures. Mesophils love medium (e.g., body) temperatures. Acidophils produce acids and are unrelated to temperature.

PTS: 1 DIF: Recall REF: p. 10 OBJ: 1
TOP: CDA, Does not apply

16. How would prevent the growth of an obligate anaerobe?
    a. Adjust the pH of the environment to 7.0.
    b. Remove protein of the environment.
    c. Maintain the environmental temperature to 37°C.
    d. Add oxygen to the environment.

    ANS: D
    A pH of 7.0 will support the growth of most bacteria. Removing protein will not always prevent growth. Keeping the temperature at 37°C will allow many bacteria to grow. Adding oxygen to the environment will prevent growth since they require low or no oxygen for growth.

    PTS: 1 DIF: Application REF: p. 11 OBJ: 1
    TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

17. Those bacteria that die in the presence of oxygen are called:
    a. aerobes.
    b. mesophils.
    c. acidogens.
    d. anaerobes.

    ANS: D
    Aerobes need oxygen for growth. Mesophils grow at medium temperatures and most are aerobes. Acidogens produce acids during growth and some are aerobes and some anaerobes. Anaerobes cannot tolerate oxygen.

    PTS: 1 DIF: Recall REF: p. 11 OBJ: 1
    TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

18. Acidogenic bacteria are noted for producing large amounts of:
    a. acids.
    b. vitamins.
    c. proteins.
    d. carbohydrates.

    ANS: A
    Acidogenic bacteria produce large amounts of acid. Vitamins may also be produced but do not relate to being acidogenic. Proteins and carbohydrates are also produced but do not relate to being acidogenic.

    PTS: 1 DIF: Recall REF: p. 11 OBJ: 1
    TOP: CDA, Infection Control, I.A. Demonstrate an understanding of infectious diseases and their relationship to patient safety and occupational risk

19. What temperatures are the surest way to kill bacteria (or any other type of microorganisms) in the shortest amount of time?
    a. Sterilizing temperatures
    b. Freezing temperatures