

Name: \_\_\_\_\_

Period: \_\_\_\_\_

## Unit 3: Cells, Histology, and Integumentary

### Test Review

1. Describe the four principle parts of a generalized animal cell and their functions.
  - a. Nucleus:
  - b. cytosol/cytoplasm:
  - c. organelles:
  - d. cell membrane:
2. Describe the structure and function of the cell membrane.
3. Define the term selective permeability.
4. Describe each of the following transport processes and classify them as active or passive.
  - a. diffusion:
  - b. facilitated diffusion:
  - c. dialysis:
  - d. filtration:
  - e. phagocytosis:
  - f. exocytosis:
5. Define and describe the major functions of the following structures within the cell and nucleus.
  - a. nucleoli:
  - b. gene:
  - c. chromatin:
  - d. chromosome:

6. Identify the major functions and characteristics of the following organelles or cell membrane modifications.
  - a. endoplasmic reticulum:
  - b. golgi complex/apparatus:
  - c. mitochondria:
  - d. lysosomes:
  - e. peroxisomes:
  - f. microfilaments:
  - g. microtubules:
  - h. centrioles:
  - i. centrosomes:
  - j. flagella:
  - k. cilia:
  - l. microvilli:
  - m. vacuole:
7. Relate the following to cell division.
  - a. mitosis:
  - b. meiosis:
  - c. cytokinesis:
8. Identify the general functions of each of the principle types of tissues.
  - a.
  - b.
  - c.
  - d.

9. Compare and contrast exocrine and endocrine glands.
  
10. Differentiate among the following types of membranes.
  - a. mucous:
  
  - b. serous:
  
  - c. synovial:
  
  - d. cutaneous:
  
11. Describe the general functions of the following structures associated with the integumentary system:
  - a. skin
  
  - b. glands
  
  - c. hair
  
  - d. nails
  
12. List and describe the three basic layers of the skin.
  - a.
  
  - b.
  
  - c.
  
13. Describe the functions of sudoriferous (sweat) and sebaceous (oil) glands.
  
  
14. Describe the following diseases/disorders of the skin:
  - a. Acne:
  
  - b. Skin Cancer
  
  - c. Decubitus Ulcers:

## Unit 3: Cells, Histology, and Integumentary

### Test Review - KEY

1. Describe the four principle parts of a generalized animal cell and their functions.
  - a. Nucleus: The control center of the cell which directs all cellular activities.
  - b. cytosol/cytoplasm: The semi-fluid portion of the cytoplasm or intracellular fluid.
    - a. Site of some chemical reactions (Anaerobic Phase of Cellular Respiration)
    - b. Site where new substances are made for cellular use.
    - c. Packaging of chemicals for transport to other parts of the body
    - d. Facilitates the excretion of waste material.
    - e. Contains the cellular organelles
  - c. organelles: Permanent small organs found within the cytosol. Each organelle has unique morphology making them highly specialized for specific cellular activities.
  - d. cell membrane: The outer, limiting membrane separating the cell's internal parts from the extracellular material and the external environment.
2. Describe the structure and function of the cell membrane.

The cell membrane structure is a phospholipid bilayer. It has heads that face outward while the tails face inward. This creates a polar hydrophilic phosphoric head and a non-polar hydrophobic tail. Proteins, cholesterol, and carbohydrates are embedded in the bilayer.

Functions:

  1. Forms the outermost limit of the cell.
  2. Regulates what enters and exits the cell.
  3. Acts as a receptor for molecules such as hormones
  4. Function as channels or pores allowing substances to move through the membrane.
  5. Some globular proteins function as enzymes that promote specific chemical reactions.
  6. Helps to identify the cell as part of the body.
3. Define the term selective permeability.

The ability of the cell membrane to allow certain substance to enter or exit the cell while not permitting others to do the same.
4. Describe each of the following transport processes and classify them as active or passive.
  - a. diffusion: (passive) Movement of molecules or ions from a region of higher concentration of molecules to a region of low concentration of molecules until the molecules are evenly distributed.

- b. facilitated diffusion: (passive) Proteins in the cell membrane function as carriers of molecules to transport them through the cell membrane.
  - c. dialysis: (passive) Diffusion of small solute particles, but not larger ones, through a selectively permeable membrane resulting in separation of large and small solutes.
  - d. filtration: (passive) The process of removing particles from a solution by allowing the liquid to pass through a membrane. Controlled and influenced by gravity or hydrostatic pressure.
  - e. phagocytosis: (active) (cell eating) Occurs when a portion of the cell membrane pinches off around solid material forming a sac-like structure called a vesicle. The vesicle moves into the interior of the cell, the membrane breaks down, and the solid particle is now inside the cell.
  - f. exocytosis: (active) Any remaining residue from phagocytosis may be expelled from the cell when a vesicle joins with the cell membrane and the contents are moved out of the cell.
5. Define and describe the major functions of the following structures within the cell and nucleus.
- a. nucleoli: Responsible for producing ribosomes and RNA.
  - b. gene: A section of DNA that codes for specific proteins such as eye color, blood type, etc.
  - c. chromatin: Thread-like mass of DNA found in the nucleus of cells.
  - d. chromosome: Contains the genes
6. Identify the major functions and characteristics of the following organelles or cell membrane modifications.
- a. endoplasmic reticulum: Composed of double membranous fluid-filled channels which are continuous with the nuclear membrane.  
Rough ER: ribosomes attached  
Smooth ER: no ribosomes attached  
Functions of Endoplasmic Reticulum
    - a. Provides surface area for many chemical reactions.
    - b. intracellular transport system
    - c. lipid synthesis (agranular - smooth ER)
    - d. protein synthesis (granular - rough ER)
    - e. detoxification of certain molecules
    - f. release of calcium ions involved in muscle contraction
  - b. golgi complex/apparatus: composed of flattened membranous sacs (4 - 8) stacked upon one another and usually are located near the nucleus.  
Functions of the Golgi Complex include processing, sorting, packaging, and delivering proteins to various parts of the cell
  - c. mitochondria: A small, slipper-shaped organelle surrounded by a double membrane.  
Function to produce energy (ATP) during the aerobic phase of cellular respiration.

d. lysosomes: Small sac-like structure surrounded by a single membrane. Contains enzymes.

Functions to digest excess of worn out organelles, food particles, or engulfed bacteria and viruses.

e. peroxisomes: Very small sac-like structures surrounded by a single membrane.

Usually found in cells of the liver and kidneys which function to detoxify molecules such as alcohol and hydrogen peroxide.

f. microfilaments: Are thin and solid, thread-like protein strands

Associated with the cell's ability to move, maintain its structure, help in muscle contraction as well as moving organelles throughout the cell.

g. microtubules: Are thin, hollow tubes made of protein.

Function to maintain a complex internal structure that provides support and shape to the cell.

h. centrioles: A pair of cylindrical structures composed of microtubules located within the centrosome.

In humans, centrioles assist with the formation of the spindle and help to separate chromosomes during mitosis and meiosis.

i. centrosomes: Dense area of spherical cytoplasm generally located near the nucleus. Contain one or two centrioles, (which are used during mitosis and meiosis).

j. flagella: A single whip-like projection modification of the cell membrane

Used for locomotion of the cell.

k. cilia: Small, hair-like projections of the cell membrane composed of microtubules.

Function in moving things along the surface of the cell or moving the cell itself.

l. microvilli: Folds in the free surface of the cell membrane.

Designed to increase surface area to increase the area used for the absorption of nutrients.

m. vacuole: Fluid-filled organelles enclosed by a membrane.

Used to store water or digested food.

7. Relate the following to cell division.

a. mitosis: The division of body (somatic) cells where each daughter cell contains the same numbers of chromosomes as the parent cell. The purpose is to increase the number of cells needed for growth and repair.

- b. meiosis: Cell division that occurs in the ovaries to form eggs (ova) and in the testes to form sperm. The chromosome number is reduced by one half.
  - c. cytokinesis: The separation of the cytoplasm into two parts. This occurs in the later stages of mitosis to divide the cytosol and cellular organelles.
8. Identify the general functions of each of the principle types of tissues.
- a. Epithelia tissue covers body surfaces, lines body cavities and ducts, and forms glands.
  - b. Connective tissue protects and supports the body, forms the framework of organs, binds organs together, and stores energy.
  - c. Muscle tissue: produces movement through the generation of force by converting chemical energy to mechanical energy.
  - d. Nervous tissue: Initiates, transmits, and interprets nerve impulses to coordinate body activities.
9. Compare and contrast exocrine and endocrine glands.  
Exocrine glands secrete their products into ducts (tubes) that empty at the surface or lining of the covering epithelium or directly onto a free surface.  
Endocrine Glands are ductless glands that secrete their products into the extracellular spaces where it diffuses into the blood.
10. Differentiate among the following types of membranes.
- a. mucous: Lines body cavities that open directly to the exterior.
  - b. serous: Lines body cavities that do not open to the exterior and covers organs found within those closed body cavities.
  - c. synovial: Lines the cavities of freely movable joints and secretes synovial fluid which lubricates the articular cartilage at the ends of bones as they move to nourishes the articular cartilage covering the bones that form the joints
  - d. cutaneous: Provide some protection for the body against U-V light, microorganisms, and water loss.
11. Describe the general functions of the following structures associated with the integumentary system:
- a. skin:
    - 1. Regulation of Body Temperature: Produces perspiration by the sudoriferous glands (sweat glands) to help maintain normal body temperature

2. Protection: Provides a physical barrier between the environment and underlying tissues. Provides protection from abrasions, bacterial invasion, dehydration, and ultraviolet radiation
3. Reception of Stimuli: Contains numerous nerve endings and receptors to detect touch, pressure, and pain.
4. Excretion: Eliminates water, salts and organic compounds through the skin
5. Immunity: Certain cells of the epidermis are important components of the immunological system
6. Synthesis of Vitamin D: in the presence of ultraviolet radiation (sunlight), the skin synthesizes Vitamin D which is necessary for the absorption of calcium.

b. glands:

a. Sebaceous (Oil) Glands

Secrete an oily substance called sebum, a mixture of fats, cholesterol, protein, and inorganic salts

Keeps hair from drying out and becoming brittle

Keeps skin soft and pliable

Inhibits the growth of certain bacteria

b. Sudoriferous (sweat) glands

Principle function is regulation of body temperature by evaporation of water

Functions in the elimination of waste products

c. hair: Primary function is protection

a. Guards scalp from injury and sunlight

b. Eyebrows and eyelashes protect the eyes

c. Hair in the external ear and nostrils prevent insects and dust from entering these cavities

d. nails: Help us grasp and manipulate small objects

Provides protection against trauma to the ends of our digits

12. List and describe the three basic layers of the skin.

a. Epidermis: the outermost layer of skin.

b. Dermis: the true skin

c. Subcutaneous layer (Hypodermis) is the layer of the skin which attaches to underlying organs such as muscle or bone.

13. Describe the functions of sudoriferous (sweat) and sebaceous (oil) glands.

Sudoriferous (sweat) glands

Principle function is regulation of body temperature by evaporation of water



Functions in the elimination of waste products

Sebaceous (Oil) Glands

Secrete an oily substance called sebum, a mixture of fats, cholesterol, protein, and inorganic salts

Keeps hair from drying out and becoming brittle

Keeps skin soft and pliable

Inhibits the growth of certain bacteria

14. Describe the following diseases/disorders of the skin:

a. Acne: An inflammatory disease of the sebaceous glands and hair follicles of the skin characterized by comedones, papules, and pustules.

b. Skin Cancer: A generally definition for cancer is the uncontrolled cell growth derived from normal tissues, and able to kill the host by the spread of the cells from the site of origin to distant sites or by local spreading.

c. Decubitus Ulcers: Also known as a pressure sore or bed sore, it is an ulcer, initially of the skin, due to prolonged pressure against areas of the skin over bony areas for a person who is bed-ridden.