Chapter 1: Scope and History of Microbiology

Question Type: Multiple Choice

1) Microbes live in us, on us and nearly everywhere around us. Which of the following activities are microbes involved in?

a) Decomposing dead organisms
b) Aiding the digestive processes of grazing animals
c) Capturing energy from the sun
d) All of the above

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.1 Why Study Microbiology?

2) Which of the following is a reason microorganisms are useful in many different research laboratories (such as ecology, biochemistry, evolution and genetics)?

a) They are easy to see and count
b) They have fairly complex structures and are expensive
c) They reproduce fast and grow in large numbers
d) They live everywhere so contaminants from the environment are not a problem.

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

3) Microbiology is the study of bacteria, algae, fungi, viruses and protozoa. Most of these are single-celled, except for which two:

a) bacteria (some of which are multicellular) and algae
b) algae and fungi (some have many cells)
c) protozoa and fungi

d) bacteria and viruses

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

4) A parasitologist studies parasites. What does a mycologist study?

a) protozoa
b) how viruses cause disease and are involved in cancer
c) the development of chemical substances to treat diseases
d) fungi

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

5) While a doctor may diagnose and treat a patient who presents with a disease, an epidemiologist:

a) helps in the development and use of vaccines
b) investigates what organism is responsible for a particular patients disease
c) figures out how to use microorganisms to clean up the environment
d) studies the frequency and distribution of the disease in the community

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

6) What did ancient civilizations know about disease?

a) Even though they could not see microbes the Greeks and Romans knew that they caused disease and could be transmitted.
b) The ancient Mosaic laws in the bible forbid the burial of waste and encouraged the separation of lepers and other diseased individuals.
c) All ancient civilizations thought that disease struck people that were morally corrupt.
d) Infectious diseases did not have much impact on the survival of people in ancient civilizations.

Answer: b

Difficulty: Hard
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.3 Historical Roots

7) What discovery was crucial to the founding of the field of microbiology?

a) Isolation of lepers limiting the spread of infectious disease
b) Agglutination of bacteria in immune serum
c) The chemical composition of DNA, the genetic material
d) Microscopes which allowed for the direct observation of microbes

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.3 Historical Roots

8) The English scientist Robert Hooke coined the term cell because the small boxes he saw in the microscope reminded him of a monk's room. What is the cell theory that was later proposed?

a) Cells are fundamental units of life.
b) Replication requires the division of cells into two equal cells.
c) Hereditary information is passed on in the form of DNA.
d) All organisms are unicellular, made up of one cell.

Answer: a

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.3 Historical Roots

9) All of the following statements agree with the germ theory of disease, except:

a) microorganisms can invade other organisms and cause disease
b) maggots only grow on meat that is left in an open flask because microbes are transmitted by flies and do not spontaneously generate
c) disease causing organisms will spontaneously arise from decaying meat
d) disease is not caused by bad air or spirits

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

10) Louis Pasteur made several important contributions to microbiology. These included studying wine making, identifying diseases in silkworms and which of the following:

a) developing culture techniques
b) developing the first rabies vaccine
c) using a swan-necked flask to prove that air contained the vital force that brought microbes
d) discovering a method to introduce unwanted organisms into food and wine

Answer: b

Difficulty: Hard
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

11) Koch’s postulates were:

a) specific to anthrax and tuberculosis but don't apply to other diseases
b) designed to establish a casual relationship between a causative microbe and a disease
c) strict in that microorganisms isolated from experimentally inoculated hosts had to be different from the microorganism that was introduced into the host.
d) interpreted as many organism could cause the same disease

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

12) Koch developed tuberculin, which he hoped would be a vaccine against tuberculosis. Tuberculin is:

a) the current vaccine used against tuberculosis
b) responsible for definitively proving that one organism causes one disease
c) administered as a skin test to diagnose tuberculosis
d) an exception to germ theory

Answer: c

Difficulty: Hard
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

13) Which of the following statements is true about infection control?

a) Semmelweiss encouraged physicians to go directly from autopsies to examining women in labor without changing their white coats in hopes of reducing puerperal fever.
b)- Surgery which uses aseptic technique increases surgical wound infections.
c) Lister aided infection control by encouraging wounds to be left open to the air instead of using bandages.
d) Semmelweiss was ridiculed by physicians for his suggestion that physicians should wash their hands and adopt more sanitary practices before seeing patients.

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

14) Vaccines are:

a) specific disease-causing molecules that incorporate into cells
b) the causative agent of Black Death
c) selective chemicals used to treat infectious disease
d) preparations that establish immunity to a disease

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

15) Which statement about variolation is false?

a) Variolation originated in ancient China.
b) Variolation involves infecting a person with dried scabs from lesions of people who had recovered from the disease.
c) Variolation used chemicals produced from another microorganism to immunize against the disease causing microbe.
d) Variolation leads to a controlled infection that induces immunity against further infection.

Answer: c

Difficulty: Hard
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

16) Pasteur worked on rabies and cholera vaccine during the emergence of immunology. While culturing a chicken cholera he noted that an old culture was weakened and useful as a vaccine as it:

a) caused disease

b) caused severe cholera symptoms and prevented further infection
c) allowed for the cholera to spread from person to person
d) did not cause disease symptoms and immunized against chicken cholera

Answer: d

Difficulty: Hard
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

17) Viruses were initially identified as small infectious agents that could pass through filters. How was it believed that these agents could survive?

a) They had small compact structures that allowed for the production of metabolites and replication.
b) They survived on the metabolites and poisons that pass through the filter.
c) They borrowed the use of existing metabolic and replicative mechanisms of the host cells they infected.
d) They are capable of capturing energy from the sun.

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

18) Because viruses could not be visualized using conventional microscopes further progress required the development of techniques for isolating, propagating and analyzing viruses. All of the following are true except:

a) crystal structure of the tobacco mosaic virus showed that it was made up of RNA and protein
b) viruses were first observed with an electron microscope
c) viral DNA has a different structure from that discovered by Watson and Crick
d) Hershey and Chase demonstrated that the genetic material of some viruses is DNA

Answer: c

Difficulty: Hard
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

19) Before Ehrlich began a systematic search for a chemical to kill specific bacteria, the only chemotherapies available were substances derived from medicinal plants. What distinguished Ehrlich's chemotherapy research?

a) Ehrlich systematically tested hundreds of compounds for their ability to destroy specific bacteria without damaging surrounding tissue.
b) Ehrlich used metals, such as antimony and mercury to treat diseases.
c) Ehrlich inoculated his own son with fluid from a cowpox blíster.
d) Ehrlich introduced cinchona tree bark, a native American remedy to treat malaria.

Answer: a

Difficulty: Medium
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

20) All of the following are true statements about the development of antibiotics, except:

a) most bacteria that stopped the growth of other bacteria by producing antibiotics were soil bacteria
b) Fleming noticed that a contaminant mold (Penicillium) prevented the growth of bacteria adjacent to itself
c) an antibiotic was discovered in the sea after a scientist noted the absence of disease causing organisms in the seawater where the sewage entered
d) sulfa drugs did not prove to be useful as the body converted them into inactive molecules

Answer: d

Difficulty: Hard
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

21) Microbiologists investigate problems by designing and carrying out experiments. What is true about the scientific method?

a) A hypothesis is the definitive explanation to account for the observation and therefore does not need to be tested.
b) A prediction is the factor that can change but is prevented from changing during the duration of the experiment.

c) A good hypothesis is one that offers the simplest most reasonable explanation and can be tested.
d) The goal of an experiment is to prove that scientists are always correct in their predictions.

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

22) To design a good experiment, an investigator must consider all variables that might affect the outcome. What is a variable?

a) the record of all the observations
b) everything that a scientist cannot control
c) an outcome that will result if the hypothesis is true
d) anything that can change for the purpose of the experiment

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

23) Microbes have played important roles in genetics and in the discovery of DNA as the genetic material. What discoveries depended on bacteria?

a) The ability of a previously harmless bacterium to change into a disease-causing bacterium was due to DNA acquisition.
b) The discovery of the intracellular reproduction of tobacco mosaic virus.
c) The development of the microscope
d) The identification of a virus that causes yellow fever.

Answer: a

Difficulty: Easy
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

24) Microbiology continues to be an important research field for all of the following reasons, except:

a) all infectious diseases have had vaccines developed and therefore can be prevented
b) many forms of genetic engineering depend on microorganisms
c) new and emerging diseases like AIDS need to be studied
d) microorganisms can be used as factories to cheaply produce drugs, hormones and vaccines

Answer: a

Difficulty: Easy
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

25) Bacteriophages are:

a) modified antibiotics that were used in the Soviet Union
b) viruses that attack and kill specific kinds of bacteria including antibiotic resistant bacteria
c) used to introduce genes in gene therapy
d) some of the genes in the human genome

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

26) Which is a false statement about genomes?

a) genomes contain all the genetic material of a species.
b) all of the genome is made up of useful genes whose function we already know
c) humans have only 300 genes not found in the mouse
d) most microbial genomes are smaller than the human genome

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

27) Over 100 microbial genomes have been sequenced. Beyond yielding insight into microbial genetics, these sequencing projects have been important because:

a) they allow insights into microbial pathogenicity
b) knowing how many chromosomes a microbe has lets us know if it causes disease.
c) without the sequence of the genome we cannot tell what the organism uses as its genetic material.
d) it demonstrates that microorganisms do not cause infectious diseases.

Answer: a

Difficulty: Medium
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

28) All of the following are considered microbes except:

a) viruses
b) bacteria
c) protozoa
d) worms

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

29) The concept of putting microbes to work to clean up the environment is called:

a) bioremediation
b) pasteurization
c) immunization
d) fermentation

Answer: a

Difficulty: Easy

Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.1 Why Study Microbiology?

30) A substance derived from one microorganism that kills or restricts the growth of other microorganisms is best described as a.

a) poison
b) antibody
c) vaccine
d) antibiotic

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

31) Microbiology is the study of microorganisms which include all of the following except:

a) bacteria
b) viruses
c) plants
d) protozoa

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

32) Which of the following diseases has been eradicated?

a) Chicken pox
b) Measles
c) Smallpox
d) Mumps

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

33) Which of the following is not true of algae?

a) they photosynthesize to produce their own food
b) they are found in both fresh- and salt-water
c) they have a nucleus
d) they never cause disease in humans

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

34) In which of the following groups would you find a mushroom?

a) bacteria
b) protozoa
c) fungi
d) viruses

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

35) Which of the following groups of organisms contains members better known for transmitting agents of disease than for causing disease themselves?

a) Arthropods
b) Protozoa
c) Fungi

d) Helminths

Answer: a

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

36) Collecting information and tracking the spread of disease is the primary responsibility of what U. S. government agency

a) Food and Drug Administration
b) Centers for Disease Control and Prevention
c) Department of Health and Human Services
d) Department of Homeland Security

Answer: b

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

37) The first person to use a microscope to observe cells invisible to the naked eye was:

a) Robert Hooke
b) Matthias Schleiden
c) Anton van Leeuwenhoek
d) Louis Pasteur

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.3 Historical Roots

38) The curve in Pasteur's swan neck flasks was important because _____.

a) It prevented flies from escaping the flask
b) It allowed only warm air to reach the infusion
c) It trapped microbes that otherwise would have entered the flask
d) It prevented oxygen from reaching organisms inside the flask

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

39) A pure culture refers to a culture:

a) containing bacteria that all have the same shape
b) which has never been used to inoculate a patient
c) which causes only a single disease
d) which contains only a single type of organism

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

40) Edward Jenner is best known for what contribution to the developing field of microbiology?

a) Developing some of the earliest vaccines
b) Disproving spontaneous generation
c) Controlling infections in patients
d) Developing methods of obtaining pure cultures of microorganisms

Answer: a

Difficulty: Easy
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.

Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

41) From the following choices, who is not known primarily for their work with antibiotics?

a) Alexander Fleming
b) Gregor Mendel
c) Selman Waksman
d) Gerhard Domagk

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

42) Who first elucidated the structure of DNA?

a) Hershey and Chase
b) Avery, McCarty and MacLeod
c) Watson and Crick
d) Tatum and Beadle

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

43) The field of _____ involves studying how a person defends him/ herself against microbial infection.

a) molecular biology
b) virology
c) mycology
d) immunology

Answer: d

Difficulty: Easy

Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

44) A microorganism that causes disease is _____ .

a) pathogenic
b) phagocytic
c) virulent
d) algae

Answer: a

Difficulty: Medium
Learning Objective 1: LO 1.3 Describe the specialized studies of immunology, virology, chemotherapy, and molecular biology.
Section Reference 1: Section 1.5 Emergence of Special Fields of Microbiology

45) The study of chemical reactions that occur in microbes is called _____.

a) microbial ecology
b) taxonomy
c) microbial metabolism
d) epidemiology

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

46) Which of the following statements about pasteurization is false?

a) It originally involved heating a substance to 56°C in the absence of oxygen for 30 minutes.
b) It kills unwanted organisms.
c) Pasteurization was orginally developed as a method to keep milk from spoiling.
d) It was developed by Pasteur.

Answer: c

Difficulty: Hard
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease

47) The period from 1874 to 1917 is generally referred to as the _____ because _____.

a) golden age of seminal discovery; research on viruses was fruitful
b) age of molecular genetics; important discoveries were made about molecular processes
c) golden age of microbiology; microbiology was at the forefront of biomedical research in medicine and biology
d) age of microbial appreciation; many people were excited about viruses

Answer: c

Difficulty: Easy
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

48) Bacteriophages have been successfully used in all of the following circumstances, except:

a) to treat wounds of Soviet Union soldiers
b) prevent Listeria infections on cut apples and melons
c) remove *E. coli O157:H7* from herds of animals
d) attack weeds

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

49) Bioterrorism:

a) involves using antibiotics and vaccines for terrorist means
b) converts factories to produce tanks, trucks and cars
c) prevents getting bacteria into ground beef to keep our food supply safe

d) uses microbes, such as anthrax, as part of terrorist attacks

Answer: d

Difficulty: Easy
Learning Objective 1: LO 1.4 Explain how advances in microbiological sciences have positively impacted medicine, agriculture, and food science.
Section Reference 1: Section 1.6 Tomorrow's History

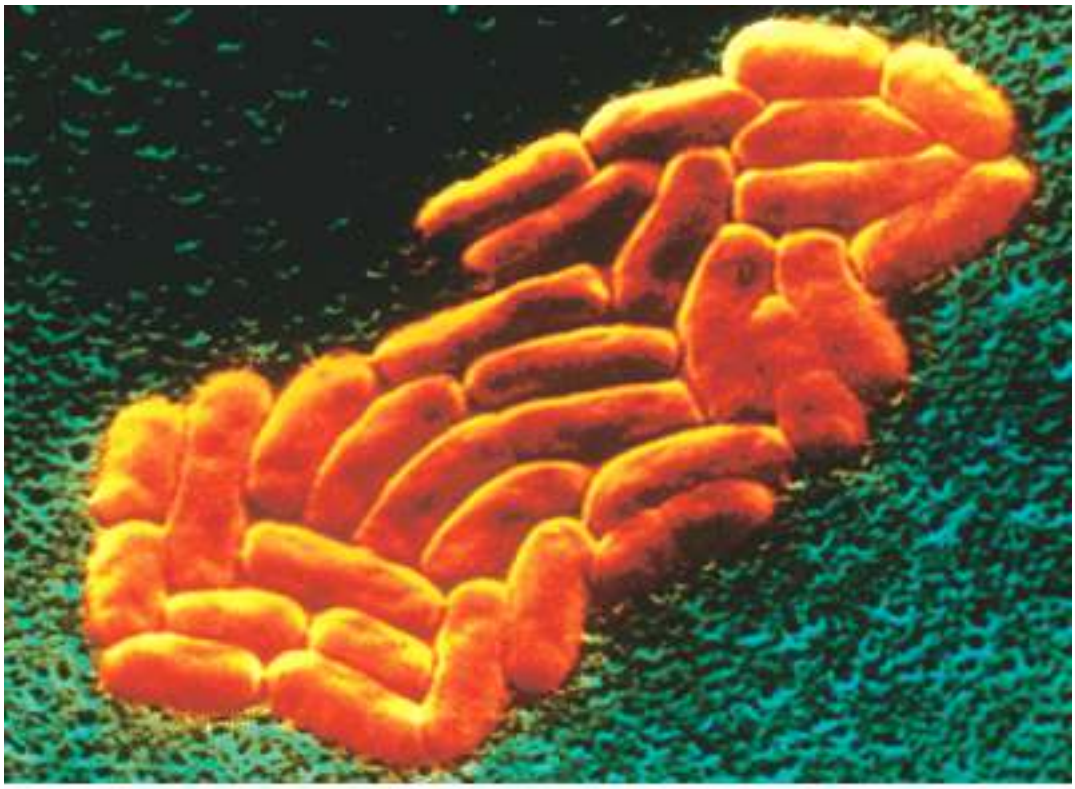
50) Which of the following statements about microbes is true?

a) Prions are proteins without any nucleic acid.
b) Viroids are single-celled microscopic organisms.
c) Protozoa are nucleic acids without a protein coat.
d) Algae depend on the metabolic processes of host cells.

Answer: a

Difficulty: Easy
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

51) This microorganism can be observed with:



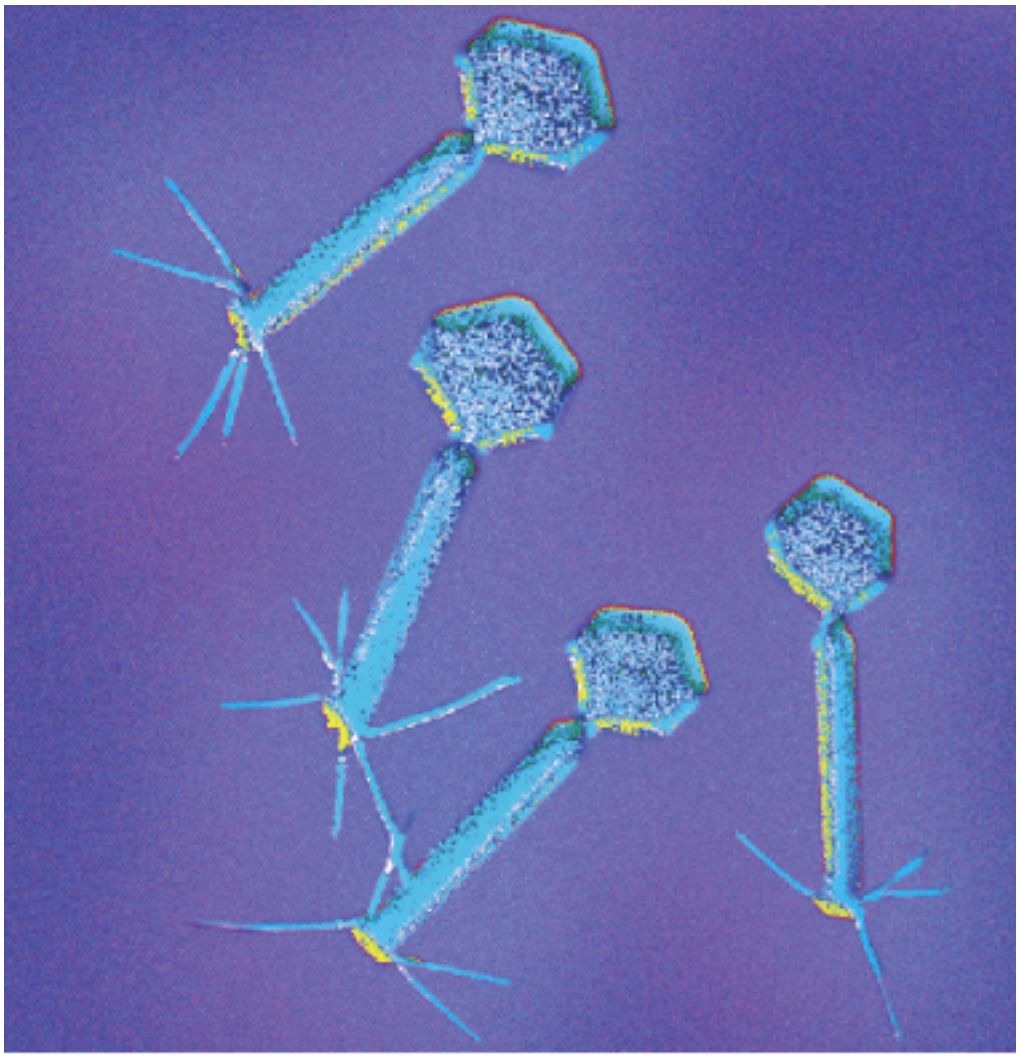
CNRI/Photo Researchers, Inc.

a) the naked eye
b) a light microscope
c) a scanning electron microscope
d) B and C are correct

Answer: d

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

52) This microorganism can infect _____.



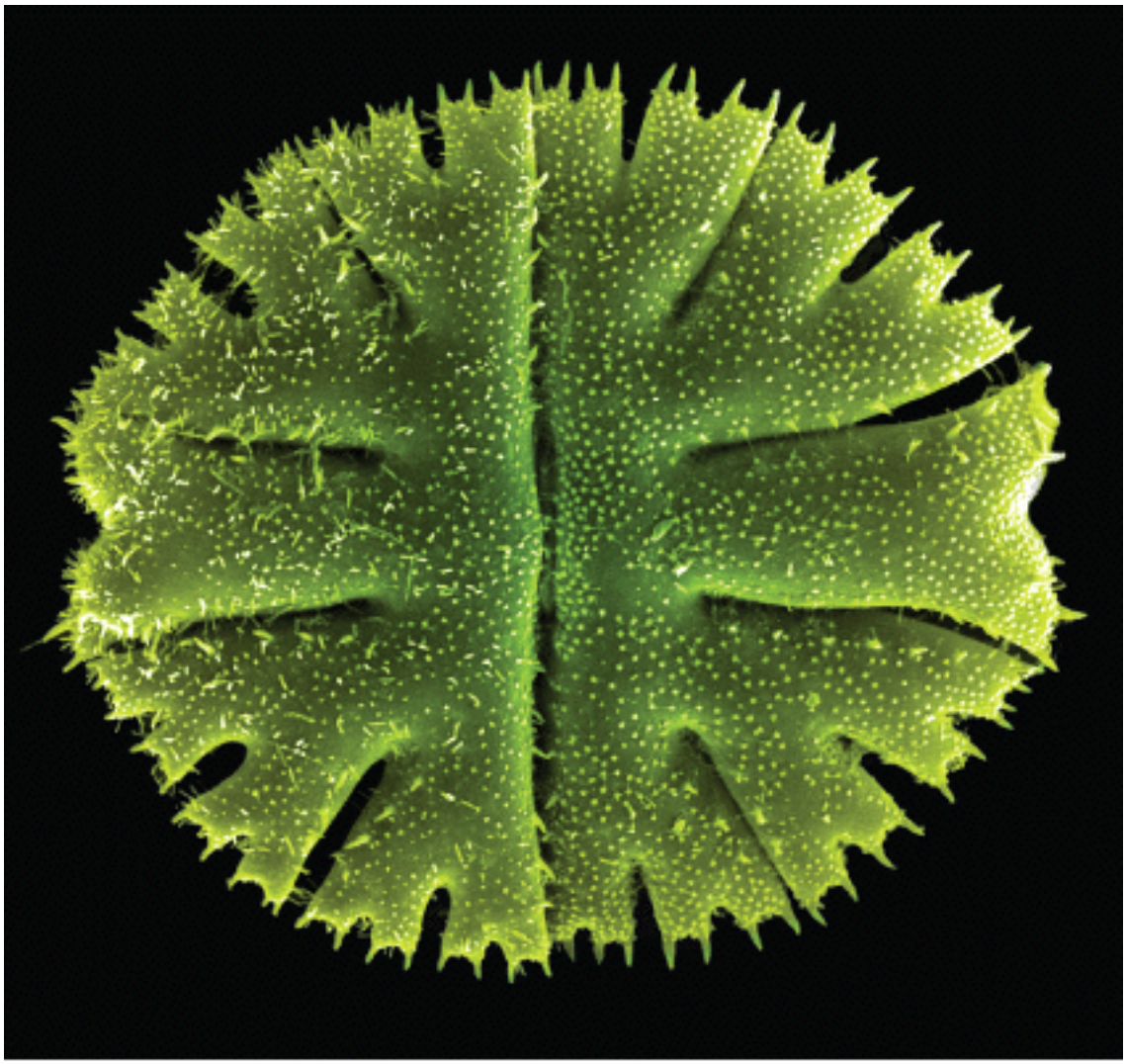
Dr. Harold Fisher/Visuals Unlimited/©Corbis

a) algae
b) bacteria
c) viruses
d) prions

Answer: b

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

53) This microorganism uses _____ to get its food.



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a) pinocytosis
b) endocytosis
c) photosynthesis
d) phagocytosis

Answer: c

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.2 Scope of Microbiology

Question Type: Essay

54) Microorganisms are often referred to as the “invisible emperors” of our world. Why is this? How would you characterize their rule? Are they helpful or demanding emperors? Give one example to support your characterization.

Answer: Microorganisms are everywhere. They are small, replicate rapidly and are well adapted to live in most conditions found on our planet. Research has suggested that bacteria are living below the surface of our planet and they have been found in other extreme conditions (e.g., hot springs, etc). Not only are they ubiquitous, living in the soil, on plants, in animals and in the ocean, but they also exceed the biomass of all other living things.
Microorganisms are emperors, in that they control a number of vital aspects of our lives whether we desire it or not. They can determine health or disease for our families, our livestock and our plant crops. They can influence water ecology affecting marine and other aquatic life. They are necessary components of the web of life necessary for all other living things. In the ocean they trap energy from sunlight and store it as molecules that other organisms then use as food. They make nitrogen available to plants. They play an essential role in the food webs that all plants and animals depend on.
Like a benevolent emporer, microorganisms are mostly helpful and only occasionally demanding. The vast majority are directly or indirectly beneficial to humans. They are helpful in their role in the food web (capturing energy from sunlight, decomposing dead organisms or waste materials, making nitrogen available to plants and aiding the digestion of mammals). They also provide humans food (mushrooms, other fungi and algae) and are used to make human food (i.e. pickles, yogurt, sauerkraut, beer/wine, bread, fructose and aspartame in soft drinks). They also produce antibiotics and can be used in genetic engineering or bioremediation.
One might consider their potential to cause disease or food spoilage as demanding or capricious.

Difficulty: Medium
Learning Objective 1: LO 1.1 Distinguish the different types of microbes in terms of their cellular structure, including the types of jobs microbiologists may hold as they study them.
Section Reference 1: Section 1.1 Why Study Microbiology?

55) What is the germ theory of disease? What did people believe caused disease to be transmitted before the germ theory of disease? Describe one experiment that supported the germ theory. Name an important innovation that arouse from the germ theory of disease.

Answer: The germ theory of disease states that microorganisms are the cause of many diseases. Before the germ theory was proven people believed that microbes were spontaneously generated and carried by bad air. The germ theory views disease as being created by microorganisms that grow by reproduction and can be transmitted.

There are four early experiments that support germ theory. Francesco Redi used three flasks with meat in each flasks and covered one with gauze, the other was tightly sealed and the last was left open After a few days he found maggots only on surfaces that were accessible by flies (e.g., on the meat in the open flask and on the surface of the gauze). Another supporting observation that was made was that no organisms spontaneously generated from boiled broth containing organic matter and either sealed in a flask or with filtered air. Pasteur and Tyndall demonstrated that freshly boiled broth exposed to air but with either a filter or a long tortuous tube that wouldn't allow for dust particles grew nothing, therefore the living organisms that grew in such broths came from outside instead of being generated within the broth. Lastly, Robert Koch demonstrated that anthrax was caused by a specific bacterium and not from a substance that spontaneously generated.
Germ theory has lead to important innovations such as improved sanitation, antibiotics, hygienic practices and aseptic technique in surgery.

Difficulty: Medium
Learning Objective 1: LO 1.2 Compare the germ theory with that of spontaneous generation, describing the contributions made by Redi, Spallanzani, Pasteur, Tyndall, and Koch that led to a resolution of these conflicting theories and an understanding the role microbes play in disease.
Section Reference 1: Section 1.4 The Germ Theory of Disease