

**Chapter 2: Multiple Choice -- This activity contains 15 questions.**

1. Chemical reactivity and the formation of chemical bonds between atoms is a function of which subatomic particles?
- neutrons
  - protons
  - electrons
  - nuclei
2. Carbon-12 has six protons and six neutrons in its nucleus. Carbon-14 has six protons and eight neutrons in its nucleus and is radioactive. Carbon-14 is an example of a(n) \_\_\_\_\_.
- isomer
  - isotope
  - ion
  - molecule
3. Glucose is an example of a \_\_\_\_\_.
- disaccharide
  - polysaccharide
  - lipid
  - monosaccharide
4. How does the H<sup>+</sup> concentration of a solution with a pH of 5 compare to a solution with a pH of 3?
- Its H<sup>+</sup> concentration is 1,000 times less.
  - Its H<sup>+</sup> concentration is 100 times less.
  - Its H<sup>+</sup> concentration is 100 times greater.
  - Its H<sup>+</sup> concentration is 20 times greater
5. Hydrogen bonds occur between \_\_\_\_\_.
- two oppositely charged ions in a solution
  - two hydrogen atoms
  - the hydrogen atom and the oxygen atom of one water molecule
  - oppositely charged regions of polar molecules that contain covalently bonded hydrogen

6.

Which of the following statements describing water is FALSE?

- The evaporation of water causes the body to lose heat rapidly.
- Water comprises 30% of blood.
- Water helps regulate body temperature.
- Water is the ideal solvent in living organisms.

7.

Covalent bonds \_\_\_\_\_.

- occur between atoms sharing a pair of electrons
- hold separate water molecules together in solution
- are weaker than ionic bonds
- occur between oppositely charged ions

8.

The atomic number of sodium is 11, and the atomic mass (mass number) is 23. This indicates that one atom of sodium will contain \_\_\_\_\_.

- 11 protons and 12 neutrons
- 11 protons and 23 neutrons
- 12 protons and 11 neutrons
- 12 protons and 23 neutrons

9.

A substance that resists or minimizes changes in pH when an acid or base is added to a solution is \_\_\_\_\_.

- a sugar
- water
- salt
- a buffer

10.

What type of bond is found in the fatty acid tail of an unsaturated fat that is not found in the fatty acid tail of a saturated fat?

- an ionic bond
- a double bond
- a covalent bond
- a single bond

11.

Which of the following is the pH of a strong base?

- 2
- 6
- 9
- 13

12.

A polar molecule can be described as being \_\_\_\_\_.

- nonpolar ionic
- hydrophobic
- hard to dissolve in water
- hydrophilic

13.

What determines the way a protein will fold up to form the tertiary structure?

- interactions with lipid molecules
- the quaternary structure of the protein
- interactions with DNA and RNA
- the placement of polar and charged groups in the chain of amino acids

14.

High temperatures or changes in pH can permanently disrupt protein structure and function. This is called \_\_\_\_\_.

- speeding up the rate of chemical reactions
- dehydration synthesis
- denaturation
- hydrolysis

15.

Which of the following is an example of a steroid?

- phospholipid
- insulin
- unsaturated fats
- cholesterol

**Chapter 3: Multiple Choice -- This activity contains 15 questions.**

1. Which type of microscope provides detailed images of the structure of organelles within cells?
- compound light microscope
  - scanning electron microscope
  - transmission electron microscope
  - dissecting microscope
2. ATP is produced during several different stages of cellular respiration. During which of these stages is most of the ATP produced?
- electron transport chain
  - citric acid cycle
  - preparatory step
  - glycolysis
3. The cytoskeleton \_\_\_\_\_.
- consists of microtubules and microfilaments
  - attaches to receptor proteins found in the plasma membrane
  - forms a framework for the nuclear membrane
  - is composed mainly of lipids
4. In cellular respiration, one glucose molecule, in the presence of oxygen, will produce \_\_\_\_\_.
- carbon dioxide, water, and about 36 ATP
  - only 36 ATP
  - carbon dioxide, water, and two ATP
  - only water and 36 ATP
5. Which of the following can diffuse directly across plasma membranes, moving right through the phospholipid bilayer?
- water
  - CO<sub>2</sub> and O<sub>2</sub>
  - Na<sup>+</sup> ions
  - glucose

6. Substance X is more concentrated in the extracellular fluid than in the intracellular fluid. Substance X will move OUT of the cell by \_\_\_\_\_.
- osmosis
  - diffusion
  - active transport
  - facilitated diffusion
7. Which best describes a stem cell?
- an artificially formed cell made in a lab
  - an early embryonic cell that is undifferentiated and can develop into any of the tissues of the body
  - an embryo
  - a sperm or an egg cell
8. Most of the chemical compounds produced by the body are synthesized by the \_\_\_\_\_.
- nucleolus
  - rough endoplasmic reticulum
  - Golgi apparatus
  - endocytic vesicles
9. What molecule in the structure of the plasma membrane prevents the membrane from becoming too fluid?
- phospholipids
  - cholesterol
  - carbohydrates
  - DNA
10. Which of the following is present in eukaryotic cells but not in prokaryotic cells?
- a plasma membrane
  - DNA
  - cytoplasm
  - a nuclear membrane

11.

What was the outcome of experimental stem cell therapy surgery that was performed in the early 1990s in the United States on Parkinson's disease patients?

- These patients are still alive and doing very well.
- The procedure was considered a miserable failure.
- The procedure only worked in women, but not in men.
- The actual outcome is still being assessed before the publication of the final outcome

12.

Which of the following statements comparing flagella and cilia is correct?

- Cilia are generally longer than flagella.
- There are generally only one or two cilia per cell, whereas there are many flagella per cell.
- Cilia generally push fluid and materials by the cell, which remains stationary, whereas flagella propel a cell from one place to another.
- The role of cilia is to increase surface area for membrane transport whereas flagella are important in membrane signaling.

13.

Which radioactive isotope has been used to determine the relative age of cells in an individual's body?

- $^{14}\text{C}$
- $^{235}\text{U}$
- $^{131}\text{I}$
- $^3\text{H}$

14.

What does the sodium potassium pump require to function normally?

- cholesterol in the cellular membrane
- ATP
- a concentration gradient
- a hypertonic condition

15.

Which type of cellular vesicle stores materials destined for release via exocytosis?

- endocytotic
- lysosomes
- peroxisomes
- secretory

**Chapter 4: Multiple Choice -- This activity contains 15 questions.**

1. What kind of control system will detect a change in a controlled variable and reverse the change to restore the variable to its desired value (set point)?
- negative feedback control system
  - cyclic feedback control system
  - positive feedback control system
  - monitored feedback control system
2. What is the abnormal condition "microchimerism"?
- a fifth type of human tissue that is sometimes present
  - the presence of many organ systems in an organism
  - the presence of multiple tissue types in many organs
  - the presence of foreign cells from another individual residing within one's body
3. In fibrous connective tissue, the proteins that make up the fibers of the tissue are secreted by \_\_\_\_\_.
- mast cells
  - the ground substance
  - red blood cells
  - fibroblasts
4. Sweat glands and the salivary glands are types of \_\_\_\_\_ tissue.
- fibrous connective
  - specialized connective tissue
  - muscle
  - epithelial
5. Tendons and ligaments are composed of \_\_\_\_\_.
- elastic connective tissue
  - dense connective tissue
  - loose connective tissue
  - reticular connective tissue

6. The epidermis is waterproof and tough due to the activity of \_\_\_\_\_.

- melanocytes
- keratinocytes
- oil glands
- papillae

7. The knee is \_\_\_\_\_ to the foot.

- posterior
- inferior
- distal
- proximal

8. Which body cavity contains the lungs and the heart?

- the posterior cavity
- the pleural cavity
- the thoracic cavity
- the pericardial cavity

9. Which of the following regarding fat cells is NOT true?

- Obese people typically have more fat cells than lean people.
- A person's fat mass increases due to an increase in the number of fat cells.
- Fat tissue is also called adipose tissue.
- The number of fat cells in an individual's body is largely determined by genetics

10. Which of the following is a FALSE statement about cartilage?

- Cartilage contains small chambers called lacunae.
- Cartilage is composed primarily of loose connective tissue.
- The ground substance of cartilage is produced by chondroblasts.
- Cartilage is a transition tissue that can give rise to bone



11. The basement membrane \_\_\_\_\_.

- is composed of epithelial cells
- is composed predominantly of lipids
- functions to anchor cells to the stronger connective tissue beneath it
- is located directly below the dermis

12. What is the current expert opinion on the safety of regular use of tanning beds?

- Regular tanning accelerates aging of the skin and increases the risk of developing skin cancer.
- Regular tanning reduces the risk of certain skin cancers.
- Regular tanning promotes optimal health of the skin.
- Regular tanning is essential to ensure adequate Vitamin D levels

13. Which of the following is NOT part of a neuron?

- axon
- cell body
- dendrites
- glials

14. Which cell type produces a dark skin pigment that protects the skin from ultraviolet radiation damage?

- adipocyte
- keratinocyte
- fibroblast
- melanocyte

15. Which of the following would NOT be found in the dermis?

- blood vessels
- keratinocytes
- adipocytes
- sebaceous glands

**Chapter 5: Multiple Choice -- This activity contains 15 questions.**

1. Actions such as flexion, extension, rotation, abduction, and adduction are possible in which of the following joints?
- all types of joints
  - cartilaginous joints
  - synovial joints
  - fibrous joints
2. The homeostatic maintenance and remodeling of bone structure depends on the balanced activity of \_\_\_\_\_.
- growth hormone and testosterone
  - chondroblasts and osteoblasts
  - osteoclasts and osteoblasts
  - growth hormone and calcitonin
3. Which statement concerning the growth plate is true?
- Growth plates are found in long bones that are still developing.
  - As a bone lengthens, chondroblasts deposit new cartilage on the inside of the growth plate.
  - The growth plate is composed of epithelial tissue.
  - The growth plates in long bones move toward each other as the long bone develops
4. Low levels of calcium and phosphate ions in the blood would stimulate the activity of \_\_\_\_\_.
- osteoclasts
  - chondrocytes
  - osteocytes
  - osteoblasts
5. Cylindrical structures in compact bone containing osteocytes arranged around a central canal are known as \_\_\_\_\_.
- canaliculi
  - trabeculae
  - osteons
  - lacunae

6. The process of ossification begins when \_\_\_\_\_.
- osteoblasts secrete osteoid
  - osteocytes invade the area
  - blood vessels enter the area
  - chondroblasts die
7. The production of new blood cells requires the activity of \_\_\_\_\_.
- stem cells in the red marrow
  - osteoblasts in the periosteum
  - stem cells in the yellow marrow
  - osteocytes
8. Which of the following conditions might an astronaut living in zero gravity develop, due to reduced stress on his bones?
- tendinitis
  - osteoporosis
  - rheumatoid arthritis
  - osteoarthritis
9. The upper limbs are attached to the axial skeleton and supported by the \_\_\_\_\_.
- sternum
  - rib cage
  - pelvic girdle
  - pectoral girdle
10. A parent with a rather short child wonders whether the child is still growing. The physician requests that the child have an X-ray to examine the bones. What is he looking for?
- to see if the cartilaginous growth plates have been converted to bone
  - to determine the density of the compact bone layer
  - to view the amount of red bone marrow
  - to examine the integrity of the joint cartilage

11.

Which of the following is NOT a feature of intervertebral disks?

- They serve as a shock absorber.
- They mark the division between each of the five anatomical regions of the vertebral column.
- They permit a small degree of movement.
- They are composed of fibrocartilage

12.

Which of the following occurs in rheumatoid arthritis, but not in osteoarthritis?

- There is joint pain.
- The joint becomes inflamed.
- The immune system attacks the body's own joint tissues.
- Joint function is reduced

13.

Which of the following is correct concerning sprains?

- Sprains rarely cause swelling and pain.
- Sprains usually heal quickly even though the ligaments have a poor blood supply.
- Torn ligaments will heal on their own.
- A sprained knee can cause long-term problems if the ligaments are torn.

14.

What best describes the function of a tendon?

- to connect two bones together at a joint
- to connect a muscle to a bone
- to connect two muscles together
- to reinforce the structure of a joint and make it stronger

15.

Which of the following is NOT a feature of having a herniated vertebral disk?

- Intense back pain is caused when the slipped disk presses against the spinal cord nerves.
- Surgical fusion of two adjacent vertebrae will alleviate the problem and cause no reduction in flexibility.
- Herniated disks are most commonly found in the lumbar region of the back.
- Surgical procedures can be performed to alleviate the pain of a damaged disk.

**Chapter 6: Multiple Choice -- This activity contains 15 questions.**

1. The contractile unit of a muscle is \_\_\_\_\_.
- a myofibril
  - a fascicle
  - a muscle fiber
  - a sarcomere
2. All of the following happen during aerobic training EXCEPT \_\_\_\_\_.
- the number of muscle cells increases
  - the number of mitochondria increase
  - the number of capillaries supplying muscle increases
  - the amount of myoglobin increases
3. In which of the following ways is cardiac muscle similar to skeletal muscle?
- Cardiac and skeletal muscle are both involuntary muscles.
  - Cardiac and skeletal muscle cells are both joined to similar cells by intercalated disks and gap junctions.
  - Cardiac muscle and skeletal muscle are both striated.
  - Cardiac and skeletal muscle are both composed of long cylindrical multinucleated cells
4. Which of the following events does NOT occur during muscle contraction??
- Myosin filaments shorten.
  - Sarcomeres shorten.
  - Actin filaments shorten.
  - A phosphate group is removed from ATP to form ADP
5. Fascicles contain many \_\_\_\_\_ bound in a connective tissue sheath.
- actin and myosin filaments
  - myofibrils
  - individual muscle cells
  - whole muscles

6. Fast-twitch muscle fibers \_\_\_\_\_.

- are well supplied with blood vessels
- have few mitochondria
- break down ATP slowly
- are called red fibers

7. Summation increases muscle force by increasing \_\_\_\_\_.

- the oxygen delivered to the muscles
- the rate of stimulation
- the availability of ATP
- the number of motor units being stimulated

8. The cell membrane of a muscle cell will generate an electrical impulse in response to \_\_\_\_\_.

- the release of acetylcholine from the sarcoplasmic reticulum
- the release of calcium into the cytoplasm
- the binding of acetylcholine to membrane receptors
- the binding of actin to myosin

9. When pushing against a stationary wall, what type of muscle contraction is generated?

- hypertonic
- isometric contraction
- aerobic
- isotonic contraction

10. Most anabolic steroids that are used to increase muscle mass are derivatives of the natural hormone \_\_\_\_\_.

- erythropoietin
- estrogen
- testosterone
- growth hormone

11. The sliding filaments that move relative to each other during muscle contraction are \_\_\_\_\_.
- the individual muscle fibers
  - actin and myosin filaments
  - troponin and tropomyosin
  - myofibrils
12. Which of the following is NOT a function of muscles?
- resisting movement
  - producing movement
  - synthesizing hormones
  - generating heat
13. Which of the following is a genetic disease that leads to the death of muscle cells?
- tetanus
  - fasciitis
  - muscular dystrophy
  - muscle cramps
14. In which of the following muscle groups would large motor units be found?
- in the thigh and leg muscles
  - in the hands and fingers
  - around the lips and mouth
  - in the eyelids
15. Once the motor neuron sends a signal that initiates an electrical impulse on the surface of a muscle cell, what will happen next?
- Acetylcholine will be released.
  - Calcium is returned to the sarcoplasmic reticulum by active transport.
  - Calcium will be released from the sarcoplasmic reticulum.
  - The troponin-tropomyosin complex exposes the myosin binding sites on actin.

**Chapter 7: Multiple Choice --This activity contains 15 questions.**

1. An individual with blood type O negative can donate blood to individuals with which of the following blood types?
- A+ and O+ only
  - O+ and O- only
  - AB+, AB-, A+, A-, B+, B-, O+, O-
  - O- only
2. A person has been feeling low on energy and is easily fatigued. A blood test reveals a hematocrit of 32%, while all other parameters are normal. Which of the following is a likely diagnosis?
- bacterial infection
  - multiple myeloma
  - mononucleosis
  - anemia
3. Which of the following is NOT directly involved with hemostasis?
- red blood cells
  - calcium ions
  - fibrinogen
  - platelets
4. A person is diagnosed with "thrombocytopenia": a deficiency of platelets. What would be a primary symptom of this condition?
- impaired blood clotting
  - increased susceptibility to infection
  - fatigue and low energy level
  - lack of inflammatory responses
5. Individuals who have the Rh antigen on their red blood cells will be:
- O+.
  - Rh+.
  - Rh-.
  - AB-.



6. Pernicious anemia results from
- too few hemoglobin molecules in each red blood cell.
  - a deficiency in stem cell production in the bone marrow.
  - a deficiency of vitamin B12.
  - excessive blood loss
7. Plasma proteins do all of the following except
- help to protect against infections and illness
  - synthesize hormones
  - transport substances in the blood
  - aid in the regulation of water balance
8. A person with kidney failure may become anemic, due to deficient production of
- thrombin
  - erythropoietin.
  - Rh factor
  - fibrin
9. What do red blood cells transport?
- carbon dioxide only
  - oxygen only
  - mostly carbon dioxide and some oxygen
  - mostly oxygen and some carbon dioxide
10. Red blood cells
- do not have a nucleus.
  - give rise to white blood cells and platelets.
  - destroy damaged WBCs by phagocytosis.
  - are long-lived
11. Stem cells are located in \_\_\_\_\_ and give rise to \_\_\_\_\_.

- red marrow; only red blood cells
- red marrow; all formed elements
- yellow marrow; platelets
- yellow marrow; all formed elements

12.

The main phagocytic cells found in the body are:

- eosinophils and basophils
- macrophages and neutrophils
- cytotoxic T cells and plasma cells
- macrophages and basophils

13.

The formed elements of the blood include all of the following except:

- proteins
- platelets
- white blood cells
- red blood cells

14.

Antibodies are:

- lipids that specifically bind to their target antigen.
- carbohydrates that inactivate foreign cells by clumping them.
- proteins that specifically inactivate infectious antibodies by preventing their entry into cells.
- gamma globulins

15.

A person who is ill has a blood test run that demonstrates an overabundance of eosinophils. What might this indicate?

- Thrombocytopenia
- anemia
- Multiple myeloma
- a parasitic infection

1.

An ECG measures \_\_\_\_\_.

- blood volume
- the pumping action of the heart
- blood pressure
- the electrical activity of the heart

2.

When the coronary arteries become clogged and blood flow to the heart is reduced, a person may experience cramping chest pain upon exertion, prior to a full-blown heart attack. This condition is called \_\_\_\_\_.

- angina pectoris
- myocardial infarction
- cardiac arrest
- stroke

3.

When the heart becomes weaker and less efficient at pumping blood, the blood may back up in the veins and cause a condition known as \_\_\_\_\_.

- myocardial infarction
- congestive heart failure
- ventricular fibrillation
- stroke

4.

Blood flows from the right ventricle to the \_\_\_\_\_.

- aorta
- pulmonary arteries
- left ventricle
- right atrium

5.

A person's resting blood pressure is 190/90 mm Hg. What condition is present?

- arrhythmia
- hypertension
- stroke
- embolism

6. In which blood vessels does most of the exchange of nutrients and wastes between the blood and body tissues occur?
- veins
  - arteries
  - coronary arteries
  - capillaries
7. Homeostatic regulation of the cardiovascular system is designed to maintain \_\_\_\_\_.
- constant arterial blood pressure
  - constant venous blood pressure
  - constant cardiac output
  - constant blood volume
8. When listening to a patient's heart with a stethoscope, a physician hears an abnormality in the "lub DUB" sounds of the heart valves. He has detected \_\_\_\_\_.
- hypertension
  - a heart murmur
  - an embolism
  - an arrhythmia
9. Semilunar valves prevent blood from flowing \_\_\_\_\_.
- backward into an atrium
  - backward into a ventricle
  - backward into a vein
  - backward into an artery
10. The cardiac conduction system initiates and delivers an electrical impulse that begins in the \_\_\_\_\_.
- atrioventricular node
  - sinoatrial node
  - Purkinje fibers
  - atrioventricular bundle

11.

Hypertension is caused by all of the following EXCEPT \_\_\_\_\_.

- periodic elevated blood pressure levels
- hardened arteries
- high salt intake in the diet
- narrowed blood vessels

12.

The systemic circuit delivers \_\_\_\_\_.

- oxygenated blood to the lungs
- deoxygenated blood to the lungs
- oxygenated blood to the body
- oxygenated blood to the heart

13.

Which of the following behaviors will NOT decrease your risk of cardiovascular disease?

- maintaining low blood cholesterol levels
- avoiding all stress
- not smoking
- regular exercise

14.

All of the following statements are TRUE about arteries EXCEPT \_\_\_\_\_.

- arterial walls have a thicker layer of smooth muscle than found in venous walls
- arteries have one-way valves
- arteries carry blood away from the heart
- arteries are under higher pressure than veins

15.

Which of the following statements describing hypertension is FALSE?

- Hypertension is easily diagnosed because of its many observable symptoms.
- Hypertension is a significant risk factor for cardiovascular disease.
- In hypertensive people, blood vessels become less able to stretch during cardiac systole.
- The heart experiences greater strain in hypertensive individuals.

**Chapter 9: Multiple Choice -- This activity contains 15 questions.**

1. Which of the following is a group of proteins that interferes with viral infection in nonspecific defense mechanisms?
- MHC proteins
  - antigen
  - interferons
  - natural killer cells
2. Vaccines \_\_\_\_\_.
- have a very slight potential to cause disease
  - consist of preformed antibodies
  - confer only short-term immunity
  - are effective against already existing diseases
3. A person has had her thymus removed ("thymectomy") due to the presence of a tumor. What sort of deficiency may she experience as a result?
- reduced production of antibacterial lysozyme
  - a decrease in the immune response and increase in susceptibility to infection
  - improper regulation of body temperature
  - a reduction in the number of red blood cells (anemia)
4. "Specific immunity" is due primarily to the actions of which cells?
- natural killer cells
  - macrophages
  - B cells and T cells.
  - complement proteins
5. The hormone progesterone greatly increases during pregnancy. One of its functions is to reduce immune activity in the mother. Why is this important?
- to allow her to develop infections and produce antibodies for the fetus
  - to reduce the risk of developing an autoimmune disease
  - to free up energy reserves for other functions
  - to reduce the tendency of her body to reject the fetus

6.

Which of the following is mismatched?

- thymus - regulates the maturation and activation of macrophages
- lymph nodes - remove microorganisms and cellular debris from lymph
- tonsils - lymphatic tissue that filters out many microorganisms that pass through the throat in food or air
- spleen - lymphatic organ that removes old, damaged red blood cells and circulating microorganisms

7.

What could be a consequence of taking antibiotic medicines for a prolonged period of time?

- a loss of "friendly" bacteria in the digestive tract
- a loss of "friendly" bacteria in the blood
- a loss of "friendly" viruses in the digestive tract
- long-lasting immunity

8.

Memory cells are formed by \_\_\_\_\_.

- only T cells
- B cells and T cells
- macrophages
- only B cells

9.

Why may it NOT be a good practice to medicate and reduce all fevers?

- High fevers help strengthen the immune system.
- High fevers help to eliminate water and concentrate immune molecules.
- Moderate fever can expel bacteria in the sweat/
- Moderate fever can enhance our immune responses

10.

The most common immunoglobulin in the body is \_\_\_\_\_.

- IgG
- IgM
- IgD
- IgA

11. The smallest known infectious agents containing RNA or DNA are \_\_\_\_\_.

- bacteria
- viruses
- fungi
- antibodies

12. Why does HIV/AIDS have such a devastating effect on the immune system's responses?

- The HIV primarily targets and destroys "helper" T cells (CD4 cells) that play a pivotal role in activating specific immunity.
- The HIV virus multiplies so fast it rapidly overwhelms the immune system.
- the HIV does massive tissue damage.
- The HIV virus is very rugged and can withstand extreme conditions

13. All of the following are participants in cell-mediated immunity EXCEPT \_\_\_\_\_.

- macrophages
- antibodies
- cytokines
- helper T cells

14. Which of the following is NOT associated with the inflammatory response?

- mast cells
- cytotoxic T cells
- basophils
- histamine

15. Which of the following is not an autoimmune disorder?

- lupus erythematosus
- AIDS
- rheumatoid arthritis
- multiple sclerosis



**Chapter 10: Multiple Choice -- This activity contains 15 questions.**

1. Venous blood \_\_\_\_\_.
- contains oxygen bound to hemoglobin
  - is transported by pulmonary arteries to the lungs
  - is found only in veins
  - is transported by pulmonary veins to the lungs
2. Most of the oxygen transported in the blood is \_\_\_\_\_.
- in solution as bicarbonate
  - bound to free hemoglobin in the plasma
  - bound to hemoglobin within red blood cells
  - in solution as dissolved oxygen
3. Tidal volume is \_\_\_\_\_.
- the amount of air one can forcibly exhale after a relaxed exhalation
  - the amount of air that remains in the lung no matter how forcefully you exhale
  - the amount of air respired during restful, relaxed breathing
  - the maximal volume of air that a person can exhale after a maximal inhalation
4. Respiratory centers in the brain that regulate breathing are primarily stimulated by \_\_\_\_\_.
- a decrease in the level of  $O_2$  in the blood
  - an increase in the level of  $CO_2$  in the blood
  - a decrease in the level of  $CO_2$  in the blood
  - an increase in the level of  $O_2$  in the blood
5. Carbon dioxide diffuses from the blood into the alveoli when the  $P_{CO_2}$  of the alveoli is \_\_\_\_\_.
- higher than the  $P_{CO_2}$  of the blood
  - able to stimulate active transport mechanisms
  - lower than the  $P_{CO_2}$  of the blood
  - the same as the  $P_{O_2}$  of the blood

6.

Congestive heart failure affects lung function because \_\_\_\_\_.

- pulmonary capillary pressure decreases
- the left side of the heart fails and blood backs up into the pulmonary vessels
- the right side of the heart fails to pump adequate blood to the lungs
- the aorta fails

7.

Carotid and aortic bodies monitor \_\_\_\_\_.

- the level of  $\text{CO}_2$  in the lungs
- the level of  $\text{CO}_2$  in the blood
- the level of  $\text{O}_2$  in the lungs
- the level of  $\text{O}_2$  in the blood

8.

Inspiration occurs as \_\_\_\_\_.

- lung volume decreases
- the diaphragm relaxes
- the volume of the pleural cavity increases
- the intercostals relax

9.

Oxyhemoglobin is \_\_\_\_\_.

- hemoglobin with bound oxygen
- hemoglobin in the cells
- only that hemoglobin that carries oxygen from the alveoli into the blood
- hemoglobin that has released its oxygen

10.

Which of the following happens when the  $\text{CO}_2$  level in the arterial blood increases?

- Receptors in the aorta and carotid arteries that are directly responsive to the blood  $\text{CO}_2$  level respond and signal the brain to increase the rate and depth of breathing.
- The hydrogen ion concentration of the cerebrospinal fluid will increase, stimulating the medulla oblongata to increase the rate and depth of breathing.
- Receptors sensitive to the carbon dioxide concentrations signal the respiratory center in the brain, resulting in a decrease in the rate and depth of breathing.
- Receptors sensitive to oxygen concentration in the blood will respond and cause an increase in the rate and depth of respiration

11.

One's bronchi and bronchioles constrict in response to minor triggers, severely restricting airflow and making breathing very difficult. This describes \_\_\_\_\_.

- pneumonia
- emphysema
- asthma
- bronchitis

12.

During an inhalation, the diaphragm moves \_\_\_\_\_.

- upward
- to the right away from the heart
- to the left, toward the heart
- downward

13.

The lower respiratory tract is responsible for \_\_\_\_\_.

- gas exchange in the tissues
- gas exchange in the alveoli
- for all sound production
- warming and humidifying incoming air

14.

What type of respiration occurs in the lungs?

- internal respiration
- cellular respiration
- tissue respiration
- external respiration

15.

Across which vessels does most internal respiration (the exchange of gases between the blood and tissues) occur?

- veins
- lymphatic vessels
- arteries
- capillaries

1.

Which of the following hormone types enters the target cells, activates genes, and brings about the synthesis of new proteins?

- protein hormones
- peptide hormones
- steroid hormones
- All of the above are correct

2.

A deficiency of which hormone secreted by the kidneys would result in anemia?

- aldosterone
- melatonin
- erythropoietin
- secretin

3.

All steroid hormones are synthesized from \_\_\_\_\_.

- phospholipids
- triglycerides
- cholesterol
- amino acids

4.

Blood calcium levels will increase under the influence of \_\_\_\_\_, and decrease under the influence of \_\_\_\_\_.

- estrogen; testosterone
- calcitonin; PTH
- PTH; calcitonin
- testosterone; estrogen

5.

Which glucocorticoid hormone produced by the adrenal glands has anti-inflammatory effects?

- aldosterone
- epinephrine
- cortisol
- norepinephrine

6. All of the following hormones are secreted by organs of the digestive system and directly regulate digestive processes EXCEPT \_\_\_\_\_.
- secretin
  - cholecystokinin
  - glucagon
  - gastrin
7. Neuroendocrine cells of the hypothalamus function as \_\_\_\_\_.
- both endocrine cells and neurotransmitter molecules
  - both endocrine cells and hormones
  - both nerve cells and hormones
  - both nerve cells and endocrine cells
8. Endocrine products are a class of molecules called \_\_\_\_\_.
- complement
  - lymphocytes
  - hormones
  - neurotransmitters
9. Which of the following hormone combinations have opposing activity and effects?
- oxytocin - prolactin
  - epinephrine - norepinephrine
  - FSH - LH
  - glucagon - insulin
10. The endocrine system and the nervous system can coordinate their activity through the pituitary gland and the \_\_\_\_\_.
- hypothalamus
  - thymus gland
  - pineal gland
  - medulla oblongata
11. Which disorder results from the excessive secretion of growth hormone in an

adult?

- gigantism
- diabetes insipidus
- acromegaly
- pituitary dwarfism

12.

Which hormone can bring about a "fight-or-flight" response similar to that of the sympathetic nervous system?

- thyroxine
- epinephrine
- cortisol
- insulin

13.

Which hormone stimulates the maturation of eggs and the production of estrogen in women, and stimulates the production of sperm in men?

- ACTH
- TSH
- FSH
- prolactin

14.

What determines whether a cell will respond to a specific hormone?

- A cell must have a specific nerve supplying it to respond to a hormone.
- A cell must be able to digest a hormone for it to have any effect.
- A cell must be close to the organ that produces the hormone.
- A cell must possess specific receptors for the hormone

15.

The incidence of which of the following endocrine disorders is increasing most rapidly?

- Cushing's syndrome
- Type 1 diabetes
- acromegaly
- Type 2 diabetes

1. The digestion of which macronutrients occurs primarily in the stomach?
- carbohydrates
  - lipids
  - vitamins
  - proteins
2. Which enzyme digests most dietary carbohydrates?
- cholecystinin (CCK)
  - amylase
  - pancreatic lipase
  - pepsin
3. Food is propelled forward through the GI tract by waves of muscular contraction called \_\_\_\_\_.
- motility
  - stretching
  - segmentation
  - peristalsis
4. Gastric juice does NOT contain \_\_\_\_\_.
- pepsinogen
  - amylase
  - HCl
  - fluid
5. Blockage or malfunction of the pyloric sphincter would affect movement of GI tract contents \_\_\_\_\_.
- from the rectum, out of the body
  - from the stomach into the small intestine
  - from the esophagus into the stomach
  - from the small intestine into the large intestine
6. The function of the gallbladder is to \_\_\_\_\_.

- store and release bile
- secrete digestive enzymes
- store pancreatic enzymes
- produce bile

7.

Which organ secretes enzymes that help digest all three major nutrient groups, including carbohydrates, proteins, and lipids?

- pancreas
- stomach
- liver
- salivary glands

8.

A primary function of the large intestine (colon) is to \_\_\_\_\_.

- absorb water from feces
- regulate the production of red blood cells
- secrete digestive enzymes
- absorb most of the nutrients in food

9.

Which layer of the digestive tract is in direct contact with the digestive tract contents?

- serosa
- mucosa
- muscularis
- submucosa

10.

All of the following macromolecules are paired with their absorbable digestion end product EXCEPT \_\_\_\_\_.

- triglycerides - monoglycerides and fatty acids
- protein - amino acids
- starch - glyceride
- sucrose - glucose and fructose

11.

What is the primary digestive function of bile?



- the breakdown and metabolism of old RBCs
- the enzymatic digestion of carbohydrates
- the enzymatic digestion of proteins
- the physical emulsification of fats to form micelles

12.

Most digestion and absorption of nutrients and water occurs in the \_\_\_\_\_.

- small intestine
- stomach
- esophagus
- oral cavity

13.

Which of the following is NOT a function of the liver?

- storage of glycogen
- storage of fat-soluble vitamins
- metabolism of toxins
- production of red blood cells

14.

Which of the following is NOT part of the structure of the small intestine?

- microvilli
- lacteal
- villi
- cilia

15.

Which of the following protein sources could be combined in order to get a balance of all of the essential amino acids?

- dried beans and corn
- black-eyed peas and asparagus
- corn and wheat
- almonds and lima beans

1. A countercurrent mechanism is essential to the production of \_\_\_\_\_.
- a dilute urine
  - urine that does not remove essential nutrients and ions
  - urine containing waste products
  - a concentrated urine
2. Which blood vessel delivers blood directly to the glomerulus for filtration?
- renal artery
  - efferent arteriole
  - afferent arteriole
  - vasa recta
3. Which of the following is NOT a function of the kidneys?
- activate vitamin D
  - control red blood cell production
  - maintaining water balance, to control blood volume and pressure
  - control white blood cell production
4. Which of the following terms includes all of the others?
- Bowman's capsule
  - loop of Henle
  - nephron
  - proximal tubule
5. The descending limb of the loop of Henle \_\_\_\_\_.
- transports urea into the tubule
  - transports NaCl into the interstitial fluid
  - is highly permeable to water
  - is impermeable to water
6. What enzyme produced by the kidneys dramatically raises blood pressure?

- ADH
- aldosterone
- ANH
- renin

7. The major nitrogenous waste product in urine is \_\_\_\_\_.

- urea
- water
- ammonia
- salt

8. Which of the following correctly traces the path of urine as it is formed **within** the kidneys?

- collecting duct → loop of Henle → Bowman's capsule → glomerulus
- nephron → urethra → urinary bladder → ureter
- glomerulus → nephron → collecting duct → renal pelvis
- renal pelvis → urinary bladder → ureter → urethra

9. Which is NOT an organ of the urinary system?

- bladder
- prostate gland
- ureters
- urethra

10. All of the following processes contribute to the formation of urine EXCEPT \_\_\_\_\_.

- tubular secretion
- tubular reabsorption
- vitamin D activation
- glomerular filtration

11. Which of the following is NOT a normal component of the glomerular filtrate that enters Bowman's capsule?

- water
- hydrogen ions
- red blood cells
- urea

12.

Most tubular reabsorption occurs in the \_\_\_\_\_.

- afferent arteriole
- urethra
- proximal tubule
- collecting ducts

13.

What condition is kidney dialysis used to treat?

- podocytes
- UTI (Urinary Tract Infection)
- kidney stones
- chronic renal failure (ESRD)

14.

All of the following hormones influence kidney function EXCEPT \_\_\_\_\_.

- aldosterone
- ADH
- atrial natriuretic hormone (ANH)
- erythropoietin

15.

Antidiuretic hormone (ADH) increases the reabsorption of water in the \_\_\_\_\_.

- ureters
- proximal tubule
- collecting duct
- bladder

**Chapter 16: Multiple Choice -- This activity contains 15 questions.**

1.

Sperm pass through all of the following structures EXCEPT the \_\_\_\_\_.

- urinary bladder
- ejaculatory duct
- urethra
- ductus deferens

2.

Following delivery, which pair of hormones is most closely associated with lactation?

- prolactin and oxytocin
- estrogen and progesterone
- progesterone and prolactin
- estrogen and prolactin

3.

Which of the following is the major risk factor for the development of cervical cancer?

- use of oral contraceptives
- genital herpes
- human papillomavirus (HPV)
- syphilis

4.

Which of the following is NOT a cause of infertility in women?

- thick cervical mucus
- ovulation midway through the menstrual cycle
- PID (pelvic inflammatory disease)
- endometriosis

5.

Human haploid gametes \_\_\_\_\_.

- contain 46 chromosomes
- are produced by mitosis
- contain 23 chromosomes
- have 23 pairs of chromosomes

6.

Day 1 of the menstrual cycle is defined by the onset of menstrual flow. On what days does ovulation normally occur?

- Day 1
- Day 7-Day 28
- Day 7-Day 9
- Day 13-Day 14

7. Immature egg cells are called \_\_\_\_\_.

- Graafian cells.
- fimbriae
- follicles
- oocytes

8. In female sterilization, the \_\_\_\_\_ is cut and tied at two sites.

- oviduct
- cervix
- ovary
- uterus

9. Oral contraceptives function by \_\_\_\_\_.

- metabolizing estrogen and progesterone produced by the ovaries
- interfering with implantation of a fertilized egg
- preventing fertilization of a released egg..
- preventing ovulation

10. Sperm are produced in the \_\_\_\_\_.

- prostate gland
- seminiferous tubules
- vas deferens
- epididymis

11. Which of the following is cut and tied during a vasectomy?

- the ductus deferens
- the urethra
- the seminiferous tubules
- the ejaculatory duct

12.

What important hormone-producing structure forms in the ovary from the residual follicle following ovulation?

- the polar body
- the Graafian follicle
- the oocyte
- the corpus luteum

13.

Which hormone, produced by the early embryo that makes the corpus luteum persist in the ovary, is tested for in a pregnancy test?

- human chorionic gonadotropin (HCG)
- testosterone
- luteinizing hormone (LH)
- oxytocin

14.

Which pituitary hormone stimulates ovulation and can be used to predict the time of ovulation?

- luteinizing hormone (LH)
- progesterone
- follicle-stimulating hormone (FSH)
- HCG

15.

All of the following can be used to prevent pregnancy AFTER intercourse EXCEPT \_\_\_\_\_.

- Preven
- traditional birth control pills
- Plan B
- Mifeprex (RU-486)

**Chapter 17: Multiple Choice -- This activity contains 15 questions.**

1.

During which phase of the cell cycle does cell division occur?

- S phase of interphase
- mitotic phase
- G<sub>2</sub> of interphase
- G<sub>1</sub> of interphase

2.

A chromosome and its newly replicated twin that are joined by a centromere are called \_\_\_\_\_.

- a homologous pair
- sister chromatids
- alleles
- centrioles

3.

A short segment of DNA that codes for a single protein is a \_\_\_\_\_.

- gene
- histone
- chromosome
- chromatid

4.

Which of the following events occurs during anaphase of mitosis?

- The chromosomes align in the center of the cell.
- The duplicate DNA molecules separate.
- New nuclear membranes form.
- The mitotic spindle forms

5.

Which term below includes all of the others?

- nucleotide
- chromosome
- gene
- genome

6.

Which of the following is required for the replication of DNA?



- RNA polymerase
- reverse transcriptase
- DNA polymerase
- ribosomes

7. All of the following are directly involved in translation EXCEPT \_\_\_\_\_.

- DNA
- Ribosomes
- tRNA
- mRNA

8. During the process of translation, \_\_\_\_\_.

- a protein is produced using an RNA molecule as a template
- an RNA sequence is converted into a DNA sequence
- a DNA sequence is converted into a protein
- a DNA sequence is converted into an RNA sequence

9. During early development, at which stage is cell differentiation thought to begin?

- 8-cell stage
- 16-cell stage
- 4-cell stage
- 2-cell stage

10. Some cells, such as skeletal muscle and osteocytes, lose the ability to undergo mitosis, and enter into a stage of the cell cycle called \_\_\_\_\_.

- G<sub>0</sub>
- S phase
- G<sub>1</sub>
- G<sub>2</sub>

11. What are permanent changes to DNA called?

- carcinogens
- translation
- mutations
- alterations

12.

What are the sections of a gene that are actually transcribed and expressed as proteins called?

- introns
- exons
- codons
- histones

13.

The purpose of meiosis is \_\_\_\_\_.

- to generate haploid gametes for sexual reproduction
- promote healing and repair of damaged tissues
- to produce cells to replace aged and worn-out cells
- to produce cells to support growth of an organism

14.

Cytokinesis is defined as \_\_\_\_\_.

- the division of the cytoplasm
- production of gametes
- duplication of the cell's DNA
- the division of the cell's nucleus

15.

Which phase of the cell cycle includes  $G_1$ ,  $S$ , and  $G_2$ ?

- cytokinesis
- prophase
- interphase
- mitotic phase

1. Each of the following is an example of a way to detect cancer EXCEPT \_\_\_\_\_.
- MRI (magnetic resonance imaging)
  - magnetism
  - mammograms
  - PSA blood test
2. Malignant tumors \_\_\_\_\_.
- can be easily removed surgically
  - can travel and begin growing in distant body locations
  - remain in one place as a well-defined mass of cells
  - are surrounded by connective tissue
3. Cancer in its early stages is usually \_\_\_\_\_.
- asymptomatic and undiagnosed
  - easy to diagnose using physical symptoms
  - metastasized to distant organs
  - easy to diagnose using blood tests
4. Which of the following indicates the progressive stages of cancer development in the correct order?
- in situ* cancer → dysplasia → malignant tumor → metastasis
  - in situ* cancer → hyperplasia → metastasis → malignant tumor
  - dysplasia → hyperplasia → metastasis → malignant tumor
  - hyperplasia → dysplasia → *in situ* cancer → malignant tumor
5. The HPV vaccine (Gardasil) is recommended for the prevention of \_\_\_\_\_.
- cervical cancer
  - lung cancer
  - skin cancer
  - prostate cancer
6. Metastasis is the process of \_\_\_\_\_.

- cancer cells breaking free of the main tumor and spreading to other locations
- destroying cancer cells with radiation
- naturally limiting cancer spread with the body's immune system.
- changes accumulating in the structure of a cancer cell

7.

Any gene, mutated or not, that is abnormally expressed and associated with the development of cancer is called a(n) \_\_\_\_\_.

- tumor suppressor gene
- growth factor
- oncogene
- proto-oncogene

8.

One cancer treatment involves "starving" the cancer cells by inhibiting \_\_\_\_\_.

- metastasis
- angiogenesis
- immune function
- digestion

9.

The immune system can help to defend against cancer cells because \_\_\_\_\_.

- cancer is able to hide inside body organs
- cancer cells may stop displaying normal "self" proteins on the cell surface
- cancer antigens attack T cells
- cancer cells metastasize

10.

Which form of skin cancer is the least common, but most dangerous?

- actinic keratosis
- basal cell carcinoma
- melanoma
- squamous cell carcinoma

11.

Which source of carcinogens is associated with approximately 30% of all cancer deaths?

- tobacco
- UV radiation
- viruses
- X-ray and gamma radiation

12.

Which of the following is NOT a classic treatment for cancer?

- chemotherapy
- surgery
- radiation
- physical therapy

13.

Which of the following is NOT a risk factor for breast cancer?

- age
- smoking
- early menstruation
- taking estrogen supplements after menopause

14.

Which of the following is the most common cancer in the United States?

- skin cancer
- colon cancer
- breast cancer
- lung cancer

15.

You can inherit a susceptibility to cancer because \_\_\_\_\_.

- cancer genes develop primarily during meiotic cell divisions
- cancer abnormalities may be passed in the cytoplasm of an oocyte
- cancer involves abnormal genes, some of which may be inherited
- cancer begins as a weakness in the tissues of an organ

1. Which of the following is released from the ovary at ovulation and may subsequently be fertilized by a sperm?
- secondary oocyte
  - a primary oocyte
  - a mature ovum
  - a zygote
2. The fertilized ovum is called a(n) \_\_\_\_\_.
- zygote
  - egg
  - embryo
  - fetus
3. The fetus begins the process of labor by \_\_\_\_\_.
- releasing ACTH from the fetal pituitary gland
  - releasing prostaglandins
  - releasing oxytocin
  - releasing steroids
4. How long does it take the fertilized ovum to travel into the uterus and implant?
- 20-21 days
  - 1-2 days
  - 5-7 days
  - 3-4 days
5. Which extraembryonic membrane forms the sac and fluid that surround the embryo and fetus?
- the chorion
  - the amnion
  - the yolk sac
  - the allantois
6. The maturation of the reproductive system occurs during \_\_\_\_\_.

- puberty
- infancy
- childhood
- neonatal

7.

Which of the following is NOT associated with theories about aging?

- telomeres
- free oxygen radicals
- myelination of nerves
- cell damage

8.

Which of the following changes occurs during aging?

- decreased ability for the liver to detoxify and remove drugs from the body
- decreased lung capacity
- fewer immune cells
- All of these changes occur during aging

9.

Which body system is most critically underdeveloped in a premature infant younger than seven months?

- respiratory system
- nervous system
- heart
- urinary system

10.

The development of the kidneys and liver begins during which month of fetal development?

- the third month
- the sixth month
- the fourth month
- the fifth month

11.

All of the following are functions of the placenta EXCEPT to \_\_\_\_\_.

- provide maternal red blood cells and white blood cells for the fetus
- provide oxygen for the developing fetus
- produce hormones that support and maintain pregnancy
- provide nutrients for the fetus

12.

Which health risks have been associated with hormone replacement therapy?

- increased risk of heart attacks
- increased incidence of breast cancer
- increased risk of strokes
- All of the above are risks associated with HRT

13.

Which of the following tissues is formed from the embryonic mesoderm?

- the epidermis (outer layer of skin)
- liver and pancreas
- nervous system tissues
- heart, muscle, bone

14.

Which of the following prenatal diagnostic techniques can specifically detect a number of genetic disorders the **earliest** in pregnancy?

- ultrasound
- percutaneous umbilical blood sampling (PUBS)
- chorionic villi sampling (CVS)
- amniocentesis

15.

Which of the following is NOT secreted by the placenta?

- testosterone
- estrogen
- hCG
- progesterone