

QUIZ for "MAPPING THE BODY WITH ART" lesson 32 Name/Date _____

- 1) Which of these is smallest?
a) collagen fibril b) collagen fiber c) collagen microfibril
- 2) Why are collagen fibers bundled together?
a) for strength b) for easy recycling c) to make them take up less space d) to make them easier to draw
- 3) Which of these is NOT one of the 3 things that ALL connective tissues have?
a) ground substance b) protein fibers c) capillaries d) specialized cells
- 4) Which one of these is NOT a type of connective tissue?
a) long bones b) cartilage in the knee c) epidermis of skin d) blood
- 5) Every third amino acid in a pre-collagen polypeptide chain is:
a) valine b) lysine c) cysteine d) glycine
- 6) What does a fibroblast cell do?
a) makes collagen b) blasts collagen apart c) Binds collagen fibers together into large bundles. d) None of these.
- 7) TRUE or FALSE? The ground substance and the protein fibers, together, can be called the matrix.
- 8) Which one of these is NOT a type of cartilaginous connective tissue?
a) hyaline b) elastic c) fibrocartilage d) All of these is cartilaginous.
- 9) TRUE or FALSE? Fat is actually a type of fibrous connective tissue.
- 10) TRUE or FALSE? Fibroblasts live a very long time, possibly even your lifetime..

QUIZ for "MAPPING THE BODY WITH ART" lesson 33 Name/Date _____

- 1) What type of cell sits near the capillary and releases histamine that makes the capillary dilate and leak?
a) mast cell b) adipocyte c) lymphocyte d) fibroblast e) macrophage
- 2) What does the fibroblast cell do?
a) Recycles collagen fibers. b) Releases histamine and starts the inflammatory process.
c) Makes collagen and ground substance. d) Fights an virus or bacteria that gets in.
- 3) What do the reticular fibers do?
a) Act like microtubules, providing roads for motor proteins. b) Make loose connective tissue stretchy.
c) Act like a net to trap pathogens (viruses and bacteria). d) Serve as an anchoring network for the fibers and cells.
- 4) In the ground substance, the hyaluronic acid acts a bit like:
a) ladders b) ropes c) plates d) hooks e) mailboxes
- 5) Proteoglycans are like "bottle brushes" attached to hyaluronic acids. What is their job?
a) To scrub the area and keep it clean. b) To soak up and hold water molecules.
c) To provide nutrients to the surrounding cells. d) To bind the collagen strands and keep them from getting tangled.
- 6) Which type of cell starts the inflammatory process?
a) adipocyte b) macrophage c) mast cell d) lymphocyte
- 7) Which cell gobbles up invaders? a) macrophage b) mast cell c) adipocyte d) lymphocyte
- 8) Mast cells contain vesicles filled with what?
a) proteoglycans b) allergens c) lipids and triglycerides d) histamines and cytokines
- 9) "Edema" is the correct term for: a) itching b) swelling c) fever d) infection
- 10) What effect does histamine have on nearby nerve endings?
a) shrinking b) swelling c) itching d) none of these
- 11) What can cause a mast cell to release its chemicals?
a) Stimulation of nerve endings b) Many triggers including pathogens and allergens
c) The fibroblasts trigger the mast cells. d) Other immune cells in the area
- 12) What is inside adipocytes?
a) triglycerides (lipids) b) vesicles filled with chemicals c) sugars such as glucose
d) immature white blood cells waiting until they are needed e) They are empty.
- 13) What do cytokine chemical do?
a) They stimulate cells to do mitosis. b) They help capillaries to stop leaking.
c) They fight pathogens. d) They are messages sent to other cells.
- 14) TRUE or FALSE? Fibroblasts make the capillaries found in loose connective tissue.
- 15) TRUE or FALSE? One thing cytokines can do is to recruit more white cells to come to the area of injury.

QUIZ for "MAPPING THE BODY WITH ART" lesson 34 Name/Date _____

- 1) Fibrous connective tissue is made by fibroblasts, and cartilaginous is made by:
a) stem cells b) adipocytes c) bone cells d) chondrocytes e) fibroblasts, also
- 2) TRUE or FALSE? Adipocytes can be classified as fibrous connective tissue because inside their vesicles are tiny fibers.
- 3) TRUE or FALSE? Cartilaginous tissues have no nerves and no capillaries.
- 4) TRUE or FALSE? Chondrocytes are like islands. They ring of liquid around them is called a lagoon.
- 5) TRUE or FALSE? Ligaments connect bone to muscle.
- 6) Where would you find dense irregular connective tissue?
a) dermis of skin b) scar tissue c) periosteum around the bone d) All of these places. e) None of these places.
- 7) In which of these places would you find mostly elastin?
a) tendons b) ends of ribs c) trachea d) cartilage in nose e) Trick question, all of these contain little elastin.
- 8) TRUE or FALSE? Regular dense connective tissue, such as is found in tendons, is very strong in one direction.
- 9) The cells in regular dense connective tissue (tendons, ligaments) look:
a) parallel, going in the same direction b) perpendicular, going at right angles c) unorganized, going every which way
- 10) Fibrocartilage is very, very tough. This is good because it gets a lot of wear and tear in its location. Where is it?
a) At the base of all your tendons b) In the cartilage inside your nose
c) Between the vertebrae in your spine d) In your wrists and ankles
- 11) Which type of tissue has no capillaries and no nerves?
a) adipose tissue b) irregular dense fibrous c) loose connective tissue d) cartilaginous
- 12) TRUE or FALSE? hyaline cartilage looks smooth and shiny. This is because it has specialized cells and ground substance, but no protein fibers.

QUIZ for "MAPPING THE BODY WITH ART" lesson 35 Name/Date _____

- 1) The matrix is made of what two things?
a) ground substance and protein fibers b) specialized cells and protein fibers
c) ground substance and specialized cells
- 2) What do osteoblasts do?
a) make minerals b) recycle bone tissue c) make collagen d) protect bone from infection
- 3) The individual unit of bone tissue is called the:
a) lamella b) osteocyte c) osteoblast d) osteon
- 4) What are canaliculi?
a) Little canals in Venice, Italy b) Little canals that join osteocytes in their lacunae
c) Little canals that join osteon to osteon d) Little canals that join osteoblasts to osteocytes
- 5) What do canaliculi do?
a) Not much b) Provide pathways for oxygen to get in c) Let cells share nutrients and communicate
d) Allow the cells room to grow e) Provide structure and framework for the osteons
- 6) What is osteoid?
a) A mesh of collagen that will fill with minerals b) Immature bone that is not yet hard
c) The substance laid down by osteoblasts d) All of these
- 7) Osteoblasts are joined by:
a) tight junctions b) gap junctions c) both gap and tight junctions d) tight junctions and reticular fibers
- 8) Which one of these would NOT be found in a Haversian canal?
a) an osteocyte b) a tiny artery c) a tiny vein d) a tiny lymph vessel e) a tiny nerve
- 9) TRUE or FALSE? The central canal and the Haversian canal are the same thing.
- 10) The rings of the osteon are called:
a) canals b) lacunae c) osteocytes d) canaliculi e) lamellae
- 11) The matrix of bone tissue is made of a network of collagen fibers filled in with:
a) minerals b) bone c) lamellae d) osteoid e) osteocytes
- 12) TRUE or FALSE? Bone tissue can be classified as connective tissue because of the lacunae around the osteocyte cells.
- 13) TRUE OR FALSE? The ground substance in bone tissue is a solid.
- 14) TRUE OR FALSE? Osteons grow large enough that you can see them without a microscope.
- 15) TRUE OR FALSE? Osteocytes on the outer rings of the osteon get their nutrients passed along to them by all the cells that are closer to the blood vessels in the central canal.

QUIZ for "MAPPING THE BODY WITH ART" lesson 36 Name/Date _____

- 1) What happens in spongy bone?
a) Cellular messes are cleaned up. b) Blood cells are made.
c) Compact bone is made. d) Bones can flex and bend.

- 2) "Hema" is Greek for: a) bones b) blood c) tissue d) cell e) red

- 3) Yellow marrow is a place where:
a) lymphoid tissue matures. b) stem cells are stored. c) new bone tissue is formed.
d) white blood cells are made. e) fat cells are stored.

- 4) What kind of connective tissue is often at the ends of bones, (especially long bones in arms and legs)
a) dense irregular cartilage b) fibrocartilage c) hyaline cartilage d) elastic cartilage

- 5) TRUE or FALSE? Spongy bone can also be called trabecular bone.

- 6) Which is the "grandfather" stem cell from which ALL blood cells come?
a) hematopoietic b) lymphoid c) myeloid d) erythrocytic

- 7) What does the megakaryocyte produce?
a) myeloid cells b) erythrocytes c) granulocytes d) platelets

- 8) Which of these does an erythrocyte NOT have?
a) nucleus b) ER c) Golgi bodies d) It has none of these.

- 9) Which of these is NOT a lymphoid cell? a) A cell b) B cell c) T cell d) NK cell

- 10) Which type of cell is found on both the myeloid side and the lymphoid side?
a) monocyte b) macrophage c) dendritic cell d) mast cell

- 11) Which of these is NOT a granulocyte?
a) basophil b) macrophage c) eosinophil d) neutrophil

- 12) TRUE or FALSE? B cells mature in bones.

- 13) Approximately what is the ratio of red cells to white cells?
a) 10 to 1 b) 600 to 1 c) 1,000 to 1 d) 1,000,000 to 1

- 14) TRUE OR FALSE? All leukocytes are lymphocytes, but not all lymphocytes are leukocytes.

- 15) TRUE OR FALSE? "Leuco" is Greek for "immune."

QUIZ for "MAPPING THE BODY WITH ART" lesson 37 Name/Date _____

- 1) TRUE or FALSE? Blood is classified as a connective tissue.
- 2) TRUE or FALSE? Another name for antibodies is immunoglobulins.
- 3) TRUE or FALSE? Antibodies are classified as solutes found in the blood.
- 4) TRUE or FALSE? Antibodies act as "taxi" and transport things through the blood.
- 5) TRUE or FALSE? 91 percent of the blood is plasma.
- 6) What do albumin taxi carry?
a) fats b) hormones c) ions d) cholesterol e) None of these. f) All of these.
- 7) The scum at the top of the test tube after centrifuging.
a) the white cells and platelets b) the scum at the top of the test tube after centrifuging
c) the proteins found in plasma d) the white cells
- 8) TRUE or FALSE? The proteins found in blood are mostly produced in the spongy red marrow.
- 9) TRUE or FALSE? The protein fibers found floating in blood are called fibrin.
- 10) TRUE or FALSE? Fibrinogen molecules have a "safety cap" that must be removed for them to become active and turn into fibrin.
- 11) TRUE or FALSE? Fibrinogen and thrombin don't interact until they are told to do so by a messenger molecule.
- 12) TRUE or FALSE? Alpha and beta globulins both act as taxi molecules.
- 13) TRUE OR FALSE? About half the proteins found in blood are albumins.
- 14) TRUE OR FALSE? Thrombin is a clotting factor.
- 15) TRUE OR FALSE? The liver, kidneys and pancreas all play an important role in manufacturing the clotting factors found in blood.

QUIZ for "MAPPING THE BODY WITH ART" lesson 38 Name/Date _____

- 1) What is the correct term for the process by which your body tries to stop blood from leaking out.
a) hemocontriction b) hematite c) hematopoiesis d) hematocrit e) hemostasis
- 2) TRUE or FALSE? The very first thing that happens, before any clotting occurs, is that the blood vessels immediately start to shrink.
- 3) The cells that form the walls of the capillaries are called:
a) endothelial cells b) epidermal cells c) epithelial cells d) endodermal cells
- 4) TRUE or FALSE? Platelets naturally stick to collagen.
- 5) TRUE or FALSE? Aspirin interferes with the activation of platelets.
- 6) How does the shape of a platelet change when it is activated?
a) Platelets grow much larger, up to ten times their original size. b) Platelets begin to divide and multiply.
c) Platelets grow spikey-looking "arms." d) Platelets begin to shrink.
- 7) TRUE or FALSE? Another name for platelets is thrombocytes.
- 8) TRUE or FALSE? Van Willebrand factor acts a bit like glue, helping platelets stick to collagen.
- 9) What is inside a platelet?
a) Nothing. b) Vesicles containing clotting factors and calcium.
c) All the normal cells parts, plus clotting factors and calcium. d) Lots of fibrinogen, plus vesicles of calcium.
- 10) Which comes first, the formation of a platelet plug or the formation of fibrin fabric?
a) Formation of fibrin fabric. b) Formation of platelet plug.
- 11) When someone's body does not make clotting factors 8, 9 or 10 we say that they have:
a) hemophobia b) hemosis c) hemophilia d) thrombosis e) thrombocyte deficiency
- 12) Why does the body use cascade processes?
a) To remind us of waterfalls. b) For a neat, linear progression. c) To keep the steps from getting mixed up.
d) For geometric increase. e) To make it harder for students to learn this stuff.
- 13) The chemical "Warfarin" blocks the action of: a) vitamin A b) vitamin D c) vitamin C d) vitamin K
- 14) TRUE OR FALSE? Another name for clotting factor number 1 is fibrin.
- 15) TRUE OR FALSE? Another name for clotting factor 2 is thrombin.
- 16) What mineral ion is needed for activation of thrombin? a) calcium b) sodium c) iron d) magnesium
- 17) There are two starting points in the clotting cascade. They are called:
a) active and passive b) extrinsic and intrinsic c) external and internal d) extensive and intensive
- 18) TRUE or FALSE? The clotting cascade is unique. There are no other cascades in the body.
- 19) When an area of "fibrin fabric" gets large enough to see, we might call it a:
a) scab b) wound c) blemish d) scar
- 20) TRUE or FALSE? Under normal conditions, collagen never comes into contact with blood.

QUIZ for "MAPPING THE BODY WITH ART" lesson 39 Name/Date _____

- 1) TRUE or FALSE? Erythrocytes cells do not have a nucleus.
- 2) An atom of this mineral sits at the center of the heme molecule and holds a molecule of oxygen.
a) calcium b) magnesium c) sodium d) zinc e) None of these.
- 3) TRUE or FALSE? A heme molecule can hold 4 hemoglobin molecules.
- 4) How many red cells are floating in your blood at any given time?
a) several million b) about a billion c) about a trillion d) about 20 trillion
- 5) How many red cells can your bone marrow make each second?
a) about 2 million b) several thousand c) about 20 trillion d) about a billion
- 6) How long do erythrocytes live? a) 3 days b) 3 weeks c) 3 months d) 3 years
- 7) What organ recycles old erythrocytes? a) spleen b) liver c) kidneys d) pancreas
- 8) What organ controls how many erythrocytes are produced?
a) bone marrow b) kidneys c) liver d) spleen e) brain stem
- 9) What is the "globin" part of hemoglobin broken down into?
a) lipids b) nucleic acids c) carbohydrates d) amino acids f) All of these.
- 10) Hemoglobin is a classic example of this type of protein structure:
a) primary b) secondary c) tertiary d) quaternary
- 11) Transferrin is a little 2-seater taxi that carries:
a) cholesterol b) iron c) erythrocytes d) calcium ions
- 12) Heme is broken down and recycled in several steps. After the first step, the broken heme is called:
a) bilirubin b) transferrin c) biliverdin d) hemotrophin
- 13) When heme has been completely broken down, it exits the body through:
a) urine b) feces c) urine and feces d) exhalation from the lungs e) They stay in the body.
- 14) TRUE OR FALSE? If you have type A blood, this means that you have the best kind of blood.
- 15) TRUE OR FALSE? If your blood is Rh+ this means that you are related to a Rhesus monkey.
- 16) TRUE or FALSE? Type B blood "hates" type A proteins.
- 17) What letter of the alphabet do antibodies look like? a) A b) T c) C d) X e) Y f) Z
- 18) TRUE or FALSE? Type O blood has neither A nor B proteins on the surface of the red cells.
- 19) TRUE or FALSE? Type AB blood has no proteins on its surface.
- 20) TRUE or FALSE? Type AB blood will not make antibodies against either A or B.

QUIZ for "MAPPING THE BODY WITH ART" lesson 40 Name/Date _____

- 1) TRUE or FALSE? Basophils are very abundant in blood. They make up about 25 percent of all white cells.
- 2) TRUE or FALSE? Mast cells are very similar to basophils.
- 3) TRUE or FALSE? Mast cells are found in blood.
- 4) Only eosinophils fight these. a) worms b) bacteria c) viruses d) fungi e) allergens
- 5) What do basophils, eosinophils and mast cells all have in common?
a) They have vesicles called granules. b) They all turn the same color with acidic stain.
c) They all do the same job. d) They all have antibodies attached to their surfaces.
- 6) What color stain will a basophil take? a) red b) blue c) purple d) black e) yellow
- 7) Basophils and mast cells are covered with IgE antibodies. What sticks to these antibodies?
a) viruses and bacteria b) B cells c) only pollen grains that cause allergies d) many types of antigens
- 8) Mast cells start what process? a) clotting b) sneezing c) inflammation d) hematopoiesis
- 9) What does histamine do? a) dilate capillaries b) make capillaries leak c) irritate nerve endings
d) All of these. e) None of these.
- 10) Which cell contains histaminase, which neutralizes histamine?
a) eosinophils b) basophils c) mast cells d) macrophages
- 11) How large are these immune cells?
a) much smaller than red cells b) just a little bigger than red cells
c) about the size of a human egg cell d) about the size of a skin cell
- 12) TRUE or FALSE? Basophils have the ability to "call" other white cells to come to the area of injury.
- 13) Which cell seems to play a key role in asthma attacks?
a) eosinophils b) mast cells c) basophils d) lymphocytes
- 14) When allergens bind to IgEs on the surface of mast cells, what happens?
a) The IgEs fall off the surface. b) The mast cell dies.
c) Calcium is released so that clotting can occur. d) Histamine is released from vesicles.
- 15) When endothelial cells are damaged, which type of cell will respond?
a) basophils b) mast cells c) eosinophils

QUIZ for "MAPPING THE BODY WITH ART" lesson 41 Name/Date _____

- 1) TRUE or FALSE? Neutrophils are very abundant in blood. About 60 percent of your white cells are neutrophils.
- 2) TRUE or FALSE? Neutrophils circulate in the blood until they are needed in tissues.
- 3) How many neutrophils does your body make every day?
a) about 100 billion b) about 20 trillion c) about a million d) hundreds
- 4) What is odd about the nucleus of a neutrophil?
a) It is very small. b) It is very large. c) It is missing. d) It has multiple lobes.
- 5) Which type of person is a neutrophil most like?
a) a surgeon b) a nurse c) a first-responder d) a mayor e) a president
- 6) What is a neutrophil covered with?
a) receptors b) IgE antibodies c) allergens d) weapons
- 7) How long does a neutrophil live? a) a few hours b) a few days c) a few weeks d) a few months
- 8) TRUE or FALSE? Neutrophils can eat pathogens.
- 9) How do neutrophils know where they are needed in tissues?
a) They receive chemical messages while floating in the blood. b) They receive messages from other immune cells.
c) They are grabbed by hooks on endothelial cells. d) They don't; they just randomly go into tissues.
- 10) What is the "interstitial" space?
a) The space between immune cells. b) The space between body cells. c) The space inside immune cells.
- 11) TRUE or FALSE? Neutrophils can move around on their own, almost like a little animal.
- 12) Which one of these does a neutrophil NOT use as a weapon?
a) oxygen atoms b) digestive enzymes c) bleach d) hydrogen peroxide e) arsenic
- 13) What is super-oxide?
a) An oxygen molecule, O_2 , with an extra electron stuck to it. b) A single oxygen atom.
c) A molecule of oxygen with an extra atom, making it O_3 . d) An oxygen atom, O_2 , that has an electron missing.
- 14) What do you call a vesicle with a pathogen inside?
a) phagocyte b) phagosome c) leucophage d) macrophage
- 15) TRUE OR FALSE? Neutrophils have enzymes that can dissolve the junctions between endothelial cells.

QUIZ for "MAPPING THE BODY WITH ART" lesson 42 Name/Date _____

- 1) Which of these is NOT a type of macrophage?
a) dust cells in lungs b) islets of Langerhans in pancreas c) microglia in brain
d) Kupffer cells in liver e) Langerhans cells in skin
- 2) Which organ stores monocytes?
a) kidneys b) bone marrow c) liver d) spleen
- 3) TRUE or FALSE? Monocytes turn into both dendritic cells and macrophages.
- 4) What organelle does a macrophage have a LOT of?
a) lysosomes b) mitochondria c) nuclei d) Golgi bodies e) ribosomes
- 5) Dendritic cells and macrophages are called:
a) amateur antigen presenting cells b) professional antigen presenting cells.
c) major histocompatibility cells d) professional cytokine producing cells
- 6) To what do the APCs present their antigens?
a) pathogens b) monocytes c) other APCs d) neutrophils e) T cells
- 7) Which of these can a macrophage not eat?
a) dirt and debris b) asbestos particles c) dead cells d) bacteria e) viruses
- 8) Macrophages have a hook called CD31 which is for interacting with:
a) neutrophils b) pathogens c) mast cells d) other macrophages e) dendritic cells
- 9) How does a neutrophil get a macrophage to release it?
a) By calling other immune cells to come and help. b) It can't get away.
c) By injuring it. d) By giving the correct chemical password.
- 10) Which of these is NOT one of the macrophage's basic functions?
a) Releasing cytokine messages. b) Presenting antigens to T cells.
c) Producing other kinds of immune cells. d) Eating pathogens.

QUIZ for "MAPPING THE BODY WITH ART" lesson 43 Name/Date _____

- 1) TRUE or FALSE? An "antigen" is anything that is "not self."
- 2) Before B cells mature, they are called:
a) A cells b) incapable c) incompetent d) naïve e) ineffective
- 3) TRUE or FALSE? A single B cell is capable of making many different types of antibodies.
- 4) Which one of these is NOT a type of antibody base? a) A b) B c) M d) D e) E f) G
- 5) The top part of an antibody (V-shaped) is called the:
a) variable region b) constant region c) naïve region d) heavy region e) mature region
- 6) Which one of these is NOT a function of antibodies?
a) Causing antigens to clump together in agglutination b) Attracting neutrophils who like to eat antibodies
c) Sticking to pathogens to slow them down d) Poking holes in bacterial membranes
- 7) About how many different types of antibodies might be floating around in your blood?
a) 10 b) 1,000 c) 10 thousand d) 10 million e) 10 trillion
- 8) What likes to eat antibodies?
a) macrophages and neutrophils b) eosinophils and neutrophils
c) mast cells and basophils d) B cells and T cells
- 9) TRUE or FALSE? Another name for antibodies is immunoglobulins.
- 10) TRUE or FALSE? Antibodies are made by ribosomes using amino acids and mRNA templates.
- 11) TRUE or FALSE? Antibodies are made using a special process that allows mutations to happen.
- 12) The base of an antibody (the "stick" of the Y) is called the:
a) variable region b) constant region c) light region d) mutation region e) binding region
- 13) What do you call an activated B cell that is cranking out antibodies?
a) memory cell b) regulatory cell c) naïve cell d) antibody cell e) plasma cell
- 14) Where do mature B cells go to sit and wait until they are needed?
a) lymph nodes b) bone marrow c) spleen d) thymus e) capillaries
- 15) The word "opsonins" is another word for what?
a) antibodies when they stick to pathogens b) naïve B cells c) cells that eat antibodies

QUIZ for "MAPPING THE BODY WITH ART" lesson 44 Name/Date _____

- 1) TRUE or FALSE? There are always proteins floating around in the cytosol.
- 2) What does a proteasome do?
 - a) Sends proteins to a lysosome to be digested.
 - b) Makes polypeptides.
 - c) Displays proteins on the plasma membrane.
 - d) Chops proteins into tiny bits.
- 3) What molecule is found on all body cells?
 - a) MHC I
 - b) MHC II
 - c) both of these
- 4) What is displayed on MHC I?
 - a) A sample of a protein found inside the cell.
 - b) A protein from the surface of the cell.
 - c) A piece of pathogen.
- 5) How does MHC I get to the surface of the cell?
 - a) endocytosis
 - b) exocytosis
 - c) osmosis
 - d) facilitated diffusion
- 6) Where is MHC I assembled?
 - a) in a Golgi body
 - b) in the nucleus
 - c) in the ER
 - d) in a lysosome
 - e) in a ribosome
- 7) TRUE or FALSE? MHC I molecules are all the same--there is no variation.
- 8) What type of medical procedure will require a careful examination of the patient's MHC I?
 - a) heart surgery
 - b) brain surgery
 - c) blood transfusion
 - d) organ transplant
- 9) What will a T cell or NK cell do if they sense a bad protein in an MHC I clip?
 - a) Kill the cell
 - b) Alert other immune cells.
 - c) Run away.
 - d) Quarantine the cell.
- 10) A bad piece of protein on MHC I could be caused by:
 - a) virus
 - b) bacteria
 - c) cancer
 - d) any of these

QUIZ for "MAPPING THE BODY WITH ART" lesson 45 Name/Date _____

- 1) A vesicle containing a pathogen is called a:
a) phagosome b) phagocyte c) lysosome d) phagolysosome
- 2) TRUE or FALSE? When a phagosome merges with a lysosome it is called a phagolysosome
- 3) TRUE or FALSE? Only antigen presenting cells use MHC II.
- 4) One difference between the assembling of MHC I and MHC II is that MHC II has a:
a) pathogen sensor b) anchoring device c) specialized holder d) safety clip
- 5) Which type of T cell recognizes MHC II?
a) CD8 killer b) CD4 helper
- 6) Which type of T cell recognizes MHC I?
a) CD8 killer b) CD4 helper c) neither d) both
- 7) Which looks like a shishkabob? (meat on a stick)
a) CD4 b) MHC I c) T cell receptor
- 8) What is a T cell receptor designed to recognize?
a) MHC I b) MHC II c) CD8 d) protein samples
- 9) TRUE or FALSE? If a CD8 T cell receptor matches a pathogen protein on MHC I, it will kill the cell
- 10) TRUE or FALSE? A T cell receptor is very similar in shape and function to an antibody.

QUIZ for "MAPPING THE BODY WITH ART" lesson 46 Name/Date _____

- 1) Where do T cells mature?
a) bone marrow b) lymph nodes c) thymus d) thyroid
- 2) Where do T cells go after they mature?
a) bone marrow b) lymph nodes c) thymus d) blood
- 3) What happens to T cells when they mature?
a) They turn into either CD4 or CD8 cells. b) They start killing pathogens right away.
c) They get larger. d) They begin making antibodies.
- 4) TRUE or FALSE? Most T cells will never be needed.
- 5) What is the T cell's weapon?
a) hydrogen peroxide b) super oxide c) antibodies d) perforin
- 6) How do T cells know where to look for pathogens?
a) They sense pathogens directly. b) The macrophages tell them.
c) They just guess. d) The B cells tell them. e) They never find out.
- 7) TRUE or FALSE? Some viruses hide outside of cells.
- 8) TRUE or FALSE? If the T cell finds out that the pathogen is hiding inside the body cells, it will go and alert B cells.
- 9) TRUE or FALSE? Cytokines are a type of antibody.
- 10) TRUE or FALSE? Our thymus grows larger as we get older.

QUIZ for "MAPPING THE BODY WITH ART" lesson 47 Name/Date _____

- 1) Which of these will a CD4 helper not differentiate into?
a) Th(0) b) Th(1) c) Th(2) d) Th(3) e) Th(17)
- 2) TRUE or FALSE? The Th(2) talks to B cells.
- 3) What does humoral mean (in this context)?
a) funny b) inside the cells c) in the blood d) initiated by memory cells e) aided by T helpers
- 4) What is apoptosis?
a) When a pathogen kills a cell. b) When a B cell releases antibodies
c) When a T killer shoot its perforin. d) When a cell kills itself.
- 5) Which antibody looks like 5 Y's stuck together?
a) IgM b) IgG c) IgE
- 6) TRUE or FALSE? Only macrophages secrete cytokines.
- 7) TRUE or FALSE? Macrophages present pieces of antigens to killer T cells.
- 8) What cell stops the T killers after the infection is over?
a) T(1)'s b) T(2)'s c) T(17)'s d) T(reg)'s
- 9) What do you call an activated B cell that is cranking out antibodies?
a) antibody cell b) naïve cell c) memory cell d) regulatory cell e) plasma cell
- 10) In order for a B cell to switch from making IgM antibodies to making IgGs, what must happen?
a) A macrophage must give the "okay." b) A Th(2) cell must give the "okay."
c) A Th(1) cell must give the "okay." d) None of these.
- 11) TRUE or FALSE? Perforin molecules assemble themselves to form a tube.
- 12) TRUE or FALSE? Another name for CD8 cells is "cytotoxic T cells."
- 13) What is the nature of the "toxins" that the killer T cell uses?
a) They are granzymes that act on the cellular machinery. b) They are poisons, much like neurotoxins.
c) They are super oxides. d) They are enzymes that dissolve everything in sight.
- 14) TRUE or FALSE? Sometimes cells send cytokine messages to themselves.
- 15) TRUE or FALSE? B memory cells live for about a year, then are recycled in the liver.

QUIZ for "MAPPING THE BODY WITH ART" lesson 48 Name/Date _____

- 1) Which one of these is NOT a physical barrier that keeps pathogens out?
a) skin b) hair c) mucus d) epithelial cells lining gut

- 2) TRUE or FALSE? Stomach acid is not strong enough to kill pathogens.

- 3) TRUE or FALSE? Another name for the innate immune system is the specific immune system.

- 4) Where do the protein gadgets come from in the Membrane Attack Complex?
a) The liver makes them. b) The immune cells make them. c) The T cells make them.
d) The bone marrow makes them. e) The epithelial cells make them.

- 5) What cell can sense when body cells have missing MHC I's on their surface?
a) Killer T cells b) B cells c) bacterial cells d) dendritic cells e) NK cells

- 6) Which of these is NOT a part of the specific (acquired) immune system?
a) Killer T cells b) NK cells c) B cells d) helper T cells

- 7) TRUE or FALSE? The antigen presenting cells are a link between the innate system and the adaptive system.

- 8) Which one of these do complement proteins NOT do?
a) Make antibodies b) Make "Membrane Attack Complexes" c) Activate mast cells
d) Stick pathogens together in clumps e) Act like opsonins (little "eat me" tags)

- 9) Which one of these is NOT a member of the innate system?
a) NK cell b) neutrophil c) basophil d) macrophage e) B cell

- 10) TRUE or FALSE? After the Membrane Attack Complex stick to a cell, granzymes then enter the cell.

QUIZ for "MAPPING THE BODY WITH ART" lesson 49 Name/Date _____

- 1) TRUE or FALSE? Motor neurons can be found in the brain and spinal cord.
- 2) What two cell parts are transported down the axon?
 - a) lysosome and vesicles
 - b) mitochondria and vesicles
 - c) Golgi bodies and mitochondria
 - d) sodium and potassium
- 3) Do sensory neurons take information towards the brain or away from the brain?
 - a) towards the brain
 - b) away from the brain
- 4) What do Schwann cells do?
 - a) Provide insulation around the axon
 - b) Protect the axon
 - c) Help severed neurons to reconnect
 - d) All of these
- 5) Schwann cells are collectively referred to as the:
 - a) myelin sheath
 - b) powerhouse of the cell
 - c) axon
 - d) nodes of Ranvier
- 6) The gaps between the Schwann cells are called the:
 - a) gaps
 - b) neuromuscular junction
 - c) nodes of Ranvier
 - d) terminal knobs
- 7) Schwann cells contain a lot of:
 - a) lipids
 - b) proteins
 - c) starches
 - d) water
- 8) TRUE or FALSE? Cholesterol is terrible for you. You would be healthier if you had zero percentage cholesterol in your body.
- 9) TRUE or FALSE? A sensory neuron has its soma in the middle, not at one end.
- 10) TRUE or FALSE? The nodes of Ranvier are not myelinated.
- 11) TRUE or FALSE? Dendrites receive signals from other neurons.
- 12) TRUE or FALSE? The electrical signal travels up from the terminal knobs and then out the dendrites at the top.

QUIZ for "MAPPING THE BODY WITH ART" lesson 50 Name/Date _____

- 1) A bundle of nerve fibers is called a:
a) axon b) sheath c) dendrite d) fascicle
- 2) Which of these is the covering around a single nerve fiber?
a) fascicle b) endoneurium c) epineurium d) perineurium
- 3) TRUE or FALSE? Nerves often run alongside blood vessels.
- 4) What are the epineurium, perineurium and endoneurium made of?
a) lipids b) myelin c) connective tissue d) epithelial tissue
- 5) Efferent and afferent neurons can be connected by:
a) an interneuron b) a motor neuron c) a sensory neuron
- 6) TRUE or FALSE? A sensory neuron can have the soma in the middle instead of at one end.
- 7) TRUE or FALSE? A reflex arc goes from a sensory neuron, through the spinal cord and then out through a motor neuron.
- 8) TRUE or FALSE? The longest axon in the body is only a few centimeters long.
- 9) TRUE or FALSE? Motor neurons usually have their terminal knobs connected to a muscle.
- 10) What is the dorsal ganglion?
a) A clump of axons inside the spinal cord. b) A clump of somas just outside the spinal cord.
c) A clump of neurons in the skin. d) A clump of dendrites just outside the spinal cord.
- 11) Which of these can be bipolar?
a) sensory neuron b) motor neuron c) neither
- 12) TRUE or FALSE? An electrical signal can travel back and forth through a neuron.

QUIZ for "MAPPING THE BODY WITH ART" lesson 51 Name/Date _____

- 1) TRUE or FALSE? The central nervous system consists only of the brain and the spinal cord.
- 2) TRUE or FALSE? Most cells in the brain are not neurons but are supporting cells.
- 3) What does "glia" mean?
a) tight b) giant c) small d) glue
- 4) Which of these cells is most like Schwann cells?
a) microglia b) astrocytes c) ependymal cells d) pericytes e) oligodendrocytes
- 5) What does "oligo" mean?
a) short b) long c) loose d) few
- 6) Which of these cells is most like a macrophage?
a) microglia b) oligodendrocyte c) astrocyte d) ependymal cell
- 7) TRUE or FALSE? The brain is well stocked with immune cells. Not only does it have microglia, but it also has neutrophils and lymphocytes.
- 8) Which cells make fluid?
a) pericytes b) neurons c) microglia d) astrocytes e) oligodendrocytes f) ependymal cells
- 9) Which cells are the best at holding the neurons in place?
a) astrocytes b) microglia c) oligodendrocytes d) ependymal cells
- 10) Which of these cells is involved in the blood brain barrier (BBB)?
a) astrocytes b) endothelial cells c) pericytes d) all of these
- 11) Which type of cell is responsible for "feeding" neurons?
a) astrocytes b) oligodendrocytes c) pericytes d) ependymal cells
- 12) TRUE or FALSE? The brain does not contain mast cells.
- 13) Which cells have cilia?
a) astrocytes b) oligodendrocytes c) pericytes d) ependymal cells e) neurons
- 14) When is the process of myelination complete in the brain?
a) at birth b) at about age 2 c) at about age 12 d) at about age 25
- 15) Which of these cells would you want to live the longest?
a) microglia b) pericytes c) neurons d) endothelial cells

QUIZ for "MAPPING THE BODY WITH ART" lesson 52 Name/Date _____

- 1) TRUE or FALSE? An influx of sodium ions into the axon is what generates the action potential.
- 2) What does the Na/K pump do?
 - a) Maintains the resting potential.
 - b) Gets rid of unwanted sodium and potassium ions.
 - c) Restores the action potential.
 - d) Makes sure the action potential only goes one way.
- 3) TRUE or FALSE? The action potential can travel up and down, back and forth, along the neuron.
- 4) What crosses the synaptic cleft?
 - a) calcium ions
 - b) cytokines
 - c) the action potential
 - d) neurotransmitters
- 5) TRUE or FALSE? The action potential can cross the synaptic cleft.
- 6) When the axon is resting, which is more abundant inside the membrane?
 - a) Ca (calcium)
 - b) K (potassium)
 - c) Na (sodium)
- 7) To what gadget do neurotransmitters stick after they cross the gap?
 - a) sodium (Na) channels
 - b) potassium (K) channels
 - c) either, depending on the situation
- 8) What is the ration of Na to K ions pumped by the Na/K pump?
 - a) 1:1
 - b) 6:1
 - c) 3:2
 - d) 100:1
- 9) Where does the action potential start?
 - a) axon terminals
 - b) hillock
 - c) Schwann cells
- 10) Saltatory conduction gets its name from the Latin word "saltare" meaning:
 - a) salt
 - b) jump
 - c) fast
 - d) slow
 - e) synapse

QUIZ for "MAPPING THE BODY WITH ART" lesson 53

Name/Date _____

- 1) TRUE or FALSE? A muscle fiber is the same thing as a muscle cell.
- 2) What is the sarcolemma?
 - a) An organelle with no equivalent in other cells.
 - b) The structure that stores calcium.
 - c) The muscle fiber's plasma membrane.
 - d) The muscle fiber's endoplasmic reticulum.
- 3) Which organelle has T tubules? (Think about what the T tubules do.)
 - a) sarcolemma
 - b) sarcoplasmic reticulum
 - c) nuclei
 - d) sarcomeres
- 4) Which is smaller, a fascicle or a myofibril?
 - a) fascicle
 - b) myofibril
- 5) What organelle does the sarcoplasm contain a lot of?
 - a) Golgi bodies
 - b) ribosomes
 - c) lysosomes
 - d) mitochondria
- 6) What neurotransmitter chemical is the in the vesicle in the axon terminals?
 - a) acetyline
 - b) acetylcholine
 - c) serotonin
 - d) dopamine
- 7) The sarcoplasmic reticulum stores what kind of ions?
 - a) calcium
 - b) sodium
 - c) potassium
 - d) magnesium
- 8) When the fascia covering around a muscle narrows and gets thick down at the end, it forms a:
 - a) tendon
 - b) ligament
 - c) muscle knot
 - d) none of these
- 9) There is a special name for the group of myofibrils that are all connected to the same neuron:
 - a) bundle
 - b) fascicle
 - c) muscle unit
 - d) motor unit
 - e) neuromuscular junction
- 10) What type of ion channel is found on the muscle side of the synaptic cleft?
 - a) water channels
 - b) potassium channels
 - c) calcium channels
 - d) sodium channels

QUIZ for "MAPPING THE BODY WITH ART" lesson 54 Name/Date _____

- 1) What role does calcium play in the binding of myosin to actin?
 - a) It binds to the myosin fibers, making them more flexible.
 - b) It binds to myosin, causing it to move closer to actin.
 - c) It changes the shape of tropomyosin so that the myosin binding sites are exposed.
 - d) It causes ATP to be released.

- 2) What is the first source of ATP that muscles use?
 - a) lactic acid fermentation
 - b) creatine
 - c) electron transport chain

- 3) The ends of the sarcomere are marked by:
 - a) A bands
 - b) M lines
 - c) X lines
 - d) Z lines

- 4) When does the myosin head actually move?
 - a) when ATP leaves
 - b) when ATP binds
 - c) when calcium ions bind
 - d) when calcium ions are released

- 5) TRUE or FALSE? Oxygen is not needed for the process of lactic acid fermentation.

- 6) Which of these doesn't really come into direct contact with actin?
 - a) ATP
 - b) myosin
 - c) troponin
 - d) tropomyosin
 - e) calcium ions

- 7) Muscle fibers look striped due to the pattern of:
 - a) myosin heads
 - b) sarcoplasmic reticulum
 - c) sarcomeres
 - d) mitochondria

- 8) Which one of these doesn't have anything to do with glycolysis?
 - a) lactic acid fermentation
 - b) creatine
 - c) electron transport chain

- 9) What does hydrolyzed mean?
 - a) Split apart using a water molecule.
 - b) Joined together using a water molecule.

- 10) Where did the calcium ions come from-- the ones that bind to troponin?
 - a) They were released by mitochondria.
 - b) They came from neurons at the neuromuscular junction.
 - c) They were floating around and just happened to drift close enough.
 - d) They were released from the sarcoplasmic reticulum.

ANSWERS for quizzes for Module 3 Tissues

ANSWERS FOR QUIZ 32

1) c 2) a 3) c 4) c 5) d 6) a 7) T 8) d 9) T 10) F

ANSWERS FOR ANSWERS for quizzes for Module 3 Tissues

ANSWERS FOR QUIZ 32

1) c 2) a 3) c 4) c 5) d 6) a 7) T 8) d 9) T 10) F

ANSWERS FOR QUIZ 33

1) a 2) c 3) d 4) b 5) b 6) c 7) a 8) d 9) b 10) c
11) b 12) a 13) d 14) F 15) T

ANSWERS FOR QUIZ 34

1) d 2) F 3) T 4) F 5) F 6) d 7) e 8) T 9) a 10) c
11) d 12) F

ANSWERS FOR QUIZ 35

1) a 2) c 3) d 4) b 5) c 6) d 7) c 8) a 9) T 10) e
11) a 12) F 13) T 14) F 15) T

ANSWERS FOR QUIZ 36

1) b 2) b 3) e 4) c 5) T 6) a 7) d 8) d 9) a 10) c
11) b 12) T 13) b 14) F 15) F

ANSWERS FOR QUIZ 37

1) T 2) T 3) F 4) F 5) F 6) f 7) a 8) F 9) F 10) T
11) T 12) T 13) T 14) T 15) F

ANSWERS FOR QUIZ 38

1) e 2) T 3) a 4) T 5) T 6) c 7) T 8) T 9) b 10) a
11) c 12) d 13) d 14) T 15) T 16) a 17) b 18) F 19) a 20) T

ANSWERS FOR QUIZ 39

1) T 2) e 3) T 4) d 5) a 6) c 7) b 8) b 9) d 10) d
11) b 12) a 13) c 14) F 15) F 16) T 17) e 18) T 19) F 20) T

ANSWERS FOR QUIZ 40

1) F 2) T 3) F 4) a 5) a 6) b 7) d 8) c 9) d 10) a
11) b 12) T 13) a 14) d 15) b

ANSWERS FOR QUIZ 41

1) T 2) T 3) a 4) d 5) c 6) a 7) b 8) T 9) c 10) b
11) T 12) e 13) a 14) b 15) T

ANSWERS FOR QUIZ 43

1) T 2) d 3) F 4) b 5) a 6) d 7) d 8) a 9) T 10) T
11) T 12) b 13) e 14) a 15) a

ANSWERS FOR QUIZ 44

1) T 2) d 3) a 4) a 5) b 6) c 7) F 8) d 9) a 10) d

ANSWERS FOR QUIZ 45

1) a 2) T 3) T 4) d 5) b 6) a 7) a 8) d 9) T 10) T

ANSWERS FOR QUIZ 46

1) c 2) b 3) a 4) T 5) d 6) b 7) F 8) F 9) F 10) F

ANSWERS FOR QUIZ 47

1) a 2) T 3) c 4) d 5) a 6) F 7) F 8) d 9) e 10) b
11) T 12) T 13) a 14) T 15) F

ANSWERS FOR QUIZ 48

1) b 2) F 3) F 4) a 5) e 6) b 7) T 8) a 9) e 10) F

ANSWERS FOR QUIZ 49

1) T 2) d 3) F 4) b 5) a 6) d 7) d 8) a 9) T 10) T
11) T 12) b 13) e 14) a 15) a

ANSWERS FOR QUIZ 50

1) d 2) b 3) T 4) c 5) a 6) T 7) T 8) F 9) T 10) b
11) a 12) F

ANSWERS FOR QUIZ 51

1) T 2) T 3) d 4) e 5) d 6) a 7) F 8) f 9) a 10) d
11) a 12) T 13) d 14) d 15) c

ANSWERS FOR QUIZ 52

1) T 2) a 3) F 4) d 5) F 6) b 7) c 8) c 9) b 10) b

ANSWERS FOR QUIZ 53

1) T 2) c 3) a 4) b 5) d 6) b 7) a 8) a 9) d 10) d

ANSWERS FOR QUIZ 54

1) c 2) b 3) d 4) a 5) T 6) a 7) c 8) b 9) a 10) d