Package Title: Test Bank
Course Title: Wessner1e
Chapter Number: 2

Question Type: Multiple Choice

1) Which term describes spherical-shaped bacteria?

a) cocci
b) bacilli
c) spirilla.
d) vibrios.
e) pleiomorphs

Answer: a

Difficulty: Easy
Learning Objective: LO 2.1 Describe the shape, multicellular arrangement and general sizes of common bacteria.
Section Reference: Section 2.1 Morphology of bacterial cells

2) What is the typical length of a bacterium?

a) 5 – 10 nm
b) 0.5 – 5 µm
c) 20 – 40 µm
d) 5 – 10 mm
e) 20 – 40 mm

Answer: b

Difficulty: Easy
Learning Objective: LO 2.1 Describe the shape, multicellular arrangement and general sizes of common bacteria.
Section Reference: Section 2.1 Morphology of bacterial cells

3) Which term describes straight, rod-shaped bacteria?

a) cocci
b) bacilli
c) spirilla.
d) vibrios.

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e) pleiomorphs

Answer: b

Difficulty: Easy
Learning Objective: LO 2.1 Describe the shape, multicellular arrangement and general sizes of common bacteria.
Section Reference: Section 2.1 Morphology of bacterial cells

4) Which region contains the chromosome in the bacterial cell?

a) Nucleus
b) Nucleoid
c) Plasmid
d) Plastid
e) Prophage

Answer: b

Difficulty: Easy
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

5) Which is an example of an "inclusion body" found in a bacterial cell?

a) the nucleus
b) the mitochondria
c) a topoisomerase
d) the cell membrane
e) polyhydroxybutyrate

Answer: e

Difficulty: Easy
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

6) Sulfur globules are an example of inclusion bodies that may be found in some bacterial cells. What is their use?

a) They are a carbon source
b) They are used for nucleotide synthesis
c) As an energy source

d) They provide buoyancy
e) They assist in membrane synthesis

Answer: c

Difficulty: Medium
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

7) How are gas vesicles used by bacterial cells?

a) As a source of oxygen
b) As a source of nitrogen
c) As a source of hydrogen
d) For buoyancy
e) As an energy source

Answer: d

Difficulty: Easy
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

8) The bacterial chromosome is a highly condensed structure that is tightly wound up around it-self to fit into the bacterial cell. What is the main enzyme responsible for condensing the DNA?

a) DNA polymerase
b) DNA ligase
c) DNA topoisomerase
d) DNA endonuclease
e) DNA synthetase

Answer: c

Difficulty: Easy
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

9) What is the main function of the FtsZ protein in the bacterial cell?

a) DNA replication
b) transcription
c) translation

d) cell division
e) meiosis

Answer: d

Difficulty: Easy
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.
Section Reference: Section 2.3 The bacterial cytoskeleton

10) The MreB protein in bacteria may play an important role in:

a) determining cell shape
b) motility
c) energy metabolism
d) meiosis
e) nuclear division

Answer: a

Difficulty: Medium
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.
Section Reference: Section 2.3 The bacterial cytoskeleton

11) What is the role of the ParM protein in bacteria?

a) iDetermination of cell shape.
b) To assign plasmids to each cell during cell division.
c) To assist in carrying out meiosis.
d) In cell movement during chemotaxis.
e) In sugar and protein metabolism.

Answer: b

Difficulty: Medium
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.
Section Reference: Section 2.3 The bacterial cytoskeleton

12) What protein plays an important role in determining cell shape by directing cell wall synthesis in non-spherical bacteria?

a) FtsZ
b) MreB
c) ParM
d) FlaA
e) PepZ

Answer: b

Difficulty: Easy
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.
Section Reference: Section 2.3 The bacterial cytoskeleton

13) What protein has been shown to play an important role in cell division through the formation of the Z-ring?

a) FtsZ
b) MreB
c) ParM
d) FlaA
e) PepZ

Answer: a

Difficulty: Easy
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.
Section Reference: Section 2.3 The bacterial cytoskeleton

14) Which best describes the chemical structure of the Bacteria domain cytoplasmic membrane ?

a) A bilayer of phospholipids.
b) A monolayer of phospholipids.
c) A monolayer of phospholipids with sterols.
d) A bilayer of phospholipids with sterols.
e) A trilayer of phospholipids.

Answer: a

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

15) Some bacteria produce sterol-like molecules called ___ that help to stabilize the plasma membrane.

a) ergosterol
b) progesterone
c) hopanoids
d) phycols
e) stigmasterols

Answer: c

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

16) Which one of the following is NOT a key function of the cytoplasmic membrane?

a) signal transduction
b) nutrient transport
c) environmental sensing
d) protein synthesis
e) oxidative electron transport

Answer: d

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

17) Which statement is FALSE in regards to the plasma membrane?

a) Glucose cannot easily diffuse across the plasma membrane.
b) Protons can easily diffuse across the plasma membrane.
c) Oxygen can easily diffuse across the plasma membrane.
d) Water can easily diffuse across the plasma membrane.
e) Potassium ions cannot easily diffuse across the plasma membrane.

Answer: b

Difficulty: Medium

Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

18) If cells are placed into a hypertonic solution, what reaction would you expect?

a) The cell would lose water.
b) The cell would gain water.
c) The cell would pump out ions.
d) The cell would lyse.
e) The cell would increase in size.

Answer: a

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

19) What conditions must be met in order for an "active transport system" to transport of a nutrient into a cell?

a) The nutrient concentration must be higher on the outside of the cell.
b) The nutrient concentration must be lower on the inside of the cell.
c) The nutrient concentration must be equal inside and outside of the cell.
d) Passive diffusion needs to drive this transport.
e) Some form of energy is required for proper transport.

Answer: e

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

20) What does the ABC transporter system use as the source of energy for transport?

a) pyruvate
b) glucose
c) ATP
d) NADH
e) diffusion

Answer: c

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

21) The proton motive force (PMF) across a cell membrane can be used for which of these processes?

a) Generate ATP.
b) Propel the flagella.
c) Transport nutrients into the cell.
d) Transport molecules out of the cell.
e) All of these choices.

Answer: e

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

22) What is a signal peptide?

a) The amino acid sequence of a protein that detects changes in the external environment and signals this change to components in the cell.
b) A regulatory protein that turns on/off the expression of certain genes.
c) A protein used to signal cell division.
d) A short amino acid sequence on the end of a protein that is used for transport of the protein out of the cell.
e) A protein in the cytoplasmic membrane that is used to communicate with other closely related cells.

Answer: d

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

23) Which is the major component of the cell wall of microbes in the Bacteria domain?…

a) cellulose
b) chitin
c) protein
d) polysaccharide
e) peptidoglycan

Answer: e

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

24) The glycan portion of peptidoglycan is composed of alternating units of which two compounds?

a) glucose and fructose
b) N-acetylmuramic acid and N-acetylglucosamine
c) N-acetylmannose and N-acetylglucose
d) N-acetylfructose and N-acetylglucose
e) N-acetylmannitol and N-acetylsorbitol

Answer: b

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

25) What is the main function of peptidoglycan?

a) Controlling movement of nutrients into and outof the cell.
b) Protecting the cell from harmful chemicals.
c) Regulating the transport of water into the cell.
d) Protecting against osmotic stress.
e) Generating energy through electron transport phosphorylation.

Answer: d

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

26) Which of these enzymes is produced by many animals for the hydrolysis of the glycan chain in peptidoglycan?

a) lysozyme
b) ligase
c) lipase
d) aminidase
e) amylase

Answer: a

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

27) What is the reaction of β-lactamase enzymes?

a) Hydrolyze the glycan chain of peptidoglycan.
b) Hydrolyze lactose to glucose and galactose.
c) Inactivate antibiotics like penicillin.
d) Inactivate the enzyme lysozyme.
e) Prevent the transpeptidation reaction during peptidoglycan synthesis.

Answer: c

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

28) Which of these is included in the the Gram-positive cell envelope?

a) peptidoglycan, LPS, and lipoteichoic acids.
b) peptidoglycan, teichoic acids, and lipoteichoic acids.
c) peptidoglycan, LPS, and teichoic acids.
d) peptidoglycan, LPS, and a periplasmic space.
e) teichoic acids, lipoteichoic acids, and a periplasmic space.

Answer: b

Difficulty: Easy

Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

29) Which of these is included in the Gram-negative cell envelope?

a) peptidoglycan, LPS, and lipoteichoic acids.
b) peptidoglycan, teichoic acids, and lipoteichoic acids.
c) peptidoglycan, LPS, and teichoic acids.
d) peptidoglycan, LPS, and a periplasmic space.
e) teichoic acids, lipoteichoic acids, and a periplasmic space.

Answer: d

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

30) Which compound binds the outer membrane of Gram-negative bacteria to the thin peptidoglycan layer?

a) lipoproteins
b) lipoteichoic acid
c) porin
d) bactoprenol
e) polysaccharide

Answer: a

Difficulty: Medium
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

31) The bacterial flagellum is turned by a motor using energy from:

a) ATP.
b) glucose.
c) a proton motive force.
d) phosphoenolpyruvate.
e) AMP.

Answer: c

Difficulty: Medium
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

32) Which of these describes the peritrichous arrangement of flagella?

a) Flagella all around the cell.
b) Flagella at both polar ends of the cell.
c) Flagella in a tuft at one end of the cell.
d) Flagella inside the periplasm wrapping around the cell.
e) Flagella on a single side of the cell.

Answer: a

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

33) What are short fiber-like structures that protrude from the bacterial surface and are primarily used for attachment called?

a) pili
b) flagellin
c) porins
d) bactoprenol
e) lipopolysaccharides

Answer: a

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

34) What is the function of the bacterial capsule?

a) Attachment.
b) Preventing phagocytosis by phagocytic cells.
c) Resisting desiccation.

d) All of these choices.
e) None of these choices.

Answer: d

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

35) All of the following are taxonomic groups used to classify bacteria EXCEPT:

a) Kingdom.
b) Phylum.
c) Class.
d) Family.
e) Genus.

Answer: a

Difficulty: Easy
Learning Objective: LO 2.6 Explain the basic rules of taxonomy and Systematics used to identify bacteria.
Section Reference: Section 2.6 Bacterial taxonomy

Question Type: True/False

36) Magnetosomes are an example of membrane enclosed organelles found in some bacteria.

Answer: True

Difficulty: Easy
Learning Objective: LO 2.2 Describe the nucleoid and the components of bacterial cytoplasm.
Section Reference: Section 2.2 The cytoplasm

37) If the cytoplasm has a higher solute concentration than the external environment, you would expect the cell to lose water due to osmosis.

Answer: False

Difficulty: Easy

Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

38) The ABC transporter system uses phosphoenolpyruvate as the energy source to drive transport.

Answer: False

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

39) Diaminopimelic acid is an amino acid naturally found in peptidoglycan.

Answer: True

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

40) The lipopolysaccharides (LPS) of most Gram-negative bacteria is able to trigger a very strong inflammatory response in humans.

Answer: True

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

41) The bacterial flagellum is structurally and functionally related to the eukaryotic flagellum.

Answer: False

Difficulty: Medium
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

Question Type: Text Entry

42.The area between the inner and outer membrane of Gram-negative bacteria is called the _____ space.

Answer: periplasmic

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

43) Protein channels in the outer membrane of Gram-negative bacteria that allow the diffusion of small molecules (600 daltons or less) across the membrane into the periplasmic space are called ____.

Answer: porins

Difficulty: Easy
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope

44) The movement of a bacterial cell toward a chemical attractant is called _____.

Answer: chemotaxis

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

45) Short hair-like protrusions on the surface of some bacterial cells, used primarily for attachment but some are used for motility, and called ___ .

Answer: pili

Difficulty: Medium
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

46) The bacterial ___ functions in protection from desiccation, and phagocytosis, and in attachment.

Answer: capsule

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

47) _____ motility is used by myxobacteria and some cyanobacteria for smooth movement across a solid surface.

Answer: Gliding

Difficulty: Medium
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

48) In the scientific name Bacillus cereus, the term Bacillus represents the organism's ___ and cereus its ____.

Answer: genus , species

Difficulty: Easy
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface

Question Type: Essay

49) A mutant strain of E. coli has been isolated that has a mutation in the mreB gene. Describe the phenotypic appearance of the mutant strain. Why does it have this appearance?

Answer:

Difficulty: Medium
Learning Objective: LO 2.3 Describe the functions of the bacterial cytoskeleton and other protein-based structural elements in the bacterial cell.

Section Reference: Section 2.3 The bacterial cytoskeleton
Solution: The mutant strain of E. coli will be coccus shaped instead of rod shaped. The mreB gene codes for the MreB protein. This protein is similar to actin filaments and forms fibers associated with the cytoplasmic membrane. The fibers help direct the formation of the cell wall during cell growth. The fibers somehow guide the organization of cell wall synthesis to form an elongated cell wall. Cells that lack this protein usually form cocci-shaped cells.

50) Describe the chemical composition of the peptidoglycan.

Answer:

Difficulty: Medium
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope
Solution: The peptidoglycan is made of glycan layers that are crossed linked to one another by a peptide bridge. The glycan layer is made of alternating units of two amino sugars; N-acetylglucosamine and N-acetylmuramic acid. The glycan chains are crossed linked to each other by short peptides hanging from adjacent N-acetylmuramic acid residues. In many Gram-negative bacteria the terminal D-alanine is lost from the pentapeptides hanging from the N-acetylmuramic acids, and a peptide bond is formed between D-alanine of one peptide and diaminopimelic acid of the other peptide. In Gram-positive bacteria a peptide interbridge is used to connect the peptides from the two adjacent muramic acids. This cross-linking of the two glycan chains is very important as it confers considerable strength to the peptidoglycan structure.

51) What advantage against antibacterials does the outer membrane of Gram-negative bacteria offer when compared to Gram-positive bacteria?

Answer:

Difficulty: Medium
Learning Objective: LO 2.4 Identify the components of the bacterial cytoplasmic membrane and cell wall, and the functions of these structures.
Section Reference: Section 2.4 The cell envelope
Solution: The outer membrane of Gram-negative bacteria offers additional protection against harmful chemicals entering into the cell. Several antibiotics that are very effective against Gram-positive bacteria have no effect on Gram negative bacteria because these chemical are either too large to cross the outer membrane, or cross at a very slow rate. The outer membrane does contain porins that allow the diffusion of small molecules across the membrane, so the cell is able to easily acquire nutrients. But the membrane does act as a barrier to larger molecules, including many antimicrobials like antibiotics and degradative enzymes. Thus, Gram-negative bacteria have an advantage over Gram-positive bacteria in their resistance to antibiotics.

52) Describe the process of chemotaxis.

Answer:

Difficulty: Medium
Learning Objective: LO 2.5 Explain how complex protein structures on the bacterial cell surface allow for motility and interaction with the environment.
Section Reference: Section 2.5 The bacterial cell surface
Solution: The process of chemotaxis is a very complex process and involves many different proteins that are associated with the cell membrane, flagellum motor mechanism, and cytoplasmic proteins. The process of chemotaxis involves a series of runs and tumbles. If the concentration of an attractant is increasing the length of a run increases, but if the attractant concentration is decreasing, tumbling occurs more often. The process involves chemoreceptor proteins found in the outer membrane that are able to sense certain attractants or repellents. When the proteins detect either attractants or repellents, they communicate with regulatory proteins inside the cell. The regulatory proteins interact with the motors of the flagellum to either increase the length of the run or cause the cell to tumble more frequently by reversing the direction of the motors. The length of runs and frequency of tumbles will result in the movement towards an attractant or away from a repellent.

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