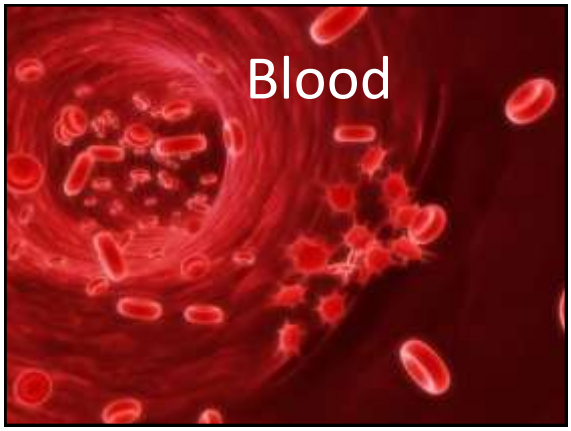


Composition

- Formed Elements
  - 45%
  - Blood cells
- Plasma
  - 55%
  - Non-living fluid matrix

Erythrocytes

- Carry O_2
- Anucleate
- Biconcave disks
- Few organelles
  - Anaerobic respiration
- Sacs of hemoglobin (Hb)
  - Fe containing protein that carries O_2
  - Can carry CO_2

Erythrocytes

- 5 million/mm^3
- Anemia: decrease in O_2 carrying ability of blood
  - Reduced # RBCs
  - Abnormal/deficient Hb
- Polycythemia: increase in RBCs
  - Increases blood viscosity

Leukocytes

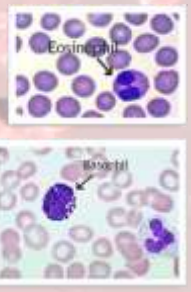
- Defense against disease
- Complete cells
- < 1% total blood volume
  - 8,000/mm^3
- Diapedesis: able to leave blood vessels
- Leukocytosis: > 11,000 cells
- Leukopenia: low WBC

Leukocytes

- Granulocytes
  - Lobed nuclei
  - Contain visible granules
  1. Neutrophils
     - Avid phagocytes

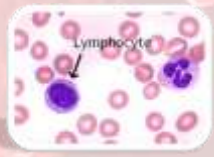
Leukocytes

- Granulocytes
  2. Eosinophils
     - Allergy attacks, parasitic worms
  3. Basophils
     - Large histamine-containing granules (vasodilator)



Leukocytes

- Agranulocytes
  - No granules
  - Normal nuclei
  1. Lymphocytes
     - Immune response
     - Found in lymph system

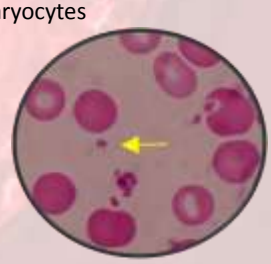


Leukocytes

- Agranulocytes
  2. Monocytes
     - Become macrophages
     - "clean up"
     - Chronic infections

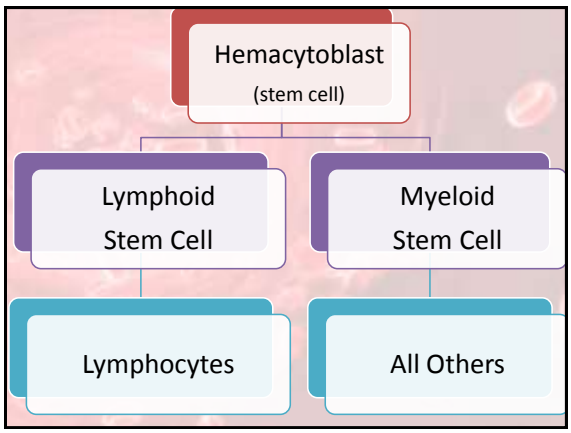
Platelets

- Not cells
- Fragments of megakaryocytes
- 300,000/mm^3
- Blood clotting



Hematopoiesis

- Blood cell formation
- Red bone marrow – myeloid tissue



Erythrocytes

- Produce huge amounts of Hb
- Eject nucleus and most organelles (collapses)
- Reticulocyte released into blood stream
- Eject rough ER and become fully functional RBC
  - 3-5 days

Erythrocytes

- 100-120 day life
- Erythropoietin:
  - Hormone controls RBC formation
  - Most made by kidneys
  - Released when O_2 level drops

Leukocytes

- Hormonal control
- Bacteria and bacteria toxins

Platelets

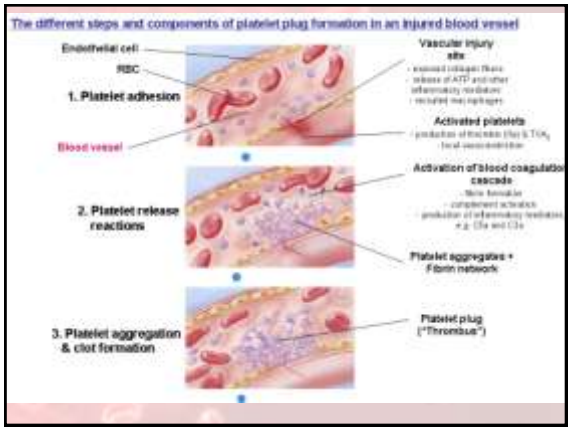
- Not well understood
- Hormonal control: thrombopoietin

Hemostasis

- Stoppage of blood flow

1. Platelet plug forms in response to damage
   - Platelets stick to collagen fibers
2. Vascular spasms occur
   - Blood vessel constricts (serotonin)

3. Coagulation
   a) Throboplastin released by injured tissue
   b) Clotting cascade activated
   c) Thrombin activated
   d) Thrombin and fibrinogen form fibrin
      - Traps RBCs and forms basis of clot
      - Clot retracts bringing ruptured edges closer together



Blood Groups

- Antigens in plasma membrane determine blood type
  - Over 30
  - ABO and Rh cause most intense reactions
- Transfusion reaction = agglutination

ABO

Antigens	Blood Type
Antigen A	A
Antigen B	B
Antigen A and B	AB
No Antigen	O

Rh Blood Group

- Rh antigen = Rh+
- No antigen = Rh-