

First Semester Exams (2011-2012)

Medical Physiology I

Identify the letter of the choice that best completes the statement or answers the question.

- (1) Blood is a connective tissue comprised of cellular elements and an extracellular matrix comprised primarily of water. What is the name of the blood's extracellular matrix. (a) hematocrit. (b) fibrinogen. (c) buffy coat. (d) plasma. (e) None of these answers.
- (2) The amount of blood in the human body is about _____ liters. (a) 2 (b) 5 (c) 10 (d) 12 (e) 15
- (3) Which is not a function of plasma proteins? (a) plasma proteins are responsible for the blood colloid osmotic pressure. (b) provide a source of readily available amino acids to be utilized by the tissue cells for the synthesis of new tissue proteins. (c) antibodies are gamma globulins, a type of plasma protein that is important in the body's defense mechanism. (d) plasma proteins play a role in buffering changes in pH in the body fluids. (e) the presence of plasma proteins in the blood is the primary factor responsible for preventing excessive loss of plasma from the capillaries into the interstitial fluid.
- (4) The function of plasma albumins is (a) contributing to the clotting process. (b) body defense. (c) maintenance of the blood's osmotic pressure. (d) transport of lipids. (e) transport of metal minerals.
- (5) If the hematocrit is 40, then the volume occupied by the (a) red blood cells is 60% of the total blood volume. (b) white blood cells is 40% of the total blood volume. (c) red blood cells is 40% of the total blood volume. (d) plasma and other cellular elements is 40% of the total blood volume. (e) More than one of these.
- (6) Carbonic anhydrase is crucial for (a) CO₂ transport in blood. (b) conversion of CO₂ into bicarbonate ion. (c) Both (a) and (b) above. (d) production of NO. (e) Both (a) and (c) above.
- (7) Erythrocytes (a) do not contain a nucleus. (b) survive an average of 120 days. (c) do not have the ability to use O₂ for energy production despite the fact that they transport O₂ to all the other tissues of the body. (d) do not contain a nucleus and survive an average of 120 days. (e) All of these answers.
- (8) Hemoglobin (a) consists of a protein made up of four highly folded polypeptide chains and four iron-containing nonprotein, nitrogenous groups. (b) appears reddish when combined with O₂ and bluish when deoxygenated. (c) can combine only with O₂. (d) Both (a) and (b) above are correct. (e) All of these answers.
- (9) In addition to transporting oxygen hemoglobin transports (a) some carbon dioxide. (b) nitric oxide. (c) buffered hydrogen ions. (d) Both (a) and (b) above. (e) All these answers.
- (10) Erythropoiesis (a) is accomplished in the bone marrow upon stimulation by erythropoietin. (b) is accomplished in the kidneys in response to reduced O₂ delivery to the kidneys. (c) refers to increased RBC count. (d) refers to RBC destruction. (e) None of these answers.
- (11) One reason why men have a higher hematocrit than women is: (a) greater erythropoiesis rates. (b) Their larger muscle mass. (c) Testosterone interactions with erythropoietin. (d) Both (a) and (b) above. (e) All these answers.
- (12) Which of these condition would result in increased rates of erythropoiesis? (a) high altitudes. (b) increased physical activity. (c) loss of blood. (d) Both (a) and (b) above. (e) All these answers.
- (13) Pernicious anemia develops from a deficiency of (a) ATP. (b) carbonic anhydrase. (c) cobalt. (d) several hormones. (e) the intrinsic factor.
- (13) Which of the following is not a possible cause of anemia? (a) dietary deficiency of folic acid. (b) deficiency of intrinsic factor. (c) malaria. (d) carbon monoxide poisoning. (e) living at high altitude.
- (14) Which of the following is not a function of white blood cells? (a) activation of factor XII, which triggers the clotting cascade. (b) production of antibodies. (c) destruction of cancer cells. (d) phagocytosis of foreign invaders. (e) phagocytosis of cellular debris.
- (15) Myeloid stem cells give rise to all leukocytes except (a) neutrophils. (b) eosinophils. (c) basophils. (d) lymphocytes. (e) monocytes.
- (16) Neutrophilia frequently accompanies (a) bacterial infections. (b) viral infections. (c) parasitic infestations. (d) allergic conditions. (e) All of these answers.
- (17) Which of the following can occur with leukemia? (a) inadequate defense capabilities against foreign invasion despite an excessive number of white blood cells. (b) anemia. (c) internal bleeding. (d) Two of these answers. (e) All of these answers.

- (18) Which of the following statements concerning platelets is incorrect? (a) platelets are produced in the bone marrow. (b) platelets form the meshwork of a blood clot upon which the other cellular elements become entrapped. (c) platelets form a plug when they adhere to the exposed collagen of a damaged vessel. (d) aggregated platelets release serotonin, epinephrine, and thromboxane A₂. (e) aggregated platelets release ADP, which causes the surface of nearby circulating platelets to become sticky so that they also adhere to the enlarging platelet plug.
- (19) Which is not a step in hemostasis? (a) vascular spasms. (b) platelet aggregation. (c) coagulation. (d) thrombopoiesis. (e) fibrinogen activation.
- (20) The chemical signal that makes platelets stick together upon aggregation is (a) ADP. (b) ATP. (c) prostacyclin. (d) thromboxane. (e) thrombopoietin.
- (21) Platelets are normally attracted to a (a) collection of white blood cells. (b) disrupted surface of a blood vessel. (c) smooth surface. (d) source of ATP production. (e) surface where the blood meets the air.
- (22) Prostacyclin (a) activates the clotting cascade. (b) induces profound vasoconstriction of an injured vessel. (c) profoundly inhibits platelet aggregation. (d) is released by aggregated platelets. (e) dissolves the clot.
- (23) In the last step of blood coagulation, (a) fibrin is converted to fibrinogen. (b) fibrinogen is converted to fibrin. (c) platelet factor enter numerous reactions. (d) prothrombin is converted to thrombin. (e) thrombin is converted to prothrombin.
- (24) When small blood vessels are damaged, loss of blood is prevented by (a) platelet aggregation. (b) vasoconstriction of these vessels. (c) formation of a platelet plug. (d) All of these answers. (e) None of these answers.
- (25) Platelets (a) convert prothrombin to thrombin. (b) form the meshwork upon which the erythrocytes become trapped to produce a clot. (c) adhere and aggregate when they contact exposed collagen in the walls of a broken blood vessel. (d) release fibrinogen once a platelet plug is formed. (e) None of these answers.
- (26) Which is the correct sequence of events leading to clot formation? (a) prothrombin-thrombin-fibrin-fibrinogen. (b) fibrin-prothrombin-fibrinogen-thrombin. (c) prothrombin-thrombin-fibrinogen-fibrin. (d) fibrin-thrombin-prothrombin-fibrinogen. (e) fibrinogen-thrombin-fibrin-prothrombin.
- (27) Which is not a required factor in the intrinsic clotting mechanism? (a) calcium ions. (b) factor XII. (c) platelet factor 3. (d) factor VII. (e) factor XI.
- (28) Clots are slowly dissolved by (a) tissue thromboplastin. (b) prostacyclin. (c) plasmin. (d) calcium. (e) exposed collagen.
- (29) Hemophilia results from (a) a deficiency of platelets. (b) inadequate hemoglobin production. (c) vitamin B₁₂ deficiency. (d) a genetic inability to produce one of the factors in the clotting cascade. (e) excess production of heparin.
- (30) Which of the following is not attributable to the immune defense system? (a) defends against pathogenic microorganisms. (b) converts foreign chemicals into compounds that can be more readily eliminated in the urine. (c) removes worn-out cells and tissue debris. (d) identifies and destroys abnormal or mutant cells. (e) can inappropriately induce allergic responses and autoimmune disease.
- (31) Interferon is a (a) family of proteins that defends against viruses. (b) natural killer cell. (c) specific bacterial surface receptor. (d) specialized type of white blood cell. (e) vasodilator agent.
- (32) Nonspecific immune responses (a) come into play whether or not there has been prior experience with the offending agent. (b) are triggered by invasion of infectious microorganisms, chemical injury, mechanical trauma, or burns. (c) are mediated by lymphocytes. (d) Both (a) and (b) above. (e) All of these answers.
- (33) Which of the following is not a component of innate immunity? (a) inflammation. (b) antibody production. (c) interferon. (d) natural killer cells. (e) the complement system.
- (34) Specific immune responses (a) require helper T cell activation. (b) are under control of the adaptive immune system. (c) could not occur if the thymus gland did not develop. (d) Both (a) and (b) above. (e) All of these answer.
- (35) Monocytes (a) are the first phagocytes to exit the blood and arrive at an injured or invaded area. (b) swell and mature into macrophages after exiting the blood. (c) act as opsonins. (d) Two of these answers. (e) All of these answers.
- (36) Which is not an outcome of complement activation? (a) promotion of localized vasodilation. (b) formation of a membrane-attack complex. (c) activation of kinins. (d) stimulation of interferon production. (e) stimulation of local mast cell activity.
- (37) The primary purpose of the vascular changes in an invaded or injured area is to (a) produce swelling, redness, heat, and pain. (b) bring to the affected area phagocytes and plasma proteins that defend against the offending agent. (c) produce pus. (d) exert an anti-inflammatory effect to protect against damage by potentially overreactive defense mechanisms. (e) trigger specific immune responses.

- (38) Which of the following is not accomplished by interferon? Interferon (a) directly breaks down viral messenger RNA and inhibits protein synthesis, both of which are essential for viral replication. (b) enhances macrophage phagocytic activity. (c) stimulates antibody production. (d) stimulates the activity of natural killer cells and cytotoxic T cells. (e) slows cell division and suppresses tumor growth.
- (39) The molecules which can invoke immunogenicity are called: (a) compliments. (b) antibodies. (c) antigens. (d) haptens. (e) interferons.
- (40) T lymphocytes (a) produce thymosin. (b) secrete antibodies. (c) are converted into plasma cells. (d) mature and differentiate within the bone marrow. (e) None of these answers.
- (41) Select the most abundant immunoglobulin in the blood. (a) IgA (b) IgD (c) IgE (d) IgG (e) IgM
- (42) Plasma cells (a) are not derived from B cells. (b) have an expanded rough endoplasmic reticulum. (c) do not secrete antibodies but remain dormant and expand the clone specific for the invading antigen. (d) are not derived from B cells and have an expanded rough endoplasmic reticulum. (e) All of these answers.
- (43) Which of the following is not accomplished by antibodies? (a) neutralization of bacterial toxins. (b) direct destruction of foreign cells. (c) activation of the complement system. (d) enhancement of phagocytosis. (e) stimulation of killer (K) cells.
- (44) Which one of the ABO blood groups has both antibodies of this group? (a) A (b) AB (c) B (d) O (e) OB
- (45) A secondary response to an invading microorganism that has invaded a previous time is (a) launched by memory cells. (b) slower and weaker than the primary response. (c) more rapid, more potent, and longer-lasting than the primary response. (d) Both (a) and (b) above. (e) Both (a) and (c) above.
- (46) Type-O blood (a) does not have any A or B red blood cell surface antigens. (b) contains both anti-A and anti-B antibodies. (c) cannot be transfused into individuals of any ABO blood type without a transfusion reaction involving this blood group system. (d) does not have any A or B red blood cell surface antigens and contains both anti-A and anti-B antibodies. (e) All of these answers.
- (47) Lymphocytes respond only to antigens that have been processed and presented to them by (a) neutrophils. (b) eosinophils. (c) macrophages. (d) helper T cells. (e) interleukin 2.
- (48) Dendritic cells (a) are neurons. (b) participate in the inflammation response. (c) are specialized for phagocytosis of worms. (d) are specialized antigen-presenting cells. (e) None of the above .
- (49) What type of immune defense cell is selectively invaded by AIDS virus? (a) cytotoxic T cells. (b) helper T cells. (c) suppressor T cells. (d) macrophages. (e) neutrophils.
- (50) Cytotoxic T cells (a) are not the most numerous of the T cells. (b) secrete B-cell growth factor and T-cell growth factor. (c) confer greater phagocytic properties on macrophages, converting them into angry macrophages. (d) release antigens. (e) bind with class II MHC glycoproteins.
- (51) Which of the following does not play a direct role in immune surveillance against cancer? (a) B cells. (b) natural killer cells. (c) macrophages. (d) cytotoxic T cells. (e) interferon.
- (52) Which of the following is not a possible cause of autoimmune disease? (a) reduction in suppressor T cell activity. (b) prolonged treatment with anti-inflammatory drugs. (c) exposure of normally inaccessible self-antigens. (d) modification of normal self-antigens. (e) exposure of the immune system to a foreign antigen almost identical structurally to a self-antigen.
- (53) Which of the following does not help defend against cancer? (a) interferon. (b) macrophages. (c) natural killer cells. (d) cytotoxic T cells. (e) antibodies.
- (54) Which of the following does not contribute to defense of the respiratory system? (a) coughs and sneezes (b) cilia-propelled mucus escalator (c) alveolar macrophages (d) normal microbial population of the lungs (e) IgA antibodies
- (55) Which of the following statements concerning cross bridges is not correct? Cross bridges (a) cross bridges bind to actin during muscle contraction. (b) cross bridges are formed by the globular heads of the myosin molecules. (c) cross bridges consist of troponin and tropomyosin protruding from the actin helix. (d) cross bridges bend during muscle contraction. (e) cross bridges protrude from the thick filaments.
- (56) Which of the following characteristics are shared by all three types of muscle tissues? (a) each one contains myosin and actin. (b) each one is neurogenic. (c) each one is striated. (d) each one is considered to be under voluntary control. (e) None of these answers.
- (57) Troponin (a) binds with calcium to prevent sarcomere shortening. (b) breaks down actin. (c) breaks down myosin. (d) forms the boundaries of a sarcomere. (e) is an enzyme in the sarcomere.

- (58) A function of tropomyosin is (a) bind Ca^{2+} . (b) form attachments with myosin cross bridges. (c) prevent myosin cross bridges from attaching to the thin filaments. (d) serve as an ATPase. (e) None of these answers.
- (59) According to the sliding-filament mechanism of muscle contraction, the (a) A bands slide in closer between the I bands. (b) thin filaments slide inward toward the center of the A band. (c) Z lines slide in between the T tubules. (d) contractile proteins contract, thus shortening the sarcomere. (e) filaments slide into the lateral sacs of the sarcoplasmic reticulum.
- (60) During excitation-contraction coupling, (a) the action potential travels down the transverse tubules. (b) Ca^{2+} is released from the sarcoplasmic reticulum. (c) Ca^{2+} is taken up by the sarcoplasmic reticulum. (d) Both (a) and (b) above are correct. (e) All of these answers.
- (61) Of the step in excitation-contraction below, which occurs before the others? (a) exposed actin sites bind with myosin cross bridges. (b) sodium channels open in the fiber's membrane. (c) calcium is released from the sarcoplasmic reticulum. (d) troponin binds calcium. (e) attachment of ATP allows for cross bridge detachment.
- (62) Which is not characteristic of cross bridges? (a) they are a component of thin filaments. (b) they are comprised of myosin. (c) they have an actin binding site. (d) they have an ATPase binding site. (e) they provide power stroking.
- (63) Which of the following statements concerning cross bridges is incorrect? Cross bridges (a) are formed by the globular heads of the myosin molecules as they protrude from the thick filaments. (b) bend during muscle contraction. (c) bind to actin during muscle contraction. (d) are not found in the I band. (e) bind with troponin and tropomyosin during muscle contraction to pull them away from the actin helical chain.
- (64) During a cross-bridge cycle in skeletal muscle, the (a) cross bridge is energized as myosin ATPase activity hydrolyzes ATP. (b) myosin cross bridge is able to bind with an actin molecule when Ca^{2+} pulls the troponin-tropomyosin complex aside. (c) linkage between actin and the myosin cross bridge is broken at the end of the cross-bridge cycle as Mg^{2+} binds to the cross bridge. (d) Both (a) and (b) above. (e) All of these answers.
- (65) Which of the following is not involved in the relaxation of muscle? (a) when acetylcholine is destroyed by acetylcholinesterase. (b) when there is no longer a local action potential. (c) when the T tubules actively take up the Ca^{2+} that had been released. (d) when the actin and myosin molecules are no longer bound together. (e) when the troponin-tropomyosin complex slips back into its blocking position.
- (66) What would happen if ATP supplies became very low in a muscle cell? (a) tension development would decrease. (b) cross bridges would not detach from actin. (c) possibly contractures. (d) in death, rigor mortis. (e) All these answers.
- (67) Why are you able to repeatedly contract and relax your muscles of respiration, allowing you to breathe in and breathe out? (a) As soon as all of the Ca^{2+} stored in the lateral sacs of the sarcoplasmic reticulum is used up, muscle relaxation occurs. (b) After the muscle cell becomes excited, acetylcholinesterase rapidly destroys acetylcholine. (c) When there is no longer a local action potential in the muscle cell, Ca^{2+} is actively transported back into the lateral sacs of the sarcoplasmic reticulum, and muscle relaxation occurs. (d) Both (b) and (c) above. (e) All of these answers.
- (68) Which of the following is not a determinant of whole muscle tension? (a) the number of muscle fibers contracting. (b) the tension produced by each contracting fiber. (c) the extent of motor-unit recruitment. (d) the frequency of stimulation. (e) the proportion of each motor unit that is contracting at any given time.
- (69) During an isotonic contraction of a muscle in the arm (a) filaments do not shorten in the muscle. (b) movement does not occur. (c) the muscle does not change length. (d) the tension in the muscle does not overcome a load. (e) the tension in the muscle remains constant.
- (70) The following statement about dopamine is incorrect (a) inhibitory neurotransmitter (b) excitatory neurotransmitter (c) prolactin-inhibiting hormone (d) secreted by the nerve endings of basal ganglia (e) none of the above.

Good Luck in Your Exams..... END