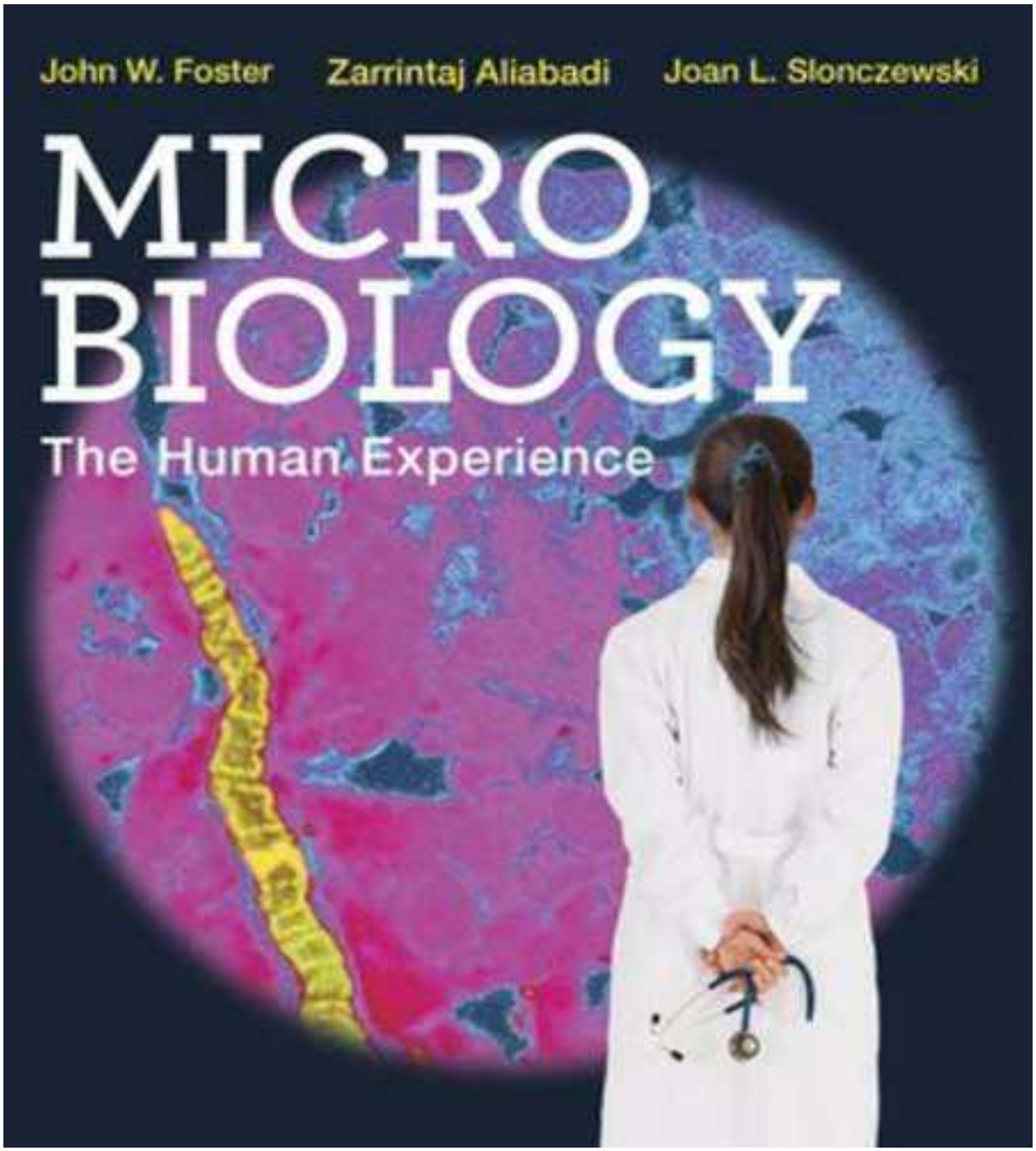
TEST BANK

Microbiology

The Human Experience

John W. Foster, Zarrintaj Aliabadi, Joan L. Slonczewski

1st Edition



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Chapter 01: Microbes Shape Our History

MULTIPLE CHOICE

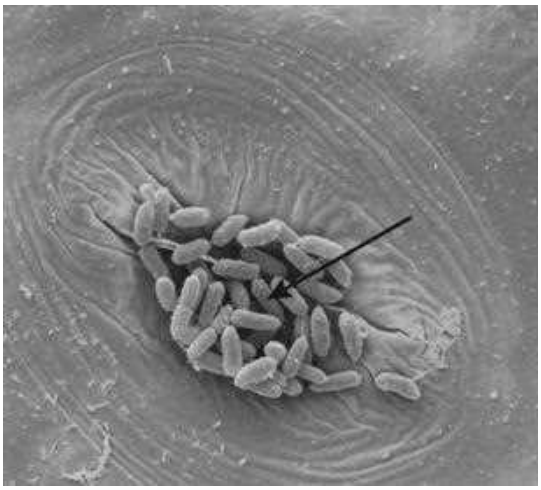
1. Which of the following is NOT considered a benefit of microorganisms?
   a. nitrogen fixation
   b. production of fermented foods
   c. synthesis of vitamins
   d. causative agents of disease

   ANS: D DIF: Easy REF: 1.1
   OBJ: 1.1a Describe how we define a microbe, and explain why the definition is a challenge.
   MSC: Remembering

2. A microbe that is 50 nm in size would most likely be
   a. fungi.
   b. *E. coli*.
   c. virus.
   d. algae.

   ANS: C DIF: Moderate REF: 1.1
   OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Applying

3. Based on the figure shown, the type of organism indicated with an arrow could be a



   a. virus.
   b. bacteria.
   c. macroscopic fungi.
   d. large ameba.

   ANS: B DIF: Easy REF: 1.1
   OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Applying

4. Based on the figure, the type of organism shown is a(n)

a. virus.
b. bacteria.
c. archaea.
d. eukaryote.

ANS: D DIF: Moderate REF: 1.1
OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Applying

5. Which of the following demonstrates correct scientific notation of a bacterial organism?
a. Staphylococcus Epidermidis
b. Staphylococcus epidermidis
c. *Staphylococcus epidermidis*
d. Staphylococcus Epidermidis

ANS: C DIF: Easy REF: 1.1
OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Applying

6. Which key characteristic differentiates a prokaryote from a eukaryote?
a. the absence of proteins
b. the presence of DNA
c. the absence of membrane-bound organelles
d. the presence of a cell wall

ANS: C DIF: Easy REF: 1.1
OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Remembering

7. Which of the following methods for classifying life forms can best be used to distinguish between two closely related rod-shaped bacterial organisms, *Salmonella typhimurium* and *Escherichia coli*?
a. physical characteristics
b. method of reproduction
c. DNA sequence comparison
d. environmental habitat

ANS: C DIF: Moderate REF: 1.1
OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Applying

8. Which of the following is always classified as a eukaryote?
a. papillomavirus
b. methanogen
c. *Escherichia coli*
d. yeast

ANS: D DIF: Moderate REF: 1.1

OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Understanding

9. Which of the following has been used as a tool for gene therapy?
   a. viruses
   b. archaea
   c. protozoa
   d. fungi

   ANS: A DIF: Easy REF: 1.1
   OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Understanding

10. Which of the following would you not expect to find in the human digestive tract?
    a. archaea
    b. algae
    c. bacteria
    d. intestinal viruses

    ANS: B DIF: Moderate REF: 1.1
    OBJ: 1.1b Describe the three major domains of life: Archaea, Bacteria, and Eukarya. Explain what the three domains have in common and how they differ. MSC: Understanding

11. Antibiotics are chemotherapeutic drugs that function by inhibiting an important cellular structure or process of an organism that is causing an infection. Which of the following would not be affected by an antibiotic that targets cellular metabolic enzymes?
    a. *Streptococcus pyogenes* bacteria
    b. Herpes virus
    c. ameba
    d. bread mold

    ANS: B DIF: Moderate REF: 1.1
    OBJ: 1.1c Define viruses, and explain how they relate to living cells.
    MSC: Analyzing

12. Which scientist is credited with constructing the first microscope?
    a. Antonie van Leeuwenhoek
    b. Catherine of Siena
    c. Robert Hooke
    d. Louis Pasteur

    ANS: C DIF: Easy REF: 1.2
    OBJ: 1.2a Explain how microbial diseases have changed human history.
    MSC: Remembering

13. Which of the following was an unexpected benefit of the bubonic plague?
    a. There was no benefit to the bubonic plague.
    b. The population of Europe experienced a baby boom.
    c. It resulted in a better understanding of aseptic practices and how to prevent the spread of infection.
    d. The population decline enabled the cultural advancement of the Renaissance.

    ANS: D DIF: Easy REF: 1.2
    OBJ: 1.2a Explain how microbial diseases have changed human history.
    MSC: Understanding

14. Which of the following organisms would you NOT be able to see using Robert Hooke's microscope?
    a. vinegar eels
    b. dust mites
    c. mold filaments
    d. *Mycobacterium tuberculosis*

    ANS: D DIF: Moderate REF: 1.2

OBJ: 1.2a Explain how microbial diseases have changed human history.
MSC: Understanding

15. Which of the following is NOT an explanation for the centuries it took between Leeuwenhoek observing microorganisms with his microscope and the discovery that microbes are capable of causing disease?
    a. Microbes are found everywhere.
    b. Bacteria appeared similar to sperm and blood cells under the microscope.
    c. Microorganisms are capable of existing through spontaneous generation.
    d. Diseases were not a problem in the world until long after the discovery of microorganisms.

    ANS: D DIF: Moderate REF: 1.2
    OBJ: 1.2a Explain how microbial diseases have changed human history.
    MSC: Applying

16. If Spallanzani had unknowingly poked a hole in the top of his flask of meat broth, what would this have implied about the theory of spontaneous generation?
    a. No growth would have occurred in the flask, refuting the theory of spontaneous generation.
    b. No growth would have occurred in the flask, supporting the theory of spontaneous generation.
    c. Growth would have occurred in the flask, refuting the theory of spontaneous generation.
    d. Growth would have occurred in the flask, supporting the theory of spontaneous generation.

    ANS: D DIF: Difficult REF: 1.2
    OBJ: 1.2b Describe how microbes participate in human cultural practices such as production of food and drink. MSC: Applying

17. What would John Tyndall have needed to use to disprove the theory of spontaneous generation with his experiments?
    a. a swan-neck flask
    b. a microscope
    c. an autoclave
    d. organic media

    ANS: C DIF: Moderate REF: 1.2
    OBJ: 1.2b Describe how microbes participate in human cultural practices such as production of food and drink. MSC: Applying

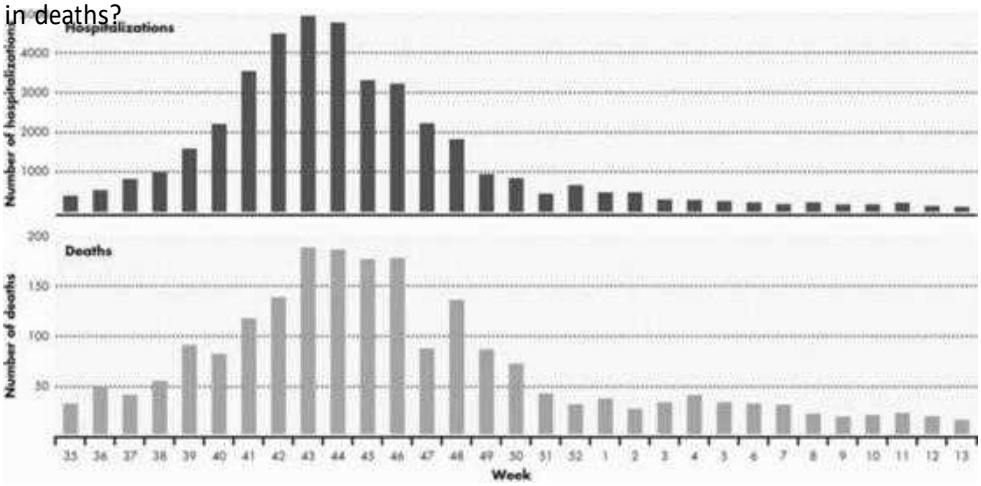
18. Which of the following theories was the Miller experiment designed to test?
    a. the endosymbiotic origin of life
    b. the idea that all the chemicals found in early Earth could have come together to form the basic components of cellular life
    c. spontaneous generation
    d. the RNA world hypothesis

    ANS: B DIF: Moderate REF: 1.2
    OBJ: 1.2a Explain how microbial diseases have changed human history.
    MSC: Understanding

19. Why did fewer soldiers die from infectious disease during the Crimean War in the winter months?
    a. Pathogens do not multiply as quickly in colder temperatures.
    b. Pathogens do not multiply as quickly in wet environments.
    c. Soldiers have fewer close interactions with other individuals during the winter months.
    d. Chemical agents used to treat and prevent infections do not function effectively in warmer temperatures.

ANS: A DIF: Moderate REF: 1.3
OBJ: 1.3b Explain how Florence Nightingale first drew a statistical correlation between infectious disease and human mortality. MSC: Applying

20. Based on the figure below, approximately what percentage of the hospitalizations in week 43 resulted in deaths?



a. 80%
b. 40%
c. 20%
d. 4%

ANS: D DIF: Moderate REF: 1.3
OBJ: 1.3b Explain how Florence Nightingale first drew a statistical correlation between infectious disease and human mortality. MSC: Analyzing

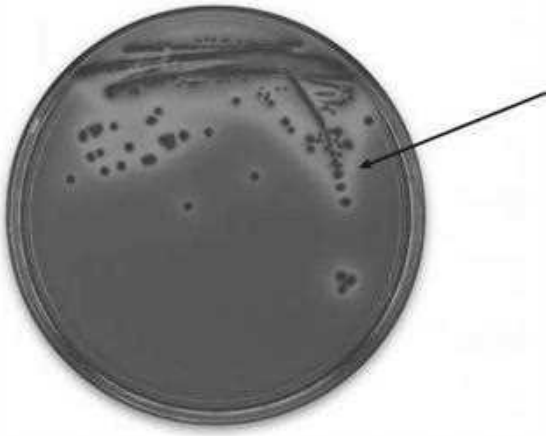
21. What is the causative agent of the infectious disease used to establish Koch's postulates?
a. *Streptococcus pyogenes*
b. *Bacillus anthracis*
c. *Helicobacter pylori*
d. *Chlamydia trachomatis*

ANS: B DIF: Easy REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Remembering

22. Why was the selection of anthrax by Robert Koch a fortunate one?
a. The microbe that causes it multiplies slowly.
b. The microbe that causes it multiplies to a high concentration in the kidneys.
c. The microbe that causes it is not dangerous to humans.
d. The microbe that causes it can remain infective outside the body for long periods.

ANS: D DIF: Moderate REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Applying

23. The arrow in the figure shows a(n)



a. gelatin suspension.
b. endospore.
c. colony.
d. cell.

ANS: C DIF: Easy REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Understanding

24. The first vaccination was done to prevent
a. AIDS.
b. smallpox.
c. tuberculosis.
d. anthrax.

ANS: B DIF: Easy REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Remembering

25. Which of the following techniques is effective in creating an attenuated version of a pathogen useful for vaccinations?
a. putting a liquid culture of the pathogen in the freezer
b. heating an aged culture of the pathogen
c. homogenizing a culture of the pathogen
d. exposing a culture of the pathogen to nuclear radiation

ANS: B DIF: Easy REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Understanding

26. Regarding the natural source for the production of antibiotics, the best weapon we have against pathogenic microorganisms is
a. medical doctors.
b. acclaimed scientific researchers.
c. other microorganisms that can exist with the pathogenic microorganisms.
d. the CDC.

ANS: C DIF: Moderate REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Understanding

27. What is happening in the figure shown?

a. The mold on the left is producing a compound that inhibits the growth of the bacterial colonies on the right.
b. The mold on the left is outcompeting the bacterial cells for nutrients and therefore is growing faster.
c. The bacterial cells on the right are inhibiting the growth of the mold on the left.
d. The mold and bacterial cells are growing in a symbiotic relationship.

ANS: A DIF: Moderate REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Applying

28. Warts are a common skin condition caused by an organism that cannot be grown in pure culture on an agar petri dish and is small enough to pass through a tiny-pored filter. What is the causative agent of warts?
a. a bacterium
b. a virus
c. an archaea
d. a fungus

ANS: B DIF: Moderate REF: 1.3
OBJ: 1.3c Explain how Koch's postulates can show that a specific kind of microbe causes a disease.
MSC: Applying

29. *Thiobacillus ferrooxidans* is a microorganism that gains its energy from the oxidation of ferrous iron (Fe^{2+}) to ferric iron (Fe^{3+}) and hydrogen sulfide (H_2S) to sulfuric acid (H_2SO_4). Based on this information, *T. ferrooxidans* is an example of a
a. nitrogen fixer.
b. lithotroph.
c. endosymbiont.
d. biofilm participant.

ANS: B DIF: Moderate REF: 1.4
OBJ: 1.4a Describe examples of how microbes contribute to natural ecosystems.
MSC: Applying

30. A microbial growth medium for *Staphylococcus aureus* is prepared with a high salt concentration to minimize the growth of many organisms that are not capable of growth in these conditions. This is an example of
a. animal culture.
b. endosymbiosis.
c. pure culture.
d. enrichment culture.

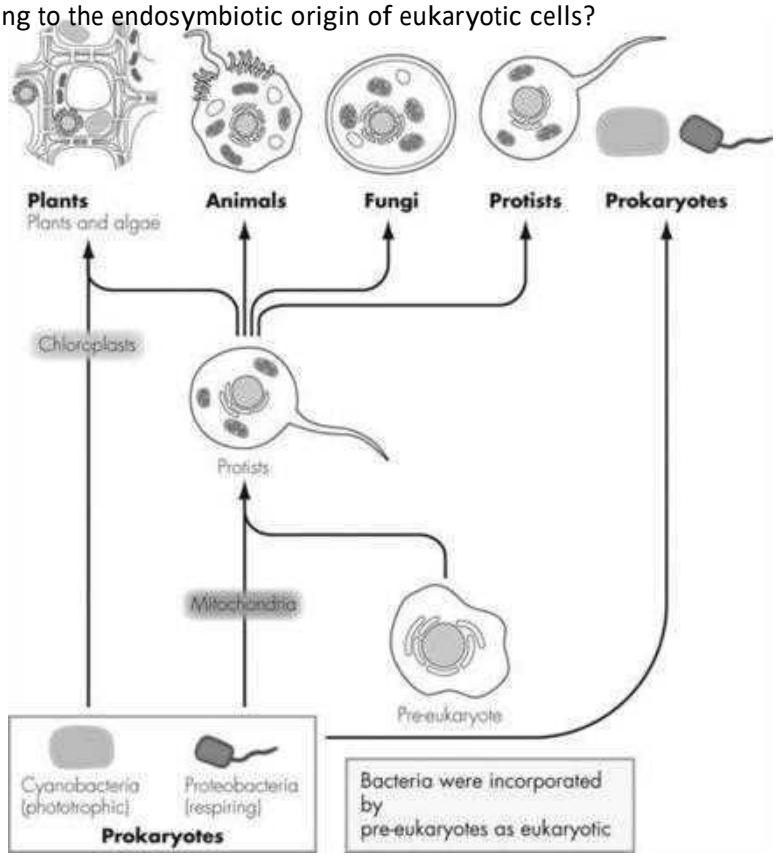
ANS: D DIF: Moderate REF: 1.4
OBJ: 1.4a Describe examples of how microbes contribute to natural ecosystems.

MSC: Applying

31. Which of the following is NOT an example of an endosymbiont?
    a. *Bacillus anthracis* spores present in the soil of cattle farms
    b. rhizobial bacteria growing in the root nodules of certain plants
    c. microorganisms in the digestive system of the cow degrading cellulose
    d. bacteria in termite intestines digesting plant polymers

    ANS: A DIF: Moderate REF: 1.4
    OBJ: 1.4a Describe examples of how microbes contribute to natural ecosystems.
    MSC: Applying

32. Consider the figure below. What does the arrow pointing from cyanobacteria to plants and algae indicate according to the endosymbiotic origin of eukaryotic cells?



    a. Cyanobacteria are the early evolutionary ancestors of plants and algae.
    b. Cyanobacteria merged together to form plants and algae.
    c. Cyanobacteria serve as a common source of energy for plants and algae.
    d. Cyanobacteria were internalized by early cells to form the chloroplast present in plants and algae.

    ANS: D DIF: Difficult REF: 1.4
    OBJ: 1.4b Explain how mitochondria and chloroplasts evolved by endosymbiosis.
    MSC: Analyzing

33. According to the endosymbiotic origin of eukaryotic cells, respiring bacteria similar to *E. coli* were engulfed by cells and evolved into the
    a. nucleotides.
    c. energy-generating organelles.

b. protein-producing organelles.
d. waste-degrading organelles.

ANS: C DIF: Easy REF: 1.4
OBJ: 1.4b Explain how mitochondria and chloroplasts evolved by endosymbiosis.
MSC: Remembering

34. The endosymbiotic origin of eukaryotic cells explains how
a. prokaryotic cells transformed into eukaryotic cells.
b. eukaryotic cells evolved from viruses.
c. prokaryotic cells were incorporated by pre-eukaryotes as eukaryotic organelles.
d. eukaryotic cells eliminated prokaryotic cells.

ANS: C DIF: Easy REF: 1.4
OBJ: 1.4b Explain how mitochondria and chloroplasts evolved by endosymbiosis.
MSC: Remembering

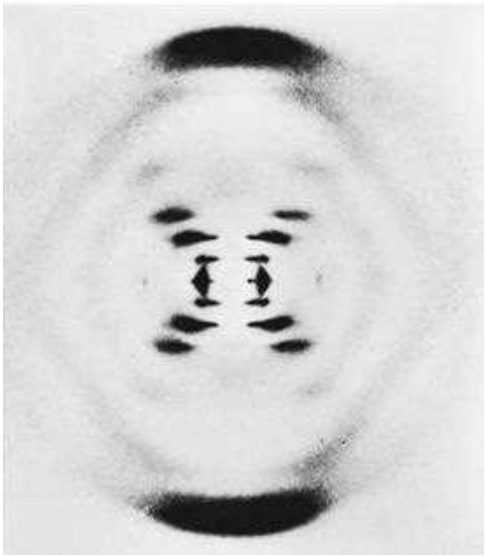
35. Which of the following statements does NOT provide evidence in support of the endosymbiotic origin of eukaryotic cells?
a. The DNA sequence of mitochondria is similar to the DNA sequence of respiring bacteria.
b. The DNA of chloroplasts is circular like the DNA of phototrophic bacteria.
c. Mitochondria are capable of free-living outside of a eukaryotic cell.
d. There is a lot of sequence homology between the DNA sequences of chloroplasts and phototrophic bacteria.

ANS: C DIF: Easy REF: 1.4
OBJ: 1.4b Explain how mitochondria and chloroplasts evolved by endosymbiosis.
MSC: Understanding

36. Which of the following negative situations could be caused by the similarity between mitochondria and bacteria?
a. Vincent's *Staphylococcus* skin infection cannot be treated because the only effective antibiotic has too many toxic side effects.
b. Alexander suffers from myoclonic epilepsy with ragged red fibers, a mitochondrial disease.
c. Lauren inherited complex I deficiency, a mitochondrial disease that inhibits her mitochondria from producing enough energy in certain organs of her body.
d. Sally was born with a pyruvate decarboxylase deficiency that prevents her mitochondria from functioning properly, resulting in severe mental retardation.

ANS: A DIF: Difficult REF: 1.4
OBJ: 1.4b Explain how mitochondria and chloroplasts evolved by endosymbiosis.
MSC: Evaluating

37. The X-ray diffraction pattern in the image seen here helped determine the structure of



a. alanine.
b. penicillin.
c. vitamin B_{12}.
d. deoxyribonucleic acid.

ANS: D DIF: Moderate REF: 1.5
OBJ: 1.5a Describe how the structure of DNA was discovered, and explain the significance of DNA for determining the traits of life. MSC: Understanding

38. Which of the following is NOT one of Rosalind Franklin's accomplishments?
a. generating the X-ray diffraction pattern of the structure of DNA
b. researching the structure of RNA
c. determining the form of tobacco mosaic virus's RNA chromosome
d. receiving a Nobel Prize

ANS: D DIF: Easy REF: 1.5
OBJ: 1.5a Describe how the structure of DNA was discovered, and explain the significance of DNA for determining the traits of life. MSC: Remembering

39. The first cellular genome sequenced was a(n)
a. animal.
b. virus.
c. archaea.
d. bacteria.

ANS: D DIF: Easy REF: 1.5
OBJ: 1.5b Describe how the manipulation of DNA information has transformed the practice of medicine. MSC: Remembering

40. The discovery of _____ first stimulated the funding of millions of dollars into medical research.
a. penicillin
b. the structure of DNA
c. DNA sequencing
d. vaccines

ANS: A DIF: Easy REF: 1.5
OBJ: 1.5b Describe how the manipulation of DNA information has transformed the practice of medicine. MSC: Understanding

41. **CASE HISTORY**