

1. Histamine increases blood flow and vascular permeability. This would account for all of the following changes that occur during inflammation except
  - A. redness of the inflamed tissue.
  - B. chemotaxis of phagocytes.
  - C. heat of the inflamed tissue.
  - D. movement of defense proteins and cells into the interstitial space.
  - E. swelling of the inflamed tissue.
2. A sample of John's blood shows a high level of pyrogens. This would indicate that John
  - A. is feeling achy.
  - B. is producing T lymphocytes.
  - C. has a sore throat.
  - D. is running a fever.
  - E. has swollen lymph nodes.
3. Cells that perform immunological surveillance are the \_\_\_\_\_ cells.
  - A. NK
  - B. plasma
  - C. B
  - D. helper T
  - E. suppressor T
4. All of the following are considered to be innate body defenses EXCEPT:
  - A. complement
  - B. phagocytosis
  - C. antibodies
  - D. lysozyme
  - E. inflammation
5. Testing T-lymphocytes for their ability to appropriately recognize self antigens is a function of the:
  - A. plasma cell
  - B. spleen
  - C. thymus
  - D. liver
  - E. bone marrow
6. Perforins are proteins associated with the activity of:
  - A. cytotoxic T cells
  - B. basophils
  - C. macrophages
  - D. Nk cells
  - E. Both A and D
7. Stem cells that will form B cells or NK cells are found only in the
  - A. red bone marrow.
  - B. liver.
  - C. spleen.
  - D. thymus.
  - E. kidneys.
8. The effects of activating the complement system include all of the following except
  - A. destruction of target cell plasma membranes.
  - B. stimulation of inflammation.
  - C. inhibition of the immune response.
  - D. opsonization.
  - E. chemotaxis.

9. The first line of cellular defense against pathogens are the
- A. T cells.
  - B. B cells.
  - C. NK cells.
  - D. phagocytes.
  - E. plasma cells.
10. Cytokines that make a cell and its neighbors resistant to virus infection are called
- A. complement.
  - B. interferons.
  - C. interleukins.
  - D. immunoglobulins.
  - E. transferrins.
11. All of the following are characteristics of adaptive defenses except
- A. versatility
  - B. tolerance.
  - C. memory.
  - D. specificity.
  - E. present at birth.
12. \_\_\_\_\_ cells enable the immune system to respond quickly and robustly if the same antigen is encountered a second time.
- A. Secondary
  - B. Primary
  - C. Memory
  - D. Responder
  - E. Transponder
13. Frank was bitten by a rattlesnake and received anti-venom containing neutralizing antibodies. Frank received \_\_\_\_\_ immunity and he \_\_\_\_\_ long-term immunity as a result.
- A. naturally acquired passive immunity / will have
  - B. artificially acquired passive immunity / will not have
  - C. artificially acquired passive immunity / will have
  - D. naturally acquired active immunity / will have
  - E. naturally acquired active immunity / will not have
14. Class II MHC molecules are found on which of the following?
- A. all body cells with a nucleus
  - B. red blood cells
  - C. granulocytes and macrophages
  - D. lymphocytes and antigen-presenting cells
  - E. liver cells and macrophages in the spleen
15. Helper T cells do all of the following except
- A. trigger B-cell division, plasma cell maturation, and antibody production.
  - B. provide a rapid response to a future exposure to the antigen.
  - C. enhance production of memory and cytotoxic T cells.
  - D. attract macrophages to the affected area.
  - E. enhance nonspecific defenses.
16. CD8 markers are to \_\_\_\_\_ T cells as CD4 markers are to \_\_\_\_\_ T cells.
- A. suppressor; cytotoxic
  - B. plasma; NK
  - C. cytotoxic; helper
  - D. helper; suppressor
  - E. NK; cytotoxic

17. An abnormal cell would be identified by the immune system because it showed
- A. Class I MHC proteins.
  - B. Class II MHC proteins.
  - C. Class I MHC proteins with an antigen bound.
  - D. Class II MHC proteins with an antigen bound.
  - E. a CD3 receptor complex in the membrane.
18. The various classes of immunoglobulins are differentiated on the basis of their
- A. asymmetry.
  - B. antigen specificity.
  - C. light-chain variable segments.
  - D. heavy-chain constant segments.
  - E. reactivity.
19. Immunoglobulins, formed of five subunits, that are the first antibodies to be produced in response to infection, are
- A. IgA.
  - B. IgD.
  - C. IgE.
  - D. IgG.
  - E. IgM.
20. The process by which antibodies bind to antigenic sites on viruses or toxins, rendering them incapable of binding to other cells, is called
- A. opsonization.
  - B. activation.
  - C. agglutination.
  - D. precipitation.
  - E. neutralization.
21. A sensitized B cell typically is not activated until
- A. it binds a helper T cell that releases cytokines.
  - B. it binds a cytotoxic T cell.
  - C. memory B cells have been cloned.
  - D. it has cloned plasma cells.
  - E. antibodies have been produced.
22. The human immunodeficiency virus (HIV) that causes the disease known as AIDS selectively infects \_\_\_\_\_ cells.
- A. B
  - B. plasma
  - C. cytotoxic T
  - D. helper T
  - E. suppressor
23. The secretion of thyroid hormones is controlled by \_\_\_\_\_.
- A. TSH from the hypothalamus
  - B. TSH from the anterior pituitary
  - C. thyroxine from the anterior pituitary
  - D. thyroglobulin from the thyroid's parafollicular cells
24. Signs and symptoms of untreated hypothyroidism include:
- A. myxedema and sleepiness
  - B. excessive sweating and nervousness
  - C. weight loss
  - D. cretinism
  - E. A and D

25. Which of the following statements is TRUE?
- A. Body heating is usually tolerated better than body cooling.
  - B. Basal metabolic rate is usually measured within 2 hours of eating a meal.
  - C. An individual with Grave's disease exhibits poor cold tolerance.
  - D. With regards to thyroid hormones, T4 binds more strongly to target tissue receptors than does T3.
  - E. T4 is the most abundant thyroid hormone produced by the thyroid gland.
26. All of the following are signs of hyperglycemia **except**.
- A. polyuria
  - B. polydipsia
  - C. polyphagia
  - D. polycythemia
27. During an afternoon class, Lisa starts to feel hungry and worries that her blood sugar level may be dropping. Which hormone is helping to prevent a drop in blood sugar level?
- A. insulin
  - B. glucagon
  - C. aldosterone
  - D. thyroxine
28. Lipoproteins that are formed within the intestinal epithelium to transfer dietary fats into circulation are called
- A. chylomicrons.
  - B. very-low-density lipoproteins.
  - C. micelles.
  - D. low-density lipoproteins.
  - E. high-density lipoproteins.
29. \_\_\_\_\_ carry excess cholesterol from peripheral tissues to the liver.
- A. Very-low-density lipoproteins (VLDLs)
  - B. Low-density lipoproteins (LDLs)
  - C. Micelles
  - D. High-density lipoproteins (HDLs)
  - E. Very-high-density lipoproteins (VHDLs)
30. Frank has diabetes mellitus and his blood pH has dropped. What is the most likely cause of his acidosis?
- A. a buildup of urea
  - B. excess ammonia production
  - C. lipoprotein metabolism
  - D. excess ketone formation
  - E. increased glycolysis
31. Factors that influence an individual's BMR (basal metabolic rate) include all of the following **except**
- A. physical exertion.
  - B. age.
  - C. body weight.
  - D. genetics.
  - E. gender.
32. If an autoimmune disorder targets the beta cells of the pancreas, production of which hormone would be directly affected?
- A. somatostatin
  - B. pancreatic polypeptide
  - C. insulin
  - D. glucagon

33. When the temperature of the preoptic area (body temperature regulation area) of the hypothalamus exceeds its thermostat setting,
- A. peripheral vasoconstriction occurs.
  - B. skin blood flow increases.
  - C. rate and depth of respiration decreases.
  - D. sweat glands are inhibited.
  - E. blood is shunted to deep veins.
34. Heat loss to the cooler air that moves across the surface of your body is called
- A. radiation.
  - B. conduction.
  - C. convection.
  - D. evaporation.
  - E. transmission.
35. Which disease is not associated with obesity?
- A. heart disease
  - B. gout
  - C. cancer
  - D. diabetes mellitus
  - E. kidney disease
36. Which of the following is not a way to conserve or generate heat?
- A. shivering thermogenesis
  - B. nonshivering thermogenesis
  - C. vasoconstriction in the skin
  - D. increasing the depth of respirations
  - E. release of thyroxine
37. The hypothalamic peptide causes you to crave carbohydrates is:
- A. leptin
  - B. galanin
  - C. serotonin
  - D. cholecystokinin
  - E. neuropeptide Y
38. As systemic blood pressure falls, the afferent arterioles of the kidneys ....., preventing a reduction in blood flow to the glomerulus.
- A. dilate
  - B. constrict
  - C. neither; the efferent arteriole is the arteriole that auto regulates to keep the GFR constant
39. The glomerular filtrate contains:
- A. everything in the blood
  - B. everything in the blood except cells and proteins
  - C. water and electrolytes only
  - D. water and waste only
  - E. water only
40. Which of the following pressures is highest in the renal corpuscle under normal circumstances?
- A. blood colloid osmotic pressure
  - B. capsular hydrostatic pressure
  - C. capsular colloid osmotic pressure
  - D. glomerular blood hydrostatic pressure
  - E. None is higher than others; all pressures are equal under normal circumstances.

41. Which of the following is/are secreted by the kidneys?
- A. antidiuretic hormone (ADH)
  - B. aldosterone
  - C. erythropoietin
  - D. angiotensinogen
  - E. All of the above are secreted by the kidneys.
42. If the glomerular blood pressure is 54 mm Hg, the capsular hydrostatic pressure is 11 mm Hg, and the blood colloid osmotic pressure is 24 mm Hg, what is the net filtration pressure?
- $54 - (11 + 24) = 19$
- A. 19 mm Hg
  - B. 41 mm Hg
  - C. 67 mm Hg
  - D. 89 mm Hg
  - E. none of the above
43. The descending limb of the loop of Henle:
- A. is not permeable to water
  - B. is freely permeable to sodium and urea
  - C. pulls water by osmosis into the lumen of the tubule
  - D. contains fluid that becomes more concentrated as it moves down into the medulla
  - E. A and D
44. The transport maximum is the:
- A. highest the glomerular filtration rate can increase without inhibiting kidney function
  - B. greatest percentage of plasma entering the glomerulus that can become filtrate
  - C. upper limit of reabsorption due to saturation of carrier systems
  - D. steepest any concentration gradient can become
  - E. fastest rate at which fluid can flow through the renal tubules
45. If the  $T_m$  for a particular amino acid is 110 mg/min and the concentration of that amino acid in the blood is 80 mg/100mL, how much of that amino acid will appear in the urine (assume normal GFR)?
- $115 \text{ mg} \quad 180 \text{ mg} \quad 180 \text{ mg}$
- A. 0 mg/min
  - B. 30 mg/min
  - C. 80 mg/min
  - D. 110 mg/min
  - E. 125 mg/min
46. Renin, an enzyme secreted from the juxtaglomerular apparatus, causes the direct:
- A. activation of angiotensin I
  - B. activation of angiotensin II
  - C. activation of aldosterone
  - D. release of ADH
47. The area of the kidney that contains the glomeruli of the nephrons is the:
- A. medulla
  - B. cortex
  - C. renal pyramid
  - D. renal column
  - E. renal capsule

48. Which of the following statements is/are FALSE?
- A. An increase in glomerular blood hydrostatic pressure causes a decrease in net filtration pressure.
  - B. Glomerular capillaries have a higher blood pressure than other capillaries of the body.
  - C. Blood in glomerular capillaries flows into arterioles, not into venules.
  - D. Vasa recta pass blood from the efferent arteriole towards venules and veins.
  - E. A) and B)
49. Nephron cells that respond to the concentration (osmolarity) of the filtrate are:
- A. alpha cells
  - B. beta cells
  - C. juxtaglomerular cells
  - D. macula densa cells
  - E. cystic cells
50. In the kidney, blood enters the interlobar vein from the:
- A. arcuate veins
  - B. renal arteries
  - C. efferent arterioles
  - D. segmental veins
  - E. renal veins
51. The filtration membrane includes all but the:
- A. glomerular endothelium
  - B. podocytes
  - C. renal fascia
  - D. basement membrane
52. What would happen if the capsular hydrostatic pressure were increased above normal?
- A. Net filtration would increase above normal.
  - B. Net filtration would decrease.
  - C. Filtration would increase in proportion to the increase in capsular pressure.
  - D. Capsular osmotic pressure would compensate so that the filtration would not change.
53. The primary function of the loop of Henle (nephron loop) is to:
- A. concentrate the urine
  - B. maximize sodium excretion
  - C. reduce urine volume
  - D. permit hydrogen ion excretion
  - E. maximize potassium reabsorption
54. Which of the following is NOT reabsorbed by the proximal convoluted tubule?
- A. Na<sup>+</sup>
  - B. K<sup>+</sup>
  - C. creatinine
  - D. glucose
  - E. amino acids
55. Urine passes through the:
- A. kidney hilus to the bladder to the ureter
  - B. pelvis of the kidney to the ureter to the bladder to the urethra
  - C. glomerulus to ureter to renal tubule
  - D. hilus to urethra to bladder