



Required Name: _____

Due: April 12, 2018
Beginning of Class

10

BLOOD

Blood, the "life fluid" that courses through the body's blood vessels, provides the means by which the body's cells receive vital nutrients and oxygen and dispose of their metabolic wastes. As blood flows past the tissue cells, exchanges continually occur between the blood and the tissue cells so that vital activities can go on continuously.

This chapter provides an opportunity to review the general characteristics of whole blood and plasma, to identify the various formed elements (blood cells), and to recall their functions. Blood groups, transfusion reactions, clotting, and various types of blood abnormalities are also considered.

COMPOSITION AND FUNCTIONS OF BLOOD

1. Complete the following description of the components of blood by writing the missing words in the answer blanks.

- _____ 1. In terms of its tissue classification, blood is classified as a _____ (1) because it has living blood cells, called _____ (2), suspended in a nonliving fluid matrix called _____ (3). The "fibers" of blood only become visible during _____ (4).
- _____ 2. _____
- _____ 3. _____
- _____ 4. If a blood sample is centrifuged, the heavier blood cells become packed at the bottom of the tube. Most of this compacted cell mass is composed of _____ (5), and the volume of blood accounted for by these cells is referred to as the _____ (6).
- _____ 5. The less dense _____ (7) rises to the top and constitutes about 45% of the blood volume. The so-called "buffy coat," composed of _____ (8) and _____ (9), is found at the junction between the other two blood elements. The buffy coat accounts for less than _____ (10) % of blood volume.
- _____ 6. _____
- _____ 7. _____
- _____ 8. _____
- _____ 9. Blood is scarlet red in color when it is loaded with _____ (11); otherwise, it tends to be dark red.
- _____ 10. _____ 11.

2. Using the key choices, identify the cell type(s) or blood elements that fit the following descriptions. Insert the correct term or letter response in the spaces provided.

Key Choices

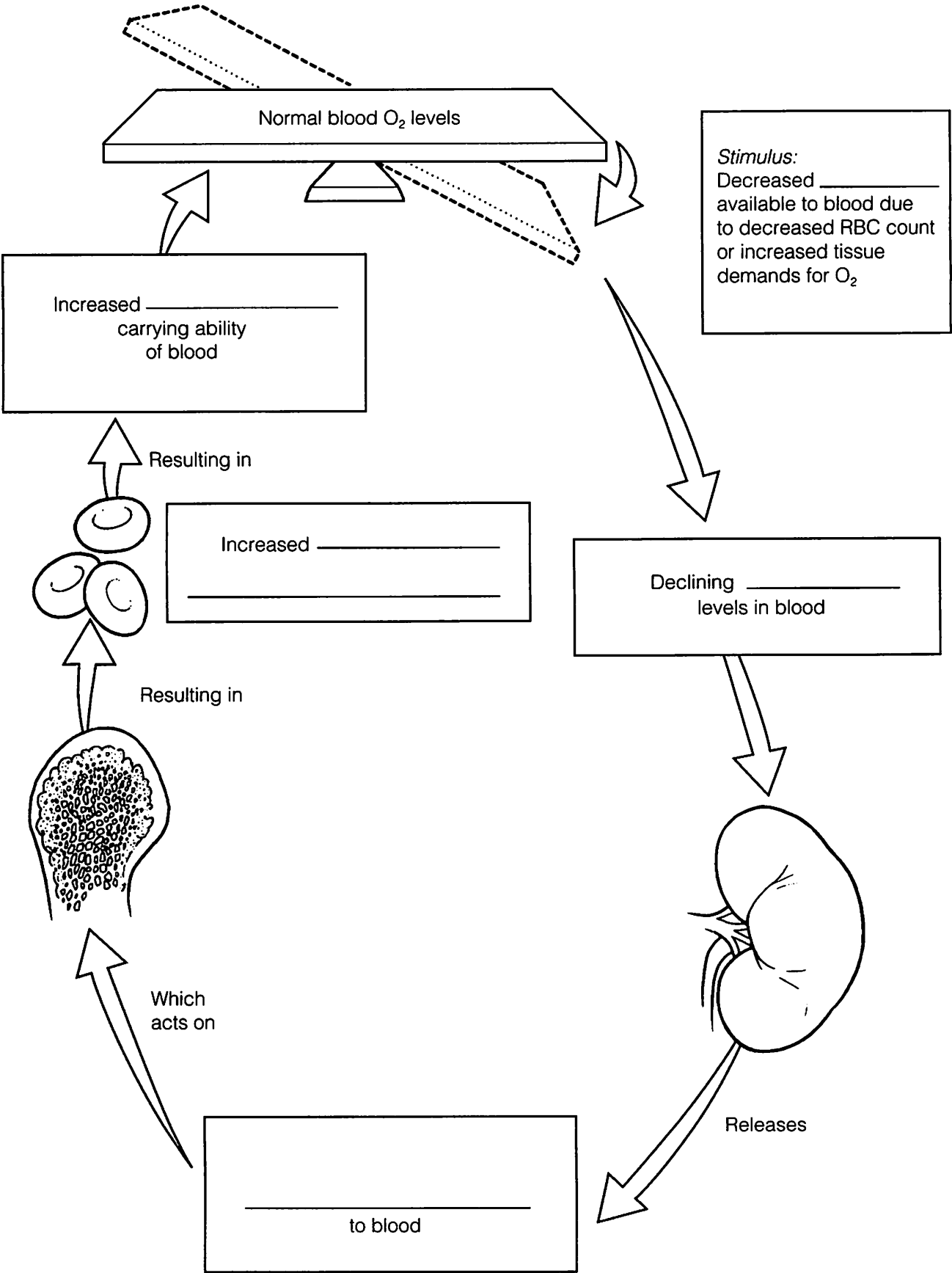
- | | | |
|-------------------|---------------|--------------------|
| A. Red blood cell | D. Basophil | G. Lymphocyte |
| B. Megakaryocyte | E. Monocyte | H. Formed elements |
| C. Eosinophil | F. Neutrophil | I. Plasma |

- _____ 1. Most numerous leukocyte
- _____ 2. _____ 3. _____ 4. Granular leukocytes
- _____ 5. Also called an erythrocyte; anucleate
- _____ 6. _____ 7. Actively phagocytic leukocytes
- _____ 8. _____ 9. Agranular leukocytes
- _____ 10. Fragments to form platelets
- _____ 11. (A) through (G) are examples of these
- _____ 12. Increases during allergy attacks
- _____ 13. Releases histamine during inflammatory reactions
- _____ 14. After originating in bone marrow, may be formed in lymphoid tissue
- _____ 15. Contains hemoglobin
- _____ 16. Primarily water, noncellular; the fluid matrix of blood
- _____ 17. Increases in number during prolonged infections
- _____ 18. Least numerous leukocyte
- _____ 19. _____ 20. Also called white blood cells (#19–23)
- _____ 21. _____ 22. _____ 23.



3. Figure 10–1 depicts (in incomplete form) the erythropoietin mechanism for regulating the rate of erythropoiesis. Complete the statements that have answer blanks, and then choose colors (other than yellow) for the color-coding circles and corresponding structures on the diagram. Color all arrows on the diagram yellow. Finally, indicate the normal life span of erythrocytes.

- Kidney Red bone marrow Red blood cells (RBCs)

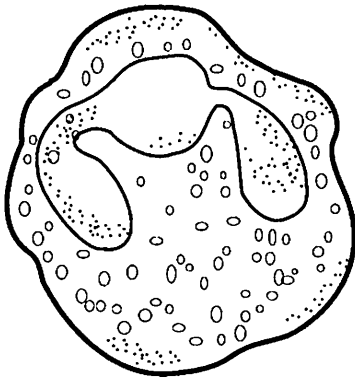


 **Figure 10-1**

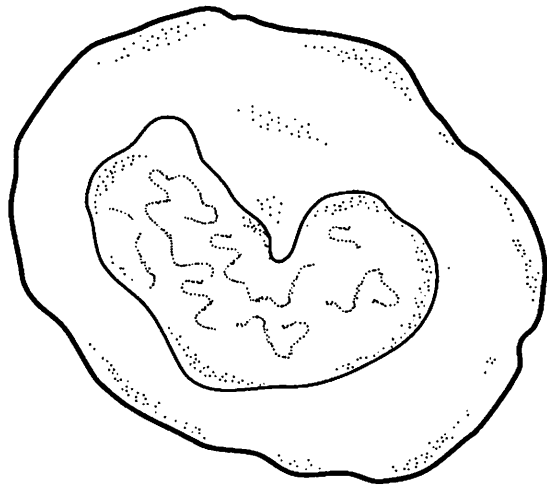


4. Four leukocytes are diagrammed in Figure 10–2. First, follow directions (given below) for coloring each leukocyte as it appears when stained with Wright’s stain. Then, identify each leukocyte type by writing in the correct name in the blank below the illustration.

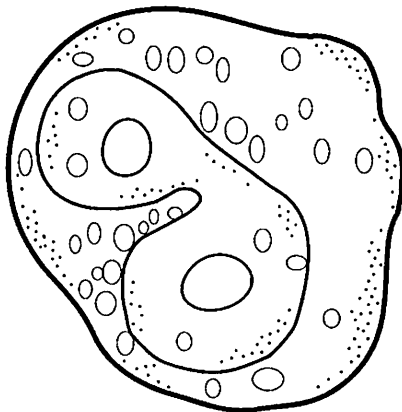
- A. Color the granules pale violet, the cytoplasm pink, and the nucleus dark purple.
- B. Color the nucleus deep blue and the cytoplasm pale blue.
- C. Color the granules bright red, the cytoplasm pale pink, and the nucleus red/purple.
- D. For this smallest white blood cell, color the nucleus deep purple/blue and the sparse cytoplasm pale blue.



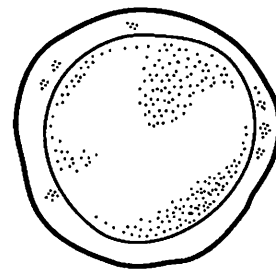
A _____



B _____



C _____



D _____

Figure 10–2

5. For each true statement, insert *T*. If any of the statements are false, correct the underlined term by inserting the correction in the answer blank.

- _____ 1. White blood cells (WBCs) move into and out of blood vessels by the process of positive chemotaxis.
- _____ 2. An abnormal decrease in the number of WBCs is leukopenia.
- _____ 3. When blood becomes too acidic or too basic, both the respiratory system and the liver may be called into action to restore it to its normal pH range.
- _____ 4. The normal pH range of blood is 7.00 to 7.45.
- _____ 5. The cardiovascular system of an average adult contains approximately 4 liters of blood.
- _____ 6. The only WBC type to arise from lymphoid stem cells is the lymphocyte.
- _____ 7. An abnormal increase in the number of white blood cells is leukocytosis.
- _____ 8. The normal RBC count is 3.5–4.5 million/mm³.
- _____ 9. Normal hemoglobin values are in the area of 42%–47% of the volume of whole blood.
- _____ 10. An anemia resulting from a decreased RBC number causes the blood to become more viscous.
- _____ 11. Phagocytic agranular WBCs are eosinophils.
- _____ 12. The leukocytes particularly important in the immune response are monocytes.



6. Circle the term that does not belong in each of the following groupings.

- | | | | |
|----------------------|-------------|------------------|--------------|
| 1. Erythrocytes | Lymphocytes | Monocytes | Eosinophils |
| 2. Neutrophils | Monocytes | Basophils | Eosinophils |
| 3. Hemoglobin | Lymphocyte | Oxygen transport | Erythrocytes |
| 4. Platelets | Monocytes | Phagocytosis | Neutrophils |
| 5. Thrombus | Aneurysm | Embolus | Clot |
| 6. Plasma | Nutrients | Hemoglobin | Wastes |
| 7. Myeloid stem cell | Lymphocyte | Monocyte | Basophil |



7. Rank the following lymphocytes from 1 (most abundant) to 5 (least abundant) relative to their abundance in the blood of a healthy person.

- _____ 1. Lymphocyte _____ 3. Neutrophil _____ 5. Monocyte
 _____ 2. Basophil _____ 4. Eosinophil

8. Check (✓) all the factors that would serve as stimuli for erythropoiesis.

- _____ 1. Hemorrhage _____ 3. Living at a high altitude
 _____ 2. Aerobic exercise _____ 4. Breathing pure oxygen

HEMOSTASIS

9. Using the key choices, correctly complete the following description of the blood-clotting process. Insert the key term or letter in the answer blanks.

Key Choices

- | | | | |
|-----------------|----------------|--------------------------|------------------|
| A. Break | D. Fibrinogen | G. Prothrombin activator | J. Thrombin |
| B. Erythrocytes | E. Platelets | H. PF ₃ | K. Tissue factor |
| C. Fibrin | F. Prothrombin | I. Serotonin | |

- _____ 1. Clotting begins when a (1) occurs in a blood vessel wall. Almost immediately, (2) cling to the blood vessel wall and release (3), which helps to decrease blood loss by helping to constrict the vessel. (4), released by damaged cells in the area, interacts with (5) on the platelet surfaces and other clotting factors to form (6). This chemical substance causes (7) to be converted to (8). Once present, molecule #8 acts as an enzyme to attach (9) molecules together to form long, threadlike strands of (10), which then traps (11) flowing by in the blood.
- _____ 2.
 _____ 3.
 _____ 4.
 _____ 5.
 _____ 6.
 _____ 7.
 _____ 8.
 _____ 9. _____ 10. _____ 11.

10. For each true statement, write *T*. If any statements are false, correct the underlined term by inserting the correction in the answer blank.

- _____ 1. Normally, blood clots within 5–10 minutes.
 _____ 2. The most important natural body anticoagulant is histamine.
 _____ 3. Hemostasis means stoppage of blood flow.

BLOOD GROUPS AND TRANSFUSIONS

11. Correctly complete the following table concerning ABO blood groups.

Blood Type	Agglutinogens or antigens	Agglutinins or antibodies in plasma	Can donate blood to type	Can receive blood from type
1. Type A	A			
2. Type B		anti-A		
3. Type AB			AB	
4. Type O	none			

12. What blood type is the *universal donor*? _____

The *universal recipient*? _____

13. When a person is given a transfusion of mismatched blood, a transfusion reaction occurs. Define the term “transfusion reaction” in the blanks provided here.

DEVELOPMENTAL ASPECTS OF BLOOD

14. Complete the following statements by inserting your responses in the answer blanks.

- _____ 1. A fetus has a special type of hemoglobin, hemoglobin (1), that has a particularly high affinity for oxygen. After birth, the
- _____ 2. infant's fetal RBCs are rapidly destroyed and replaced by hemoglobin A-containing RBCs. When the immature infant
- _____ 3. liver cannot keep pace with the demands to rid the body of hemoglobin breakdown products, the infant's tissues become
- _____ 4. yellowed, or (2).

Genetic factors lead to several congenital diseases concerning the blood. An anemia in which RBCs become sharp and “logjam” in the blood vessels under conditions of low-oxygen tension in the blood is (3) anemia. Bleeder's disease, or (4), is a result of a deficiency of certain clotting factors.

