

Anatomy and Physiology - Bio 2710 (Exam B)
Unit Three Lecture Exam (C19 – C20 – C21 – C22 - C23)
OK to make marks on exam booklet

Name: _____

C19

1. What is the normal value for hematocrit?

- A. 01 %
- B. 45 %
- C. 25 %
- D. 75%

2. What is removed from the plasma to make serum?

- A. fibrinogen
- B. albumin
- C. thrombin
- D. immunoglobulin

3. What occurs when erythropoietin is secreted?

- A. increased blood viscosity.
- B. increased hematocrit.
- C. increased RBC production.
- D. all of the above

4 What statement about polycythemia is NOT TRUE?

- A. primary polycythemia is caused by a cancer of the erythroblasts
- B. polycythemia is an excess of RBC.
- C. secondary polycythemia reduces the hematocrit.

5 What term describes a condition that reduces the number of functional thromocytes?

- A. thromocytosis
- B. thrombocytopenia
- C. anemia
- D. none of the above

6 What tissue type is blood?

- A. epithelial
- B. connective
- C. nervous
- D. muscle

7. What condition may develop during a second pregnancy if the first child is Rh positive and the mother is Rh negative?

- A. pernicious anemia
- B. polychythemia
- C. hemolytic disease of the newborn

8. What blood type is the universal donor?
- A. AB
 - B. A
 - C. O
 - D. B
9. What cell will increase from 5,000 to 25,000 cells per microliter when you have a bacterial infection?
- A. basophils
 - B. monocytes
 - C. erythrocytes
 - D. eosinophils
 - E. neutrophils
10. What WBC changes its name when it moves from the blood into the interstitial space and secretes histamine to initiate inflammation?
- A. Eosinophils
 - B. Basophil (Mast cell)
 - C. Neutrophils
 - D. Platelets
 - E. Monocytes
11. What is not true about macrophage?
- A. it circulates in the blood as an eosinophil and becomes a macrophage in the interstitial space
 - B. it is antigen presenting cell
 - C. the name means big eater
 - D. it is found in high concentrations inside lymphatic organs
12. What is not a step in hemostasis?
- A. vascular spasm.
 - B. clot formation (i.e. coagulation)
 - C. plasmin activation
 - D. platelet plug formation.
13. How long does it take to form a blood clot by the extrinsic pathway?
- A. 15 sec
 - B. 45 sec
 - C. 5 min
 - D. 10 min
14. How long may a RBC circulate in the blood?
- A. 3 days
 - B. 45 days
 - C. 75 days
 - D. 120 days
15. Where do RBC go to be recycled (i.e. RBC graveyard)?
- A. spleen
 - B. liver
 - C. pancreas
 - D. thymus

16. How many days does it take to form a new RBC?
- A. 1
 - B. 5
 - C. 10
 - D. 120
17. What statement is **not true** about someone with AB+ blood type?
- A. they have the A and B antigen on their RBC membrane
 - B. they will make antibodies against the Rh factor if they are exposed to antigen D
 - C. they do not have anti-A or anti-B in their plasma
 - D. they are universal recipients
18. What WBC concentration increases with a parasite infection?
- A. basophils
 - B. neutrophils
 - C. erythrocytes
 - D. eosinophils
19. What is the diameter of a RBC? (given in micrometers)
- A. 15
 - B. 2
 - C. 7.5
 - D. 45.5
20. What term describes many RBCs connected to each other by an antibody?
- A. diapedesis
 - B. compliance
 - C. agglutination
 - D. complement
21. What is the function of the circulatory system?
- A. transport
 - B. protection
 - C. regulation
 - D. all of the above
22. What organ is stimulated by hypoxemia to secrete erythropoietin?
- A. liver
 - B. kidney
 - C. pancreas
 - D. thymus
23. What cell may produce a respiratory burst?
- A. basophils
 - B. neutrophils
 - C. erythrocytes
24. What do we call a blood clot that is moving in the blood stream?
- A. embolism
 - B. thrombus
 - C. infarction

25 What side of the heart is called the “high pressure pump”?

- A. right side of the heart.
- B. the left side of the heart
- C. the ventricles

26 What is afterload?

- A. pressure above the aorta and pulmonary semilunar valves that must be overcome in order to eject blood
- B. amount of tension in the ventricular myocardium immediately before it begins to contract
- C. the volume of blood leaving the ventricles
- D. the volume of blood entering the ventricles
- E. the blood volume in the ventricles just before the ventricles contract

27. How long does it take to complete one cardiac cycle?

- A. 0.2 sec
- B. 0.4 sec
- C. 2.0 sec
- D. 1.6 sec
- E. 0.8 sec

28. What structure allows the heart to contract as a single “unit” (i.e. as if the heart cells are a single muscle)?

- A. striated myofibrils
- B. internal conduction system
- C. atrial-ventricular septum
- D. intercalated discs
- E. gap junctions

29. What term describes a slow heart rate?

- A. ectopic
- B. bradycardia
- C. asystole
- D. tachycardia

30. What term describes the volume of blood ejected by the heart in one minute?

- A. cardiac reserve.
- B. preload.
- C. afterload.
- D. stroke volume.
- E. cardiac output.

31. What statement is **false** about the heart?

- A. It is located in the mediastinum
- B. It is surrounded by a fibrous capsule
- C. The base of the heart is attached to the diaphragm
- D. Preload describes the amount of blood in the ventricles at the end of ventricular diastole.
- E. The endocardium is composed of simple squamous epithelial cells

32. Where does blood with the highest oxygen content enter the heart?
- A. right atria
 - B. right ventricle
 - C. left atria
 - D. left ventricle
33. What valve is between the right atria and the right ventricle?
- A. tricuspid
 - B. mitral
 - C. bicuspid
 - D. semilunar
34. What term is used to describe the blood in the ventricles when both the AV valves and semilunar valves are closed?
- A. end systolic volume
 - B. end diastolic volume
 - C. isovolumic volume
 - D. ejection fraction
35. What is not a part of the intrinsic cardiac conduction system?
- A. sinoatrial node
 - B. bundle branches
 - C. purkinje fibers
 - D. trabeculae
 - E. AV node
36. What event is associated with the first heart sound?
- A. closing of the semilunar valves
 - B. opening of the semilunar valves
 - C. closing of the atrialventricular valves
 - D. opening of the atrialventricular valves
37. In a resting state, what is stroke volume?
- A. 120 ml
 - B. 40 ml
 - C. 70 ml
 - D. 500 ml
38. Where is the cardiovascular regulation center located?
- A. diencephalon
 - B. cerebellum
 - C. pons
 - D. thalamus
 - E. medulla oblongata
39. What term describes the myocardium when it contracts extremely fast but without a normal rhythm?
- A. fibrillation
 - B. tachycardia
 - C. bradycardia
 - D. ectopic focus

40. What EKG event is associated with ventricular systole?

- A. T wave
- B. P wave
- C. QRS complex
- D. W wave

41. What is the heart rate if the SA node is damaged and the AV node becomes the pacemaker? (bpm = beats per minute)

- A. 30 bpm.
- B. 50 bpm.
- C. 75 bpm.
- D. 100 bpm.

42. What **does not happen** to the heart in response to action potentials from the sympathetic nervous system?

- A. increase heart rate
- B. coronary arteries dilate
- C. delayed in ST segment
- D. increase in the force of myocardium contraction

43. What circuit uses the elastic recoil of the aorta to perfuse the myocardium with blood?

- A. systemic circuit
- B. pulmonary circuit
- C. coronary circuit

C21

44. What organ has sinusoid capillaries?

- A. Brain
- B. Small intestine
- C. Liver
- D. Kidney

45. How do we regulate blood flow in a capillary bed?

- A. Local control (metabolic theory of autoregulation)
- B. voluntary control
- C. vasomotor center
- D. autonomic nervous system

46. What is a portal system?

- A. two capillary beds between an artery and vein
- B. one capillary bed separated by two venules
- C. it is a fetal structure which closes after birth
- D. provides collateral circulation in the spleen.

47. Where is the vasomotor center located?

- A. hypothalamus
- B. medulla oblongata
- C. spinal cord
- D. cerebellum
- E. cortex

48. What is the most important force used to move blood toward the heart in the arms and legs?
- A. gravity
 - B. blood pressure
 - C. skeletal muscle pump
 - D. cardiac suction
49. What is the maximum allowable distance a cell can be from a capillary?
- A. 7.5 micrometers
 - B. 20 micrometers
 - C. 40 micrometers
 - D. 80 micrometers
50. What term describes the force that moves fluid out of the capillary on the arteriole side of the capillary bed?
- A. osmotic pressure
 - B. colloidal force
 - C. filtration
51. Under normal physiologic conditions, how much fluid is lost across the capillary bed? (given as a percent)
- A. 85
 - B. 30
 - C. 15
 - D. 60
 - E. 0
52. What fetal structure allows blood to flow directly from the right atria to the left atria?
- A. ligament atriosum
 - B. ductus atriosum
 - C. fossa ovalis
 - D. foramen ovalis
- C23
53. What enzyme inside red blood cells combine water and carbon dioxide to make this molecule H_2CO_3 ?
- A. hemoglobinase
 - B. carboxyhemoglobinase
 - C. carbonic anhydrase
 - D. bisphosphoglycerase
54. What is the maximum number of oxygen molecules carried by a hemoglobin molecule?
- A. 1
 - B. 2
 - C. 3
 - D. 4
55. What ion is responsible for “unloading oxygen” from hemoglobin in the systemic circuit?
- A. sodium
 - B. potassium
 - C. chloride
 - D. hydrogen (H^+)

56. What occurs during systemic gas exchange?

- A. oxygen is unloaded from the hemoglobin
- B. the chloride shift occurs
- C. carbonic acid is converted into bicarbonate
- D. carbon dioxide is transformed into carbonic acid within the RBC
- E. all of the above

57. Why does air move into the lungs?

- A. air molecules move faster in the atmosphere which causes air to flow into the lungs
- B. pressure in the intra-pleural cavity is greater than atmospheric pressure
- C. air moves from a high concentration to a low concentration
- D. pressure in the intra-pleural cavity is lower than atmospheric pressure

58. What term best describes expiration during quiet breathing?

- A. passive
- B. active
- C. diffusion
- D. neutral

59. In the respiratory cycle, how long is inspiration? (given in seconds).

- A. 1
- B. 2
- C. 3
- D. 5

60. What is **false** about the respiratory membrane?

- A. this structure is formed by an endothelial cell and an alveoli cell
- B. there is only a single basement membrane
- C. gas diffusion will increase if fluid accumulates within the respiratory membrane
- D. oxygen and carbon dioxide diffuses in opposite directions across the respiratory membrane

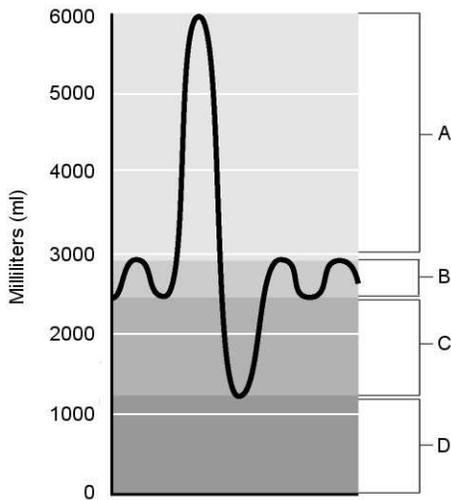
61. What is **not** a mechanism used to transport carbon dioxide?

- A. carbamino association (carbon dioxide attached to the surface of a protein)
- B. as a dissolved gas
- C. as bicarbonate ion
- D. attached to the heme molecule's iron

62. What will **slow down** gas exchange between the blood and the alveolus?

- A. an increase in the respiratory membrane thickness
- B. an increase in alveolar surface area
- C. an increase in respiratory rate
- D. a decrease in respiratory membrane thickness

Matching: (63 – 64)



Use this figure for #63 and #64

63 Tidal volume.

64 Inspiratory reserve volume.

65. When you inhale air, how much of this air reaches the alveoli (in ml)?

- A. 150
- B. 500
- C. 200
- D. 350
- E. 750

66. When at rest, how much air is moved in and out of the lungs?

- A. 150 ml
- B. 250 ml
- C. 500 ml
- D. 750 ml

67 What WBC secretion from the interstitial space will cause systemic blood vessels to dilate but bronchioles to contract?

- A. acetylcholine
- B. epinephrine
- C. histamine
- D. serotonin

68. What **is not true** about pulmonary surfactant?

- A. it is produced by type II alveolar cells
- B. it is produced during the first trimester of a pregnancy
- C. it disrupts the formation of hydrogen bonds in the water lining the alveoli
- D. babies born several weeks early often died due to respiratory failure
- E. pulmonary surfactant is a “soap like molecule” that disrupts hydrogen bonds

69. What reflex uses stretch receptors in the smooth muscle of bronchi, bronchioles and the visceral pleura to inhibit inspiratory neurons?
- A. Frank Starling Law
 - B. Hering-Breuer Reflex
 - C. Wolf's Law
 - D. Irritant Reflex
70. What will happen if a local region in the lung is not ventilated?
- A. you will feel sleepy
 - B. blood flow into this area will decrease
 - C. blood flow into this area will increase
 - D. you will start to cough which restores ventilation
71. How much oxygen is unloaded from hemoglobin when it passes through a capillary bed (resting state)?
- A. 50%
 - B. 10%
 - C. 25%
 - D. 75%
72. What terms describes a lack of adequate oxygen in the tissue?
- A. apoxia
 - B. hypoxia
 - C. anoxia
 - D. cyanosis
 - E. eupnea
73. What alveoli cell produces surfactant?
- A. squamous alveolar cell (type I cell)
 - B. alveolar cell type II cell (great alveolar cell)
 - C. Macrophage
 - D. Dust cells
74. How long is a single respiratory cycle? (seconds)
- A. 2
 - B. 3
 - C. 5
 - D. 12
75. What lung disease is marked by abnormally few but large alveoli and a total reduction in the respiratory membrane's surface area?
- A) cor pulmonale
 - B) pulmonary hemosiderosis
 - C) emphysema
 - D) atelectasis

76. What statement is **not true** about the spleen?
- A) the spleen filters blood and monitors the blood for foreign antigens
 - B) the spleen is the “graveyard” for old RBC
 - C) the spleen holds 40% of the circulating platelets
 - D) macrophage and lymphocytes are stored in the spleen’s white pulp
 - E) T cells are educated in the spleen, they receive their plasma membrane receptors in the spleen
77. What WBC is located in the stratum spinosum of the epidermis, is an antigen presenting cell, and transports foreign antigens to WBC in the lymph nodes?
- A. Natural Killer Cells
 - B. Macrophage
 - C. Dendritic Cells
 - D. Reticular Cells
 - E. T-Cells
78. What line of defense is characterized as non-specific resistance mechanisms (e.g. macrophage, immune surveillance, inflammation, and fever)?
- A) first line of defense
 - B) second line of defense
 - C) third line of defense
 - D) fourth line of defense
79. What cell type is required to activate cytotoxic-T -Cells, B cells, and inflammation?
- A. Helper T cells
 - B. B cells
 - C. Cytotoxic T cells
 - D. Regulatory T cells
 - E. Memory cells
80. What term describes a cell “squeezing” through a gap between endothelial cells?
- A. chemotaxis
 - B. margination
 - C. diapedesis
 - D. phagocytosis
81. What **is not** considered one of inflammation’s four cardinal signs but is considered an important factor that aids in the overall recovery process?
- A. Impaired use
 - B. Redness
 - C. Pain
 - D. Heat
 - E. Edema
82. What lymphocytes provides immune surveillance and may kill cells infected with either cancer or virus?
- A) Natural killer cells
 - B) Plasma cells
 - C) B lymphocytes
 - D) Mast cells
 - E) Regulatory T cells

83. What type of immunity uses antibodies collected from horse serum to treat a snake's neurotoxin?

- A. artificial passive immunity.
- B. artificial active immunity.
- C. natural passive immunity.
- D. natural active immunity.

84. Where are B cells educated (i.e. become immunocompetent)?

- A. thymus
- B. lymph nodes
- C. red bone marrow
- D. liver

85. What cell makes antibodies (be specific)?

- A. T cells
- B. NK cells
- C. B cells
- D. Plasma cells
- E. D cells

86. What statement about a lymph node is false?

- A. lymph nodes have many afferent vessels but only one efferent vessel
- B. macrophage are found in high concentration within lymph nodes
- C. B cells and T cells are found in high concentrations within lymph nodes
- D. lymph nodes swell when infected with bacteria
- E. RBC are broken apart and recycled in lymph nodes

87. What cell is not an antigen presenting cell?

- A. Neutrophil
- B. Dendritic cell
- C. B cell
- D. Macrophage

88. After a pathogen is "defeated", what will happen to the cytotoxic T cells and plasma cells?

- A. they are deactivated and return to the lymph nodes
- B. they die by apoptosis
- C. they continue to circulate in the blood and wait for a second similar infection
- D. they are converted into memory cells and return to the lymph nodes
- E. they die by necrosis

89. Why is fever classified as a form of non-specific resistance?

- A. fever increase blood iron concentrations which slows down bacterial growth
- B. fever stimulates B and T cells mitosis
- C. fever causes iron to be concentrated in liver so iron is not available to support bacterial growth
- D. fever is a key steps to activate monocytes

90. What immune cell using a "kiss of death" to kills tissue cells infected with foreign antigen?

- A. T_c (cytotoxic T cells)
- B. T_H (helper T cells)
- C. T_R (regulatory T cells)
- D. T_M (memory T cells)

91. What type of immune cells will remain in the body after a bacterial infection is defeated and may live as long as 70 years within lymphatic organs?
- A. regulatory cells
 - B. cytotoxic T cells
 - C. memory B cells and memory T cells
 - D. helper T cells
92. What condition occurs if a hypersensitive person is stung by a bee?
- A. fever
 - B. lack of hunger
 - C. anaphylactic shock
 - D. hyperactive
 - E. chills
93. What is the first line of defense against pathogens?
- A. non specific resistance
 - B. physical barriers
 - C. adaptive immunity
94. Where are T cells and B cells “born”?
- A. thymus
 - B. spleen
 - C. red bone marrow
 - D. yellow bone marrow
 - E. none of the above
95. What are the “three Rs” of immunity?
- A. recognize, reorder, remember
 - B. recognize, react, retreat
 - C. recognize, react, remember
 - D. recognize, react, regenerate
96. What must both B cells and T cells receive in order to become immunocompetent?
- A. rough endoplasmic reticulum
 - B. a unique receptors matched to each B and T cell
 - C. plasmids
 - D. interferon
 - E. cytokines
97. What is complement?
- A. protein made by the liver and circulate in the blood
 - B. able to be activated by either G or M antibodies bound to foreign antigen
 - C. able to punch holes in plasma membranes (cytolysis)
 - D. able to stimulate inflammation and immune clearance
 - E. All of the above
98. What is not true about antibodies?
- A. They render bacteria harmless and tag bacteria for destruction
 - B. antibody type “A” may pass from mother to newborn through breast feeding
 - C. antibodies kill pathogens
 - D. they are large protein molecules
 - E. antibody type “G” may pass from the mother to the fetus through the placenta

99 What cell type used MHCP-1 to display endogenous antigen in their plasma membrane?

- A. Helper T cells
- B. Memory T cells
- C. Host nucleated cells
- D. Cytotoxic T cells

100 What WBC is first to arrive in tissue infected with bacteria?

- A. mast cell
- B. esinophil
- C. B cell
- D. neutrophil
- E. macrophage