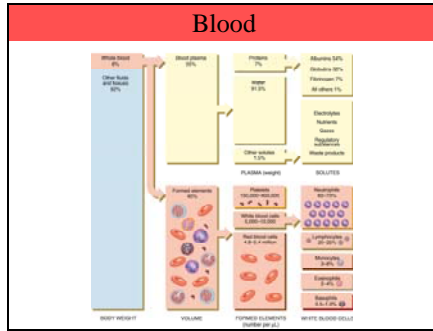




Slide 4




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Slide 5

- Blood**
- Blood (specialized CT)
    - Plasma (Fluid portion of blood = 55% of blood)
    - Components
      - Water 92%
      - Plasma proteins
        - » Albumin (helps with osmotic pressure: containing H<sub>2</sub>O)
        - » Globulins (Abs & lipid, iron and copper transport proteins)
        - » Fibrinogen (helps blood clotting)
- If allowed to stand coagulation occurs

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Slide 6

**Blood**

Dissolved gases

- » Oxygen O
- » Carbon dioxide CO<sub>2</sub>

Electrolytes (Ions)

- » Sodium Na<sup>+</sup>
- » Potassium K<sup>+</sup>
- » Calcium Ca<sup>2+</sup>
- » Chloride Cl<sup>-</sup>
- » Others

Hormones

	PLASMA	Function	Source
	Water (92-98% of plasma)	Maintains blood volume; transports molecules	Absorbed from intestine
	Plasma proteins (7-8% of plasma)	Maintain blood osmotic pressure and pH	Liver
	Albumins	Maintain blood volume and pressure	
	Globulins	Transport; fight infection	
	Fibrinogen	Coagulation	
	Salts (less than 1% of plasma)	Maintain blood osmotic pressure and pH; aid metabolism	Absorbed from intestine
	Gases		
	Oxygen	Cellular respiration	Lungs
	Carbon dioxide	End product of metabolism	Tissues

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Slide 7

Blood		
PLASMA	Function	Source
Nutrients Lipids Glucose Amino acids	Food for cells	Absorbed from intestine
Nitrogenous wastes Uric acid Urea	Excretion by kidneys	Liver
Other Hormones, vitamins, etc.	Aid metabolism	Varied

\* Appearance with Wright's stain.

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Slide 8

**Blood**

- Formed Elements (Cells)  
(Solid portion of blood = 45% of blood)  
Most can not divide (life span of hrs to months)

Erythrocytes  
Leukocytes  
Thrombocytes

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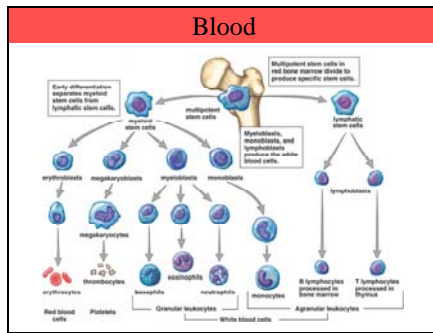
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Slide 9




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Slide 10

**Blood**

- Erythrocytes (RBCs)
  - Oxygen transporting!
  - Biconcave disc shape (depressed center)
  - About 8  $\mu\text{m}$  in diameter, no nucleus or organelles
  - Contain hemoglobin, which binds to O and CO<sub>2</sub>
  - Normally 406 million RBCs per cmm
  - Oxidation of iron atoms from hemoglobin give the red color
  - From red marrow
  - Anemia =  $\downarrow$  O carrying ability of blood from too little RBCs or abnormal hemoglobin

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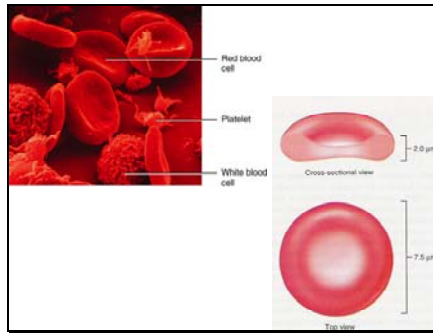
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Slide 11



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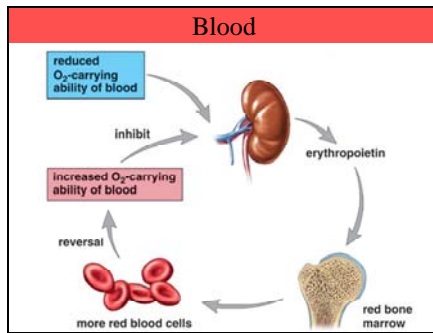
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Slide 12



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Slide 13

**Blood**

- Leukocytes (WBCs) –true cells
  - 5 normal types (see lab manual)
    - » Neutrophils \
    - » Eosinophils (granulocytes)
    - » Basophil /
    - » Small lymphocyte
    - » Monocyte

Mobility out of bloodstream to tissues

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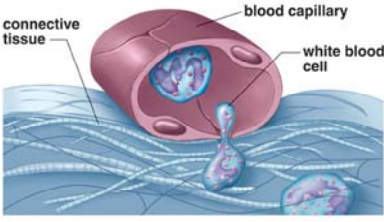
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Slide 14

**Blood**



The diagram shows a cross-section of a blood capillary. A white blood cell is shown in the process of exiting the capillary into the surrounding connective tissue. Labels include 'connective tissue', 'blood capillary', and 'white blood cell'.

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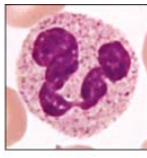
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Slide 15

**Blood**

- Leukocytes (WBCs) –true cells
  - Neutrophils
    - » Phagocytic
    - » Inflammatory role
    - » 2-5 lobes in their nucleus
    - » Pale purple stain



(c) Neutrophil

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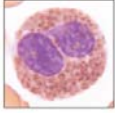
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Slide 16

**Blood**

- Leukocytes (WBCs) –true cells
  - Eosinophils
    - » 2 lobes per nuclei
    - » Phagocytize microbes maked with Ab
    - » Decrease inflammatory response



(a) Eosinophil

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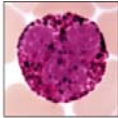
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Slide 17

**Blood**

- Leukocytes (WBCs) –true cells
  - Basophil
    - » Large granules within the whole cell
    - » Release histamines and heparin



(b) Basophil

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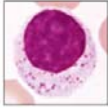
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Slide 18

**Blood**

- Leukocytes (WBCs) –true cells
  - Small lymphocyte
    - » Nucleus fills the cell
    - » Main cells of the lymphatic system
  - » B-cells
  - » T-cells
  - » Monocyte



(d) Small lymphocyte

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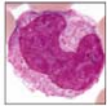
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Slide 19

**Blood**

- Leukocytes (WBCs) – true cells
  - Monocyte
    - » U –shaped nucleus
    - » Phagocytize used neutrophils



(e) Monocyte

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Slide 20

**Blood**

- Function: part of body's defense against infections
- Normally 4000-11,000 WBCs per cmm
- Leukemia = a form of cancer where immature leukocytes flood into the bloodstream. Cancerous cells overtake the marrow and slow the production of normal blood cells

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Slide 21

**Blood**

- Thrombocytes (Platelets)
  - Cell fragments (disc shaped)
  - 1/10 as abundant as RBCs
  - Life span 5 – 10 days
  - Part of the body's clotting system
    - » By adhering to collagen
    - » Releasing a clotting molecule (PF3)
  - Thrombocytopenia
    - » Lack of thrombocytes
    - » What would happen here?

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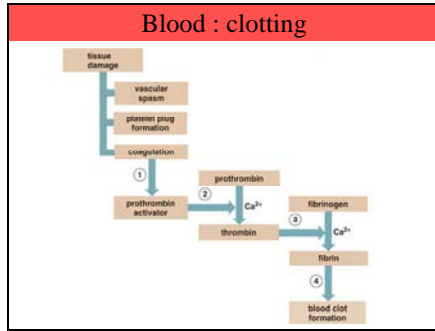
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Slide 22



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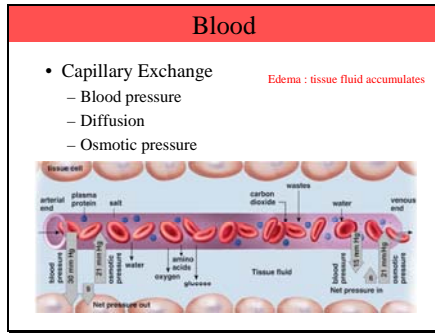
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Slide 23



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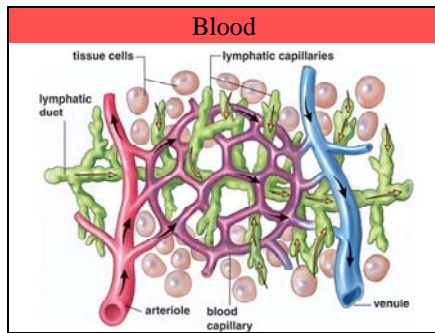
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Slide 24



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Slide 25

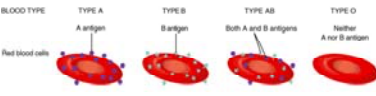
**Blood**

Blood Typing

- All cells have proteins within their membrane
  - Protein markers = antigens
- RBCs
  - A
  - B
  - Some have both = AB
  - Some have neither = O

BLOOD TYPE    TYPE A    TYPE B    TYPE AB    TYPE O

A antigen    B antigen    Both A and B antigens    Neither A nor B antigen



Red blood cells

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Slide 26

**Blood**

Blood Typing

- Rh factor
  - Determines the + or - of ones blood type
  - + = have the Rh factor
  - - = no Rh factor
- This protein may cause problems in childbirth if the mothers blood type is not known

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Slide 27

**Blood**

**Mom = Rh- & Dad= Rh+**

- The 1<sup>st</sup> child =Rh+
- Giving antigens to the mom
- Mom then makes Abs to Rh+
- The 2<sup>nd</sup> child = Rh+
- The mothers Rh+ Abs will attach the child's



red blood cell    anti-Rh antibody

Child is Rh positive; mother is Rh negative.    Red blood cells leak across placenta.    Mother makes anti-Rh antibodies.    Antibodies attack Rh-positive red blood cells in child.

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