Assignment 2: Chapter 3 & 4: Membrane Transport & Tissues

Due: 11:59pm on Monday, January 28, 2013

Note: To understand how points are awarded, read your instructor's Grading Policy.

Get Ready for A&P Video Tutor: Cell Membrane Structure

Watch the Video Tutor on Cell Membrane Structure and then answer the questions below.

Part A

Which of the following is the main component of the cell membrane?

Hint 1. Nonpolar

The molecules that make up the bulk of the cell membrane give the membrane its mostly nonpolar nature.

ANSWER:

- (•) phospholipids
- ( ) cholesterol
- ( ) water
- ( ) carbohydrates

Correct

Although phospholipids have a polar head, the long fatty acid tails are nonpolar, making the membrane mostly nonpolar.

Part B

Which of the following is a characteristic of the cell membrane?

Hint 1. Chemical control of movement

The chemical composition of the cell membrane determines what can and cannot pass through.

ANSWER:

- fully permeable
- impermeable
- semipermeable
- not permeable

Correct

The cell membrane is semipermeable, or selectively permeable, because some things can easily pass through it while others cannot.

Part C

Which of the following is not a major function of proteins in the cell membrane?

Hint 1. Membrane components

Proteins are not the only organic molecules in the cell membrane.

ANSWER:

- acting as receptors
- anchoring cells to other structures
- forming the entire glycocalyx
- forming channels

Correct

The glycocalyx is composed mostly of carbohydrates.

Part D

What part of a cell membrane is usually in contact with the interstitial fluid?

Hint 1. Composition of interstitial fluid

Interstitial fluid contains a lot of water.

ANSWER:

- phosphate heads of phospholipids
- fatty acid tails
- hydrophobic molecules
- cholesterol

Correct

The phosphate heads of the phospholipids are polar, so they are attracted to the polar water molecules.

Art-labeling Activity: Figure 3.3

Part A

Drag the appropriate labels to their respective targets.

ANSWER:

Correct

Chapter 3 Matching Questions 8-14

Part A

Use the figure to match the following.

Drag the appropriate labels to their respective targets.

ANSWER:

Correct

Chapter 3 Multiple Choice Question 10

Part A

Which type of cell junction acts as anchors and distributes tension through a cellular sheet and reduces the chance of tearing when it is subjected to great mechanical stress?

ANSWER:

- (•) desmosomes
- ( ) connexons
- ( ) tight junctions
- ( ) gap junctions

Correct

Chapter 3 True/False Question 5

Part A

Lipid rafts, found in the cell outer membrane surface, are concentrating platforms for certain receptor molecules or for protein molecules needed for cell signaling..

ANSWER:

- (•) True
- ( ) False

Correct

Chapter 3 True/False Question 17

Part A

Cholesterol helps to stabilize the cell membrane while decreasing the mobility of the phospholipids.

ANSWER:

- (•) True
- ( ) False

Correct

A&P Flix: Membrane Transport

Watch the animation, then answer the questions below.

Part A

A primary active transport process is one in which _____.

Hint 1. Factors that drive movement of a substance across the plasma membrane

Recall that diffusion is a passive transport process driven by concentration gradients. More specifically, the random, high-speed movement of ions and molecules increases the likelihood of transport down, rather than against, concentration gradients. However, active transport processes move ions and molecules against their gradients. Thus, they are driven by factors other than concentration gradients.

ANSWER:

- molecules pass directly through the phospholipid bilayer of the plasma membrane
- the plasma membrane folds inward to form a vesicle containing extracellular material
- molecules move across the plasma membrane without an input of energy
- molecules move through transport proteins that have been activated by ATP
- an intracellular vesicle fuses with the plasma membrane and releases its contents to the extracellular fluid

Correct

Yes! You've got it! Primary active transporters, such as the sodium-potassium ATPase (or pump), are activated when ATP is hydrolyzed. This activation allows for the transport of solutes across the plasma membrane against concentration gradients.

Part B

Some transport processes use transport proteins in the plasma membrane, but do not require ATP. This type of transport is known as _____.

Hint 1. Processes that do not use ATP

Passive transport processes do not require ATP. Instead, they rely on the kinetic energy of concentration gradients.

ANSWER:

- simple diffusion
- active transport
- exocytosis
- endocytosis
- facilitated diffusion

Correct

Yes! You've got it! Facilitated diffusion is a passive transport process during which molecules move down their concentration gradients through transport proteins.

Part C

The majority of water molecules moving across plasma membranes by osmosis do so via a process that is most similar to ____.

Hint 1. Osmosis

Osmosis is the movement of water, a lipid-insoluble molecule, across the plasma membrane. It occurs when solute concentrations differ on the two sides of the membrane. Osmosis passively equalizes these concentrations.

ANSWER:

- a process that requires energy from the cell
- simple diffusion
- cotransport
- active transport
- facilitated diffusion

Correct

Yes! You've got it!

Part D

The sodium-potassium pump uses ATP to move sodium and potassium ions across the plasma membrane. This statement describes _____.

Hint 1. Processes that use ATP

Active transport processes are those that require ATP. The sodium-potassium pump becomes active when ATP is hydrolyzed.

ANSWER:

- primary active transport
- facilitated diffusion
- secondary active transport
- exocytosis
- simple diffusion

Correct

Yes! You've got it! The sodium-potassium pump is activated by ATP. This activation allows the pump to transport sodium and potassium ions against their gradients.

Part E

A vesicle fuses with the plasma membrane and releases its contents to the extracellular fluid. This statement describes _____.

Hint 1. Vesicular transport

The transport of solid particles or solutes in bulk across the plasma membrane is known as vesicular transport. This type of transport allows cells to import and export substances across their membranes.

ANSWER:

- facilitated diffusion
- active transport
- exocytosis
- simple diffusion
- endocytosis

Correct

Yes! You've got it! The term exocytosis literally means "out of the cell."

Get Ready for A&P Video Tutor: Osmosis

Watch the Video Tutor on Osmosis and then answer the questions below.

Part A

Which of the following is not required for osmosis to occur?

Hint 1. Special type of diffusion

Osmosis is a special type of diffusion of a specific substance.

ANSWER:

- water
- selectively permeable membrane
- energy
- concentration gradient

Correct

Osmosis is a special type of diffusion, which is always a passive process.

Part B

Which of the following solutions contains the most solute?

Hint 1. Consider the prefix

Solutions are often named according to their relative solute concentration.

ANSWER:

- equilibrium
- isotonic
- hypertonic
- hypotonic

Correct

“Hyper” means “high,” so a hypertonic solution has a higher solute concentration than the solution to which it is being compared.

Part C

In general, to maintain homeostasis the relationship between our intracellular and extracellular fluids should be which of the following?

Hint 1. Homeostasis

Homeostasis refers to a balance or equilibrium.

ANSWER:

- (•) isotonic to each other
- ( ) intracellular should be hypertonic to extracellular
- ( ) intracellular should be hypotonic to extracellular
- ( ) intracellular and extracellular should both be hypertonic

Correct

In order to prevent the cells from either swelling or shrinking, the body fluids should be isotonic, meaning that they are at equilibrium.

Part D

If a person is severely dehydrated, their extracellular fluids will become hypertonic to the intracellular fluid. What do you predict will happen to the person's cells?

Hint 1. Diffusion

Osmosis is a special type of diffusion. What determines the direction of movement in diffusion?

ANSWER:

- ( ) The cells will rupture.
- (•) The cells will lose water and shrink.
- ( ) The cells will swell.
- ( ) Extracellular fluids do not impact cell size, because cells contain intracellular fluid.

Correct

The hypertonic extracellular fluid will draw water out of the hypotonic intracellular fluid, so the cells will shrink. This is called crenulation.

Chapter 3 Reading Quiz Question 3

Part A

Why is the selective permeability of the plasma membrane essential for normal cell function?

ANSWER:

- (•) Selective permeability allows cells to exclude some substances and allow others to pass into or out of the cell.
- ( ) Selective permeability allows cells to determine which proteins they should produce and retain.
- ( ) Selective permeability allows cells to bind to one another in a fluid environment.
- ( ) Selective permeability allows cells to communicate with each other by sharing large and small molecules.

Correct

Selective permeability of the plasma membrane ensures that the continual traffic across the membrane does not include undesirable substances. It also ensures that desirable cell contents are retained within the cell.

Chapter 3 Reading Quiz Question 4

Part A

What is the difference between active and passive transport across the plasma membrane?

ANSWER:

- Active transport means that the cell is actively going after substances that it wants to bring into the cell, whereas passive transport means that the cell just waits for the substance to cross the membrane.
- Active transport is ATP dependent, whereas passive transport uses only the kinetic energy of the particles for movement across the plasma membrane.
- Active transport implies that the cell is working with other cells, whereas passive transport implies that the cell does not cooperate with other cells.
- Active transport is used to move substances down their concentration gradient, whereas passive transport is used to move substances against their concentration gradient.

Correct

In active transport, the cell provides the metabolic energy (ATP) needed to move substances across the plasma membrane (against their concentration gradient). In passive transport, substances cross the plasma membrane (down their concentration gradient) using kinetic energy, without any energy input from the cell.

Chapter 3 Multiple Choice Question 5

Part A

A red blood cell placed in pure water would _____.

ANSWER:

- swell initially, then shrink as equilibrium is reached
- shrink
- neither shrink nor swell
- swell and burst

Correct

Chapter 3 True/False Question 6

Part A

In osmosis, movement of water occurs toward the solution with the lower solute concentration.

ANSWER:

- True
- False

Correct

Chapter 3 True/False Question 8

Part A

A process by which large particles may be taken into the cell for food, protection of the body, or for disposing of old or dead cells is called phagocytosis.

ANSWER:

- True
- False

Correct

Chapter 4 Chapter Test Question 3

Part A

Which of the following increases the surface area of certain epithelial tissues?

ANSWER:

- (•) microvilli
- ( ) basal lamina
- ( ) basement membrane
- ( ) desmosomes
- ( ) cilia

Correct

Microvilli are small finger-like projections that greatly increase the surface area of epithelial cells (thus epithelial tissues), an important attribute of tissues that have a role in absorption and secretion.

Chapter 4 Chapter Test Question 4

Part A

Which of the following is a property of epithelial tissue?

ANSWER:

- (•) Epithelial tissue is innervated.
- ( ) Epithelial tissue is typically unable to regenerate.
- ( ) Epithelial tissue does not exhibit polarity.
- ( ) Epithelial tissue contains blood vessels.

Correct

Epithelial tissue is an innervated, avascular tissue that exhibits polarity. Epithelial tissue is also highly regenerative.

Chapter 4 Chapter Test Question 6

Part A

Where is transitional epithelium found?

ANSWER:

- ( ) in areas involved in absorption
- ( ) in areas involved in filtration
- ( ) in areas subject to wear and tear
- (•) in areas subjected to stretching

Correct

Transitional epithelium is found in the urinary system. It lines the ureters, bladder and proximal part of the urethra-organs that are subjected to distention or stretching as urine passes through or fills them.

Chapter 4 Chapter Test Question 7

Part A

Exocrine glands _____.

ANSWER:

- secrete hormones
- are only unicellular in structure
- secrete substances into blood
- secrete substances onto body surfaces

Correct

Exocrine glands use ducts to secrete substances into the external environment (onto the surfaces of the cutaneous and mucous membranes). Note: "exo" means outside. Endocrine glands are ductless; they secrete hormones into the extracellular fluid of our internal environment. Note: "endo" means inside.

Chapter 4 Chapter Test Question 9

Part A

Which of the following describes a holocrine gland?

ANSWER:

- Holocrine glands secrete their products by exocytosis.
- Holocrine glands secrete their products by rupturing.
- Holocrine glands secrete their products by pinching off the apex of the cell.
- Holocrine glands secrete their products by endocytosis.

Correct

Holocrine glands secrete their products by rupturing. Sebaceous (oil) glands are the only example of holocrine glands in the body.

Chapter 4 Chapter Test Question 23

Part A

All epithelia have two surfaces, an apical surface and a basal surface, that differ in both structure and function.

ANSWER:

- True
- False

Correct

All epithelia exhibit polarity, which is defined by the presence of an apical surface and a basal surface that differ in both structure and function.

Chapter 4 Chapter Test Question 24

Part A

Pseudostratified epithelium consists of multiple cell layers.

ANSWER:

- True
- False

Correct

While pseudostratified epithelium has the illusion of being a multi-layered tissue, it is in fact made up of only one cell layer. The irregular heights of the cells in pseudostratified epithelia give the tissue a layered appearance. In reality, all of the cells in this tissue rest on the basement membrane (i.e., their basal surfaces are in contact with the basement membrane).

Chapter 4 Reading Quiz Question 3

Part A

Which type of gland produces hormones?

ANSWER:

- unicellular exocrine glands
- multicellular exocrine glands
- holocrine glands
- endocrine glands

Correct

Endocrine glands, which are ductless glands, secrete hormones into the interstitial fluid surrounding them. The hormones then diffuse toward and pass through a nearby capillary wall to enter the blood. Circulating throughout the body in the blood stream is how hormones eventually reach their target cells.

Chapter 4 Multiple Choice Question 9

Part A

Which of the following is a single-celled layer of epithelium that forms the lining of serous membranes?

ANSWER:

- simple columnar
- simple cuboidal
- pseudostratified columnar
- simple squamous

Correct

Chapter 4 Multiple Choice Question 21

Part A

_____ epithelium appears to have two or three layers of cells, but all the cells are in contact with the basement membrane.

ANSWER:

- Stratified cuboidal
- Stratified columnar
- Pseudostratified columnar
- Transitional

Correct

Chapter 4 Multiple Choice Question 22

Part A

A many-layered epithelium with cuboidal basal cells and flat cells at its surface would be classified as _____.

ANSWER:

- transitional
- simple cuboidal
- simple squamous
- stratified squamous

Correct

Chapter 4 Multiple Choice Question 33

Part A

Select the correct statement regarding epithelia.

ANSWER:

- Pseudostratified epithelia consist of at least two layers of cells stacked on top of one another.
- Simple squamous epithelia consist of tall, narrow cells.
- Simple epithelia form impermeable barriers to viruses.
- Stratified squamous epithelia are present where protection from abrasion is important.

Correct

Chapter 4 True/False Question 5

Part A

Goblet cells are found within pseudostratified ciliated columnar epithelium.

ANSWER:

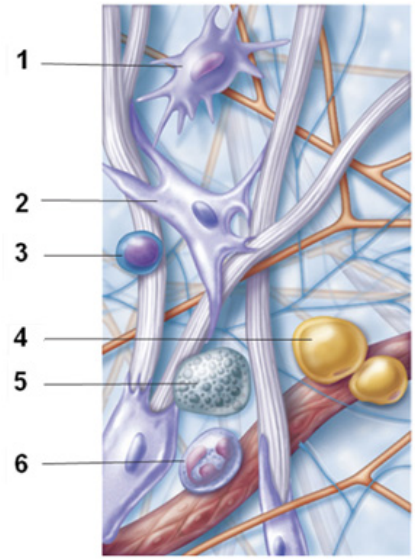
- True
- False

Correct

Art Question Chapter 4 Question 1

Part A

Which of the numbered cell types is primarily responsible for producing protein fibers found in connective tissue proper?



ANSWER:

- 3
- 2
- 5
- 4

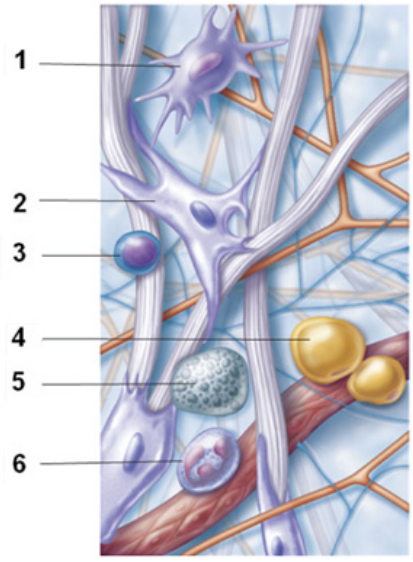
Correct

Cell 2 is a fibroblast, which is the primary producer of the major ECM components in connective tissue proper.

Art Question Chapter 4 Question 3

Part A

Which numbered cell type initiates inflammatory responses to infection or tissue damage?



ANSWER:

- 3
- 4
- 5
- 6

Correct

Cell 5 is a mast cell, which produces and secretes inflammation-triggering chemicals such as histamine. Note the secretory granules within the pictured cell.

Chapter 4 Chapter Test Question 13

Part A

In connective tissue, the role of collagen fibers is to _____.

ANSWER:

- provide tensile strength
- retain fluid
- form delicate networks around blood vessels and support the soft tissue of organs
- provide elasticity

Correct

Collagen fibers are extremely tough and provide high tensile strength (that is, the ability to resist being pulled apart) to the matrix. Stress tests show that collagen fibers are stronger than steel fibers of the same size!

Chapter 4 Chapter Test Question 16

Part A

_____ are highly phagocytic cells that are a part of the body's defense system. These cells can be localized (fixed), or they can wander throughout the body.

ANSWER:

- Eosinophils
- Mast cells
- Basophils
- Erythrocytes (RBC)
- Macrophages (selected)

Correct

Macrophages, which are peppered throughout loose connective tissue, bone marrow, and lymphatic tissue, may be attached to connective tissue fibers (fixed) or may migrate freely through the matrix. They phagocytize a broad variety of foreign materials, ranging from foreign molecules to entire bacteria to dust particles. These "big eaters" also dispose of dead tissue cells, and they are central actors in the immune system.

Chapter 4 Reading Quiz Question 4

Part A

Why are adipose, blood, and bone all considered to be connective tissues?

ANSWER:

- They have the same types of cells.
- They all have collagen and elastic fibers in their extracellular matrix.
- They connect to each other.
- They have a common origin, mesenchyme. (selected)

Correct

Adipose, bone, and blood (like all connective tissues) are derived from mesenchyme, an embryonic tissue. Also common to all connective tissues is the presence of cells and an extracellular matrix that consists of fibers bathed in ground substance.

Chapter 4 Reading Quiz Question 9

Part A

What is the most obvious structural feature of areolar connective tissue?

ANSWER:

- the numerous types of cells that are present
- the presence of fat cells
- the presence of blood cells mixed with the areolar cells
- the loose arrangement of its fibers (selected)

Correct

The most obvious structural feature of this tissue is the loose arrangement of its fibers. The rest of the matrix, occupied by ground substance, appears to be empty space when viewed through the microscope. Note: the Latin term *areola* means "a small open space."

Chapter 4 Matching Questions 1-5

Part A

Use the figure to match the following functions.

Drag the appropriate labels to their respective targets.

ANSWER:

Correct

Chapter 4 Multiple Choice Question 23

Part A

Edema occurs when

ANSWER:

- adipose cells enlarge by pinocytosis
- reticular connective tissue invades the area
- areolar tissue soaks up excess fluid in an inflamed area
- collagen fibers enlarge as they change from dehydrated to hydrated shape

Correct

Chapter 4 Multiple Choice Question 29

Part A

What are the three main components of connective tissue?

ANSWER:

- fibroblasts, chondroblasts, and osteoblasts
- alveoli, fibrous capsule, and secretory cells
- ground substance, fibers, and cells
- collagen, elastin, and reticular fibers

Correct

Chapter 4 Multiple Choice Question 34

Part A

Select the correct statement regarding adipose tissue.

ANSWER:

- Most of the cell volume is occupied by the nucleus.
- It is composed mostly of extracellular matrix.
- Mature adipose cells are highly mitotic.
- Its primary function is nutrient storage.

Correct

Chapter 4 True/False Question 2

Part A

The role of brown fat is to warm the body; whereas, the role of white fat is to store nutrients.

ANSWER:

- True
- False

Correct

Chapter 4 True/False Question 24

Part A

Blood is considered a type of connective tissue.

ANSWER:

- True
- False

Correct

Score Summary:

Your score on this assignment is 95.8%.
You received 36.39 out of a possible total of 38 points.