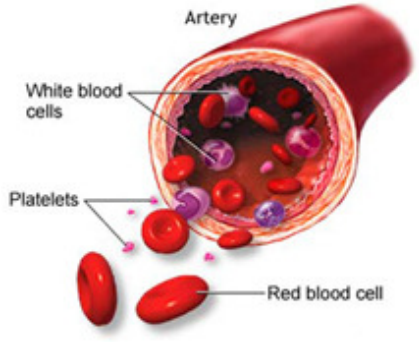
Unit 8a – Blood

Lecture Outline



Anatomy and Physiology
Mrs. Michaelsen

2/9/2010 www.diapharma.com/glossary/blood.jpg 1

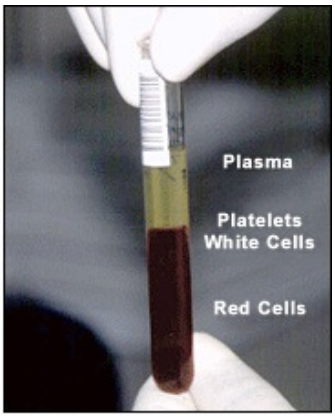
I. Blood Composition

A. Blood Plasma (55%)

1. Definition:

2. Composition: Water containing

3. Amount of blood: Varies with size and sex.



4. Slightly alkaline:

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B. Formed elements

1. Kinds

a. RBC's _____

b. WBC's _____

I. Granular leukocytes –

II. Nongranular leukocytes –

c. Platelets or _____

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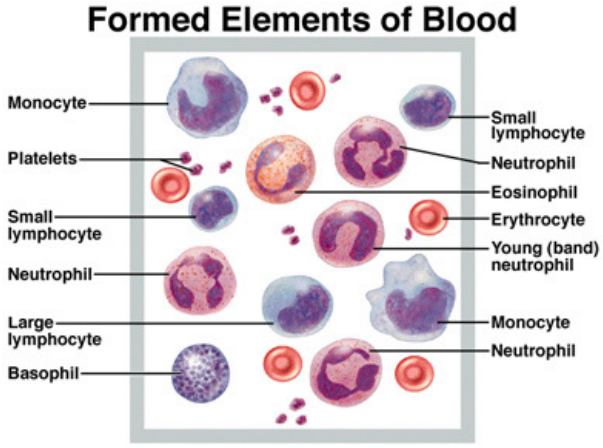
2. Numbers

a. RBC's: 41/2 to 5 million per mm^3 of blood

b. WBC's: 5000-10,000 per mm^3 of blood.

c. Platelets: 300,000 per mm^3 of blood.



www.extension.iastate.edu/nutrition/ supplements/Iron.html

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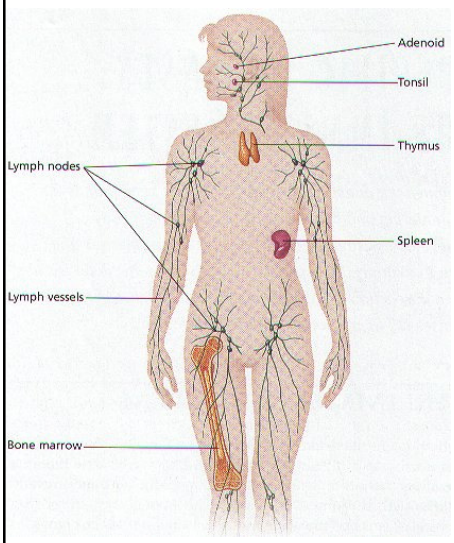
3. Formation



a. Red bone marrow (myeloid tissue) forms all types of blood cells except

b. Formation of blood cells is called:

c.

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C. Mechanisms of Blood Disease

1. Most blood diseases are disorders of

2. Results from failure of the myeloid and lymphatic tissues to
3. Diseased bone marrow can sometimes be replaced by

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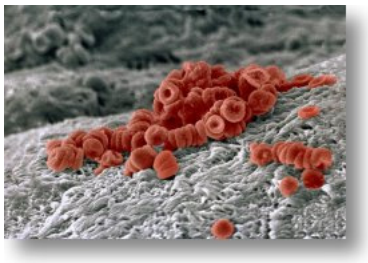
D. Red Blood Cells



1. Structure:

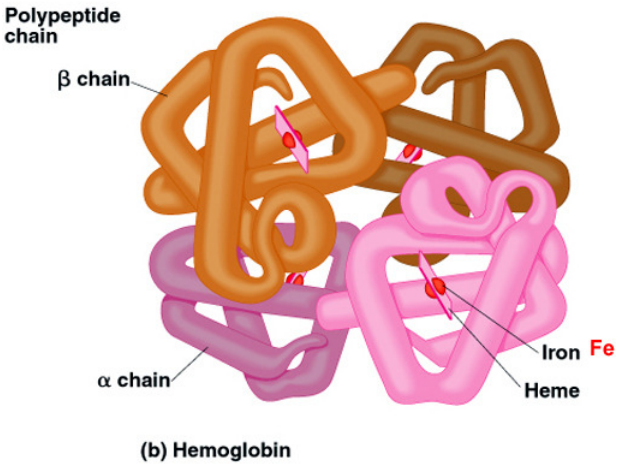
2. Functions:

a. <u>Hemoglobin</u>: red pigment in RBC's that

b. Transports large quantities of

http:www.extension.iastate.edu/nutrition/supplements/Iron.html

Hemoglobin



(b) Hemoglobin

fig.cox.miami.edu/~cmallery/150/ chemistry/hemoglobin.jpg

E. Red Blood Cell Disorders

1. Anemia: Inability of blood to
   Characterized by:
   a. Abnormal
   b. Deficiency in

2. Changes in RBC Number
   a. Hematocrit: Test in which a centrifuge is used to separate

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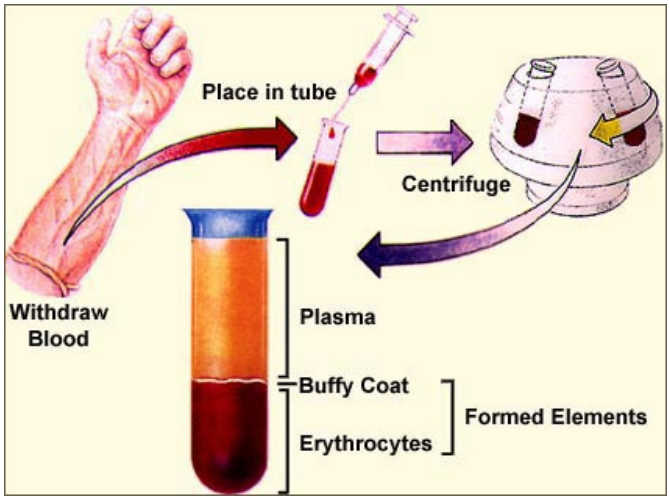

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b. RBC count: Hemocytometer or automatic counter is used to calculate actual number of RBC's

c. Aplastic anemia: Low RBC number caused by

d. Pernicious anemia: Low RBC number caused by

e. Folate-deficiency anemia: Low RBC number caused by

3. Changes in Hemoglobin
   a. Both the

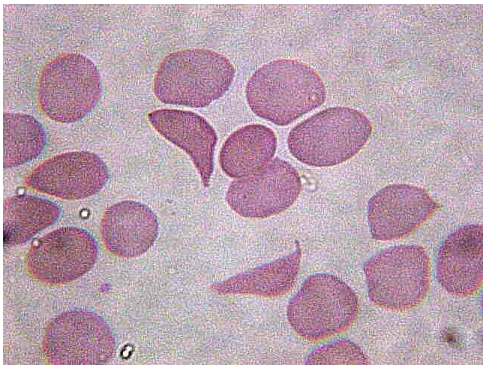
   b. Hemoglobin concentration is often measured with optical devices. Normal ranges:
      i. Female:
      ii. Male:

   c. Iron deficiency anemia: Low hemoglobin caused by

d. Hemolytic anemia: (Group of disorders) Characterized by

i. Abnormal types of hemoglobin can be separated with

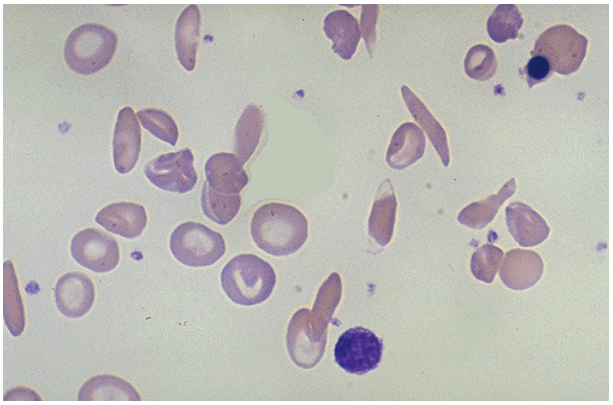
ii. Sickle cell anemia: Example of a hemolytic anemia.



www.sunyniagara.cc.ny.us/ val/sicklecellhigh.html

- Can inherit one or two genes that cause the disease.
- Causes chronic
- Treatment usually includes a
- New drug *Hydroxyurea* reduces

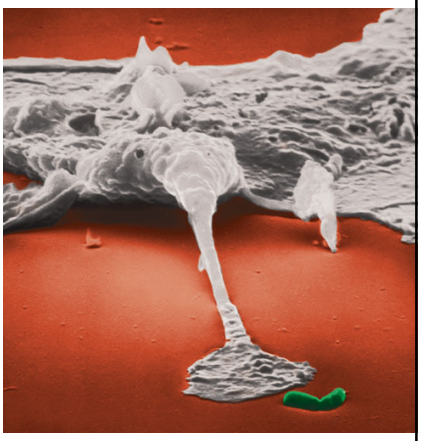
Sickle Cell Crisis



This is sickle cell anemia in sickle cell crisis. The abnormal hemoglobin SS is prone to crystallization when oxygen tension is low, and the RBC's change shape to long, thin sickle forms that sludge in capillaries, further decreasing blood flow and oxygen tension. Persons with sickle cell trait (Hemoglobin AS) are much less likely to have this happen.

F. White Blood Cells

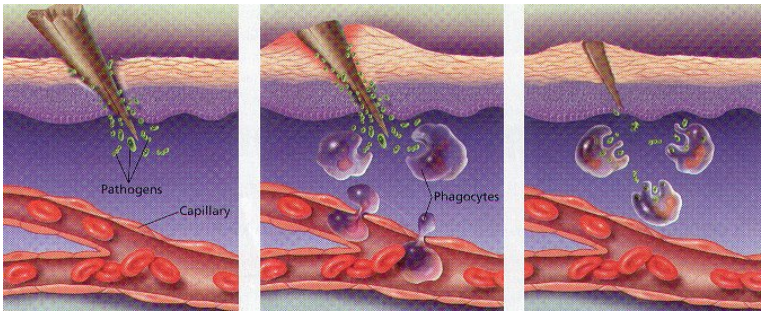
1. Function:
2. Neutrophils (most common)
3. B-lymphocytes produce
4. Eosinophils protect against
5. Basophils produce



Neutrophil attacking a bacterium.

Inflammatory Response (Example)

- Neutrophils circulate freely through blood vessels, and they can squeeze between cells in the walls of a capillary to reach the site of infection. They then engulf and destroy any pathogens they encounter.



G. White Blood Cell Disorders

1. Leukopenia:

   a.

1. Leukocytosis:

   a.

1. Leukemia:

   a. Hematocrit – buffy coat is much more noticeable

   b. Different forms of leukemia –

H. Hemostasis: The stoppage of bleeding

1. Blood Vessel Spasm
   a. Cutting or breaking a smaller blood vessel

   b. Lasts only a few minutes and hormone serotonin can also

2. Platelet Plug Formation
   a.

   b. Helps to control blood loss –

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3. Steps to Blood Coagulation
   a. Clotting factors released at the injury site produce

      i. At the same time some

   b. Prothrombin activator and calcium convert prothrombin to
   c. Thrombin reacts with

   d. Vitamin K stimulates

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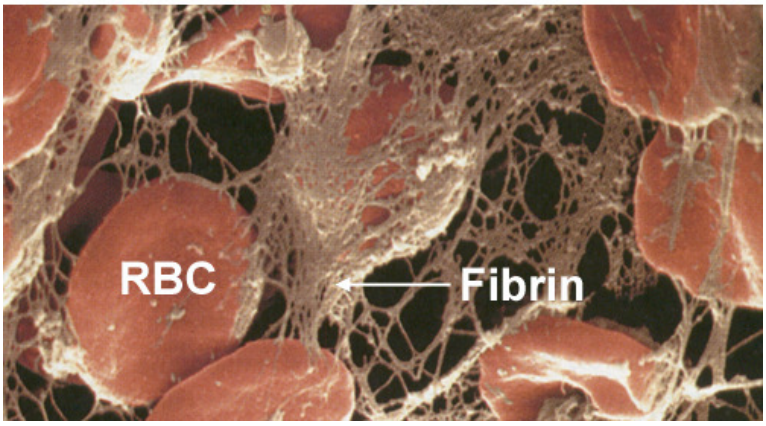

www.ethal.org.my/.../MedicalGeneral/ 134rmgPlatelet.ht

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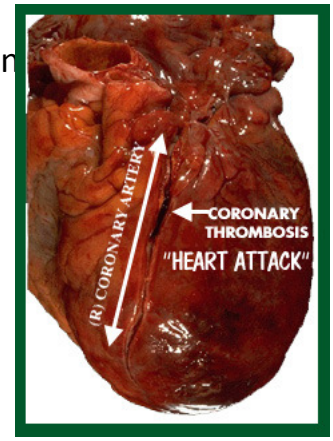
I. Clotting Disorders

1. Thrombosis: Formation of an

2. Embolism:

3. Hemophilia: X-linked inheritance of



4. Thrombocytopenia: Abnormally small number of

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II. Blood Types

A. ABO System

1. Type A Blood: Type ___antigens in RBC's; _____ type antibodies in plasma.
2. Type B Blood: Type ___ antigens in RBC's; _____ type antibodies in plasma.
3. Type AB Blood: Type ___ and Type ___ antigens in RBC's; _____antibodies in plasma.
4. Type O Blood: ___ Type ___ or Type ___ antigens in RBC's; _____ _____and _____ antibodies in plasma.

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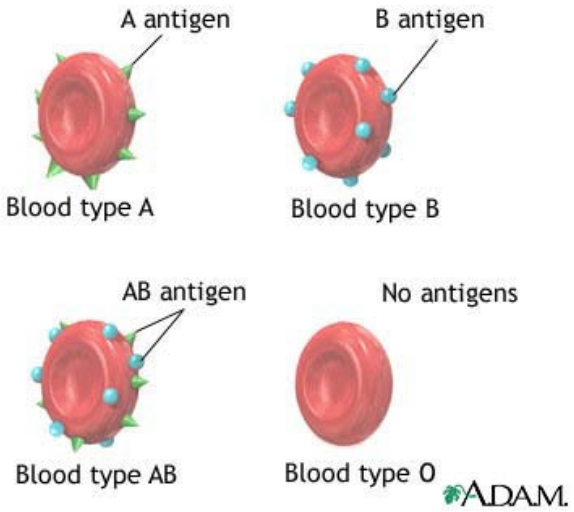

www.nlm.nih.gov/medlineplus/ ency/imagepages/9125.htm

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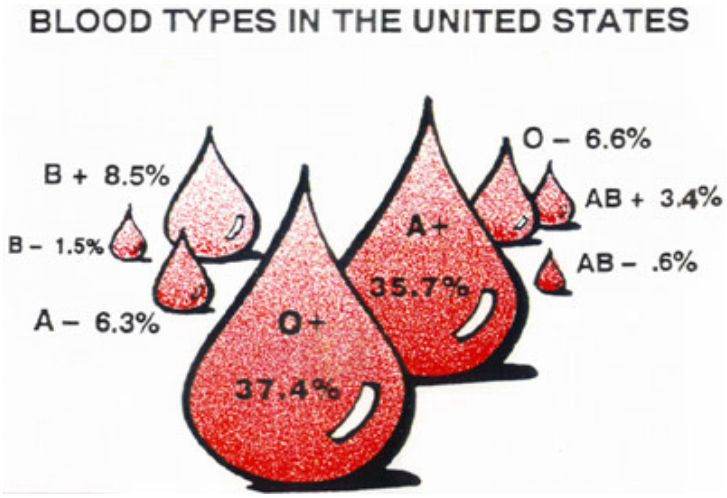

www-med.stanford.edu/.../aboutblood/ blood_types.html

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B. Rh System

1. Rh-positive blood: Rh factor antigen

2. Rh-negative blood:

   a. Anti-Rh antibodies, however, appear in the plasma of Rh-negative persons if Rh-positive RBC's have been introduced into their bodies.

3. Erythroblastosis fetalis: May occur when

   a. Caused by mother's

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a. b. c.

a. **If the fetus is Rh positive, there is a risk that some of its Rh positive blood cells will get into the mother's bloodstream during the pregnancy or delivery and mix with her Rh negative blood.**
b. **Left untreated, the mother's blood will make antibodies that attack the Rh positive blood of the fetus.**
c. **These antibodies can cause health problems for the fetus, such as anemia or even death.**
d. **If the mother then has another baby later on that is also rhesus positive (Rh), her antibodies may cross the placenta and attack the baby's blood, destroying its blood cells.**

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