Human Anatomy & Physiology I
with Dr. Hubley

Practice Exam 1
1. Which definition is the best definition of the term “gross anatomy”?
   a. The study of cells.
   b. The study of tissues.
   c. The study of structures of the body.
   d. The study of functions of the body.
   e. The study of structures that are visible without a microscope.

2. Jim studies how the body is affected by disease. Among other things, he collects samples of tissue and body fluids from sick people and analyzes them with a microscope. He often reports his findings to doctors who are treating the patients. Based on this information, which term best describes Jim?
   a. biologist
   b. anatomist
   c. cytologist
   d. physiologist
   e. pathologist

3. What is collagen?
   a. a cell
   b. an organ
   c. a chemical
   d. an organism
   e. a tissue

4. What is pseudostratified columnar epithelium?
   a. a cell
   b. an organ
   c. a chemical
   d. an organism
   e. a tissue

5. What organ system is responsible for producing hormones?
   a. cardiovascular
   b. endocrine
   c. reproductive
   d. respiratory
   e. skeletal
For questions 6 through 9 consider this: The amount of carbon dioxide (CO$_2$) in the blood is monitored by cells called chemoreceptors. They send signals to the medulla oblongata of the brain, which compares the level of CO$_2$ to what it should be. When the level of CO$_2$ rises too high, the medulla oblongata send signals to the diaphragm to make it contract. This lowers the amount of CO$_2$ in the blood.

6. In this example of a homeostatic control mechanism, what is the control center?
   a. CO$_2$
   b. chemoreceptor
   c. blood
   d. medulla oblongata
   e. diaphragm

7. In this example of a homeostatic control mechanism, what is the effector?
   a. CO$_2$
   b. chemoreceptor
   c. blood
   d. medulla oblongata
   e. diaphragm

8. What type of feedback system is illustrated by this control mechanism?
   a. negative feedback
   b. positive feedback
   c. both negative feedback and positive feedback
   d. neither negative feedback nor positive feedback

9. What is the level of CO$_2$ considered in this situation?
   a. variable
   b. effector
   c. receptor
   d. stress
   e. control center
10. Which of the following structures is not part of a plasma membrane?
   a. glycoprotein
   b. phospholipid
   c. cholesterol
   d. ribosome
   e. integral protein

11. The inner portion of a plasma membrane is hydrophobic. Which of the following statements is most relevant to this fact?
   a. The phosphate portion of a phospholipid is negatively charged.
   b. Phospholipid “tails” are composed of non-polar C–H bonds.
   c. The glycocalyx includes polar carbohydrate molecules.
   d. Carbohydrate molecules can attach to the phospholipid heads.
   e. Oxygen and carbon dioxide molecules require channels to cross the membrane.

12. What structures are most important to the function of a tight junction?
   a. glycoproteins and glycolipids on the outer surface of the plasma membrane
   b. proteins that hold membranes close together and prevent materials from passing between cells
   c. protein channels that connect cells that are next to each other
   d. Na⁺/K⁺-ATPase pumps
   e. protein fibers that extend through the plasma membranes of two adjacent cells

13. What structures make holes that allow small molecules to pass from one cell to another?
   a. desmosomes
   b. gap junctions
   c. tight junctions
   d. glycocalyx
   e. phospholipids

14. There is not much space between the cells of adipose tissue, but there is some fluid found between these cells. This fluid is best described as ______________ fluid.
   a. cytoplasmic
   b. interstitial
   c. transitional
   d. intracellular
   e. More than one of the responses above is correct.
The picture above represents a container with water and chloride ions (Cl\(^-\)) inside. The dashed line in the middle represents a membrane that is permeable to water and chloride ions. Use this picture to answer questions 15-19.

15. In which direction can chloride ions move across the membrane?
   a. from A to B  
   b. from B to A  
   c. in both directions  
   d. Cl\(^-\) cannot cross the membrane

16. In which direction do chloride ions diffuse?
   a. from A to B  
   b. from B to A  
   c. in both directions  
   d. Cl\(^-\) does not diffuse across the membrane

17. In which direction does osmosis occur?
   a. from A to B  
   b. from B to A  
   c. in both directions  
   d. there is no osmosis in this system

18. What will happen to the rate of osmosis if the concentration of Cl\(^-\) in side A increases to 50 mM?
   a. The rate of osmosis will increase.  
   b. The rate of osmosis will decrease.  
   c. The rate of osmosis will not change.  
   d. Osmosis still does not occur in this system.

19. Which side of the container is the hypertonic side?
   a. side A  
   b. side B  
   c. Neither; the two sides are isotonic.
20. Blood plasma is isotonic with a solution of 0.9% NaCl. If you place a red blood cell in a solution of 1.9% NaCl, what will happen to the cell?
   a. It will shrink.
   b. It will swell and possibly burst.
   c. There should be no effect on the cell.

21. Which organ system is responsible for removing waste products from the blood and eliminating them from the body?
   a. digestive
   b. endocrine
   c. cardiovascular
   d. lymphatic
   e. urinary

22. Jim recently had an accident, he lost a significant amount of blood, and his blood pressure is abnormally low. As a result, Jim’s kidneys are retaining more salt than usual, which is helping Jim’s body conserve water. Since this is a negative feedback system, what should happen to Jim’s blood pressure over the next few days?
   a. Jim’s blood pressure should fall.
   b. Jim’s blood pressure should rise.
   c. Jim’s blood pressure should rise to a higher level, then fall again.
   d. There should be no change in Jim’s blood pressure.

23. Refer back to #22. What is the stress in this situation?
   a. loss of blood
   b. blood pressure
   c. kidneys
   d. salt
   e. More than one of the responses above is correct.

24. Urine in the lumen of the urinary bladder is best described as ________________ fluid.
   a. extracellular
   b. intracellular
   c. cytoplasmic
   d. interstitial
   e. transitional
25. Why is diffusion across a plasma membrane described as a “passive” process?
   a. Diffusion requires kinetic energy.
   b. Diffusion results in a net movement of particles from high concentration to low concentration.
   c. A cell does not have to expend energy to make diffusion happen.
   d. Because diffusion requires ATP.
   e. Because diffusion can be facilitated or simple.

26. Which particle cannot cross a membrane by simple diffusion?
   a. oxygen
   b. glucose
   c. water
   d. Na⁺
   e. More than one of the responses above is correct.

27. Although we have not discussed them yet, calcium pumps are very important to the function of muscle cells. What process is accomplished by calcium pumps?
   a. simple diffusion
   b. active transport
   c. osmosis
   d. facilitated diffusion
   e. vesicular transport

28. What process is an aquaporin used for?
   a. simple diffusion
   b. facilitated diffusion
   c. active transport
   d. exocytosis
   e. endocytosis

29. A macrophage (a type of white blood cell) encounters a bacteria and engulfs (“eats”) the bacteria. This is an example of what process?
   a. facilitated diffusion
   b. exocytosis
   c. pinocytosis
   d. receptor-mediated endocytosis
   e. phagocytosis
30. Which of the following tissues is **NOT** one of the four primary tissue categories of the human body?
   a. nervous tissue
   b. connective tissue
   c. epithelial tissue
   d. bone tissue
   e. muscle tissue

31. Skin is covered by a layer of epithelial tissue. Which part of this tissue do you see when you look at your skin?
   a. the apical surface
   b. the basal surface
   c. the basement membrane
   d. cilia
   e. goblet cells

32. Which of the following statements is true about epithelial tissues?
   a. They are generally very good at regenerating after they have been damaged.
   b. The apical surface is in contact with underlying connective tissue.
   c. Most epithelial tissues have a rich supply of blood vessels.
   d. All of the responses above are correct.
   e. None of the responses above is correct.

33. Which structure is often found on the apical surface of simple columnar epithelium?
   a. tight junction
   b. microvilli
   c. cilia
   d. desmosome
   e. basement membrane

34. Which of the following terms is **NOT** the name of an actual epithelial tissue?
   a. pseudostratified columnar epithelium
   b. simple columnar epithelium
   c. stratified simple epithelium
   d. simple cuboidal epithelium
   e. stratified cuboidal epithelium
35. What are you most likely to find where an epithelial tissue and a connective tissue join together?
   a. microvilli
   b. cilia
   c. goblet cells
   d. basement membrane
   e. Responses “a” and “b” are both correct.

Match each of the statements, 36-38, to one of the following types of epithelial tissue:
   a. pseudostratified columnar
   b. simple cuboidal
   c. simple squamous
   d. stratified squamous
   e. None of the responses above is correct.

36. This tissue may contain keratin to make it resistant to water loss.
37. This tissue is found in the alveoli of the lungs and the glomerular capsules of the kidneys.
38. This tissue may have cilia and is found lining the inside of the trachea.

39. Which of the following statements is true about BOTH connective tissues and epithelial tissues?
   a. They contain blood vessels.
   b. The tissue contains cells.
   c. There is a large amount of extracellular material.
   d. There are collagen fibers.
   e. The tissue has an apical surface.

40. Which of the following structures is NOT normally found in the extracellular matrix of a connective tissue?
   a. collagen fiber
   b. water
   c. reticular fiber
   d. ground substance
   e. microvilli
41. Which of the following tissues is considered a loose connective tissue?
   a. areolar
   b. hyaline cartilage
   c. dense irregular
   d. bone
   e. blood

Answer questions 42 and 43 with one of the following responses:
   a. collagen fiber
   b. elastic fiber
   c. reticular fiber
   d. keratin fiber
   e. More than one of the responses above is correct.

42. What fiber is the primary structural ingredient of dense regular connective tissue?

43. Which type of fiber is abundant in basement membranes and the lymph nodes?

44. What type of cell is responsible for producing histamine and causing inflammation?
   a. chondrocyte
   b. fibroblast
   c. macrophage
   d. mast cell

Answer each question, 45 through 47, with one of the following responses:
   a. adipose tissue
   b. areolar tissue
   c. dense regular tissue
   d. dense irregular tissue
   e. More than one of the tissues above is correct.

45. Which tissue is the main tissue found in tendons and ligaments?

46. Which type of tissue contains collagen fibers?

47. Which type of tissue has the primary function of storing energy for the body?
48. Which type of tissue is found in the outer ear and the epiglottis?
   a. elastic cartilage
   b. fibrocartilage
   c. hyaline cartilage

49. Which of the following lists has structures in order from the simplest level of organization to the most complex level?
   a. hyaline cartilage, water, chondrocyte
   b. phospholipid, adipose tissue, adipocyte
   c. glucose, goblet cell, simple columnar epithelium
   d. osteocyte, calcium, bone
   e. More than one of the lists above has structures in the proper order.

50. While taking A&P II next semester, you are dissecting a cat and you come across a gland that does not look familiar. A closer look reveals that a duct leads from the gland to the lumen of the small intestine. An even closer look makes it pretty clear that this gland produces a substance that is released into the lumen of the small intestine. What kind of gland is this?
   a. endocrine
   b. exocrine
c. It is both an endocrine and exocrine gland.

d. It is neither an endocrine nor an exocrine gland.