

## Chapter 18 Study Guide

1. What are the three primary functions of the Circulatory system?
2. Define the physical characteristics of blood, plasma, and serum?
3. What are the seven formed elements of blood?
4. What are the granulocytes and agranulocytes? Be able to distinguish by characteristics (see fig 18.1)
5. What are the functions of the plasma proteins? What are the three main categories?
6. How is viscosity and osmolarity related to the function of blood?
7. What is colloid osmotic pressure?
8. What is hemopoiesis? What is the difference between myeloid hemopoiesis and lymphoid hemopoiesis?
9. What is the function of the pluripotent stem cell?
10. Erythrocytes:
  - a. Size
  - b. Shape
  - c. How does an immature and mature RBC differ?
  - d. What are the functions of the cytoskeletal proteins spectrin and actin?
  - e. How much hemoglobin in the RBC's cytoplasm?
  - f. What is a reticulocyte?
  - g. What is carbonic anhydrase?
11. Hemoglobin:
  - a. What is the structure of adult hemoglobin (HbA)? (fig 18.5)
  - b. Where is the oxygen located and what role does it play?
  - c. Hematocrit
  - d. HbF
  - e. Average life span in days
  - f. How many RBC do you make per second?
  - g. How long does it take to produce a RBC?
  - h. What are the four stages of erythropoiesis?
  - i. Erythropoietin (Where is the receptor located for this hormone?)

12. What is the mechanism that regulates iron metabolism? (fig 18.8)
13. What is hypoxemia? How does hypoxemia influence erythropoiesis? (fig 18.7) What is this type of regulation called?
14. What happens during hemolysis? Where does this occur? What type of cell plays a major role in this process? What is known as the erythrocyte graveyard and why?
15. The Life and Death of Erythrocytes (fig 18.9)
16. Blood disorders:
  - a. Polycythemia (primary and secondary)
  - b. Anemias
    - i. Hemorrhagic anemia
    - ii. Hemolytic anemia
    - iii. Iron-deficiency anemia
    - iv. Pernicious anemia (intrinsic factor / B12)
    - v. Hypoplastic anemia
    - vi. Aplastic anemia
    - vii. Sickle cell anemia
17. Sickle Cell Disease:
  - a. What is the molecular difference between HbA and HbS?
  - b. What is the difference between people who are either homozygous or heterozygous for HbS?
  - c. In an HbS individual, what happens to the RBC in a hypoxic state?
  - d. What is the advantage of being heterozygous for HbS?
18. Explain what determines a person's ABO blood type: (Key Words: glycoprotein, antigens, antibodies, agglutination, antigen-antibody complex, agglutinogens, agglutinins) (See fig 18.14)
19. What is a transfusion reaction?
20. How is the Rh antigen-antibody mechanism different from the AB antigen-antibody mechanism?
21. Explain the mechanism that controls the hemolytic disease of the newborn (HDN): (fig 18.16)
22. What are the names of the three different granulocytes?
  - a. Rank the granulocytes by % of WBC.
  - b. What is the primary function of each granulocyte?
23. What are the names of the two agranulocytes?

- a. Rank the agranulocytes by % WBC.
- b. Which agranulocyte is the largest of the WBC?
- c. What is the subcategory for these two cell lines?

#### 24. Leukocyte Life Cycle

- a. Leukopoiesis
- b. Myeloblasts
- c. Monoblast
- d. Lymphoblasts
- e. What cells secrete colony-stimulating factors and where are the receptors located?
- f. What is the relationship between monocytes and macrophage?

#### 25. Leukocyte disorders:

- a. Leukopenia
- b. Leukocytosis
- c. Myeloid leukemia
- d. Lymphoid leukemia

#### 26. Platelet Form and Function

- a. Are platelets cells? What organelles do they have in their cytoplasm?
- b. How numerous are platelets?
- c. Pseudopods and ameboid movement
- d. What are some of the functions of platelets?
- e. How are platelets formed?

#### 27. Hemostasis

- a. What are the three major hemostatic mechanisms? (fig 18.21)
- b. What causes vascular spasm?
- c. What is the function of prostacyclin?
- d. What is the role of platelets pseudopods in the formation of a platelet plug?
- e. What is released during platelet degranulation?
- f. What is thromoxane A<sub>2</sub>?
- g. What is the object of clotting? (at the molecular level)
- h. What is the difference between extrinsic and intrinsic mechanisms?
- i. Figure 18.23
  - i. What initiates each pathway?
  - ii. Where do the different paths become one?
  - iii. What enzyme converts fibrinogen (soluble) into Fibrin (insoluble)?
  - iv. What is the significance of enzyme amplification in blood clotting? (fig 18.24)

#### 28. Post Clot Formation

- a. When does clot retraction occur? What causes clot retraction?
- b. What enzyme causes fibrinolysis?
- c. Explain how kallikrein is at the center of a positive feedback loop: (fig 18.25)

29. How does the body prevent inappropriate clotting? (three mechanisms)

30. What is a hematoma?

31. What is the relationship between a thrombus and an embolus?