

THE CIRCULATORY SYSTEM

OBJECTIVES

- Identify the structures of the heart
- Describe the functions of the heart
- Trace blood flow through the cardiovascular system
- Identify blood vessel structures
- Describe blood vessel functions

OBJECTIVES

- Identify & describe cellular & noncellular components of blood
- Locate & name the most commonly used veins for phlebotomy
- Describe the phases of hemostasis
- Describe how to take a blood pressure & pulse rate

**PRIMARY COMPONENTS OF
THE CARDIOVASCULAR
SYSTEM**

- **Heart** (pump)
- **Blood vessels** (connecting tubes)
- **Blood** (circulating fluid)

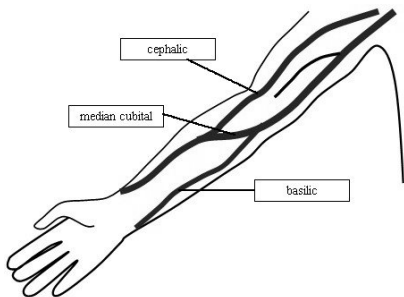


BLOOD VESSELS

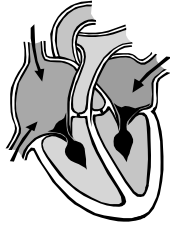
- Arteries
- Veins
- Capillaries
- Arterioles
- Venules



MAJOR ARM VEINS



THE HEART



What does the term systole mean?



- Contraction of the heart, B/P increases.

What does diastole mean?



- Relaxation of the heart, B/P decreases.

FUNCTIONS OF BLOOD

- **Transportation**
- **Disburse nutrients**
- **Regulation**
- **Homeostasis**



THE BLOOD

- **Composition**
- **Average human volume +/- 5 quarts**
- **Whole blood:**
 - 60% plasma
 - 40% cells - RBC'S, WBC'S,
 - Thrombocytes



Red Blood Cell

ERYTHROCYTES

- **Mature through several stages**
- **Each stage with unique morphology**
- **Lose nuclei prior to maturity**
- **Biconcaved disks**



Red Blood Cell

ERYTHROCYTES

- RBC's:
- Number 4.5 - 5.5 million/mm³
- Size 6 - 7 μ m
- Function transport O₂ & CO₂
- Formation bone marrow
- Destruction life span +/- 120 days
fragmentation & removal
in spleen, liver & bone
marrow

ABO BLOOD GROUP SYSTEM

- | • Blood Type | Antigens | Antibodies |
|--------------|----------|-------------|
| • A | A | Anti-B |
| • B | B | Anti-A |
| • AB | AB | Neither A,B |
| • O | None | Anti-A & B |

RH FACTOR

- Rh positive RBC's have antigen for Rh factor
- Rh negative RBC's DO NOT have antigen for Rh factor



What does cross-match testing mean?



- Exposing donor blood to recipient blood

What cellular changes occur with a blood cross-reaction?

- Agglutination
- Hemolysis



LEUKOCYTES

- Two major groups:
- **GRANULOCYTES:**
- Neutrophils
- Eosinophils
- Basophils
- **AGRANULOCYTES:**
- Lymphocytes
- Monocytes



LEUKOCYTES

- **WBC's:**
- **Number** 5,000 - 9,000 / mm³
- **Size** 9 - 16 μ m
- **Function** defense
- **Formation** granulocytes in bone marrow
- **Destruction** life span 1 day to years, spleen, liver, bone marrow

What does the term phagocytosis mean?



- **Condition of / eating, destroying / cell**

What information does a WBC with differential provide?



- **WBC count & categorization of the cells by type, percentage of each type and morphology / maturity.**

What does the term morphology mean?



- Study of characteristics - size, shape, color, maturity

THROMBOCYTES

- Platelets
- Clotting
- Hemostasis



THROMBOCYTES

- **PLATELETS**
- **Number** 250,000 - 450,000 mm³
- **Size** 1 - 4 μ m
- **Function** clotting
- **Formation** bone marrow
- **Destruction** life span 9 - 12 days, removed in spleen

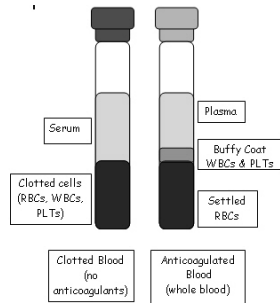
What does the term hematopoietic mean?



- pertaining to / blood / formation

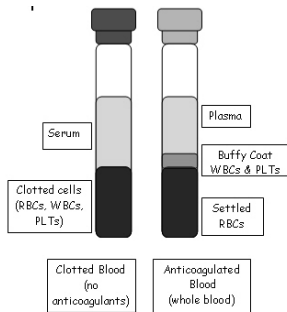
What is plasma?

- Liquid portion of blood without cells
- 90% water
- 10% solutes



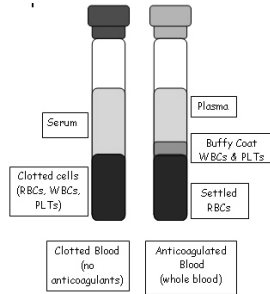
What is serum?

- The watery portion of blood after coagulation.



What is the buffy coat?

- A thin, white layer above RBC's formed by WBC's & platelets.



HEMOSTASIS & COAGULATION

- Hemostasis
- Vascular phase, vasoconstriction
- Platelet phase
- Coagulation phase
- Fibrinolysis

