

PROJECT LEAD THE WAY

PLTW

Igniting imagination and innovation through learning.

3.1.1. Components of Blood

Blood – Did You Know...

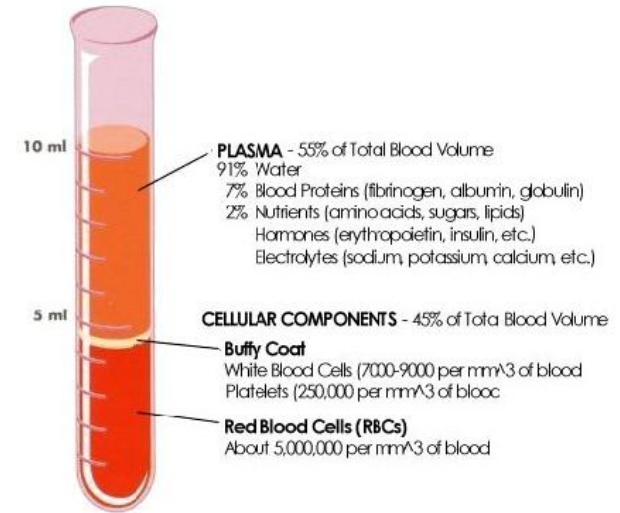
- An average adult has approximately 4.7 L (5 quarts) of blood.
- Blood comprises about 8% of a person's total body weight.
- **Blood** travels 60,000 mi (96,540 Km) per day in your body.
- 15 million **blood cells** die every day and have to be replaced.

What is the Composition of Blood?

- Blood is about 78% liquid and 22% solids
- Four Major Components of Blood
 - Plasma
 - Red Blood Cells (RBC)
 - White Blood Cells (WBC)
 - Platelets

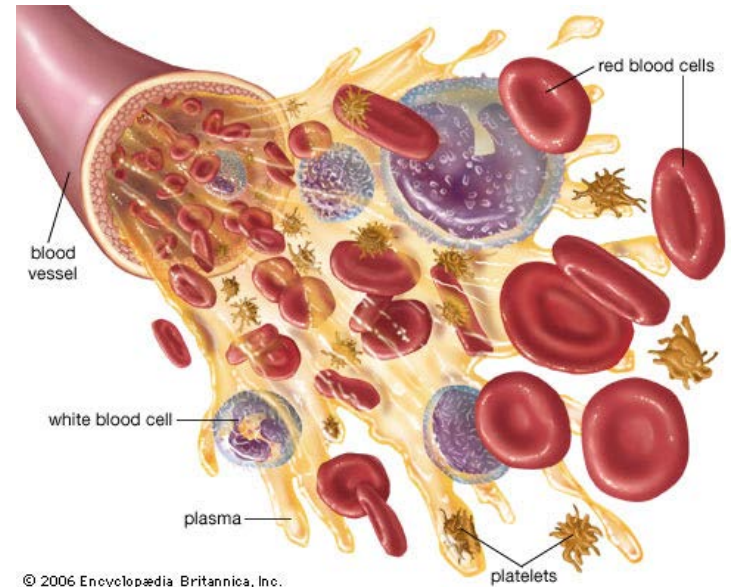
Blood Plasma—The Liquid of Life

- **Composition:**
 - 90% water
 - Ionic salts (electrolytes)
 - Soluble proteins
- **Functions:**
 - Helps maintain homeostatic balance
 - Allows for the correct function of muscles and nerves
 - Transports soluble substances
 - Carries factors needed for blood clotting



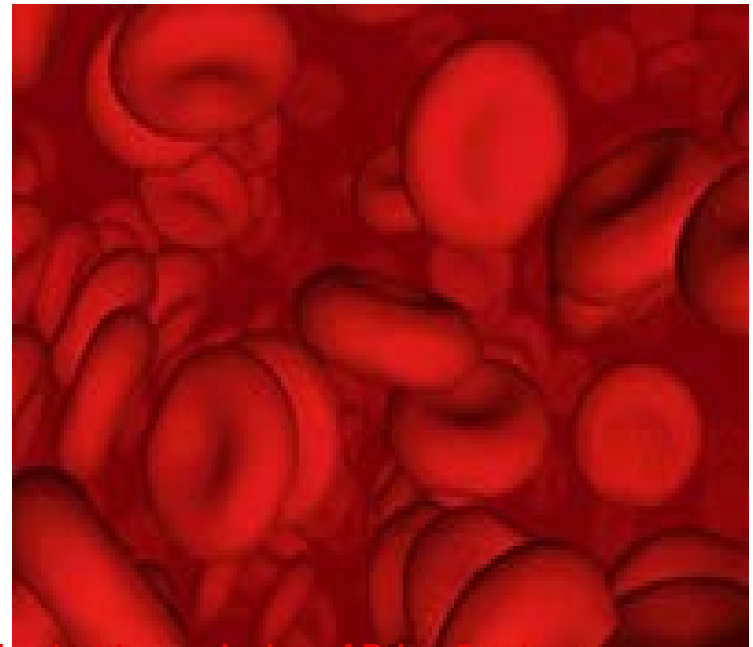
Transports:

- Nutrients
- Electrolytes (salts)
- Hormones
- Antibodies (to fight disease)
- Clotting factors
- Metabolic wastes
- Dissolved Gases (oxygen and carbon dioxide)



Red Blood Cells (Erythrocytes)

- Most abundant blood cell
- 5.2 billion RBC per mL of blood
- Mature cells lack a nucleus
- Average Lifespan: 120 Days

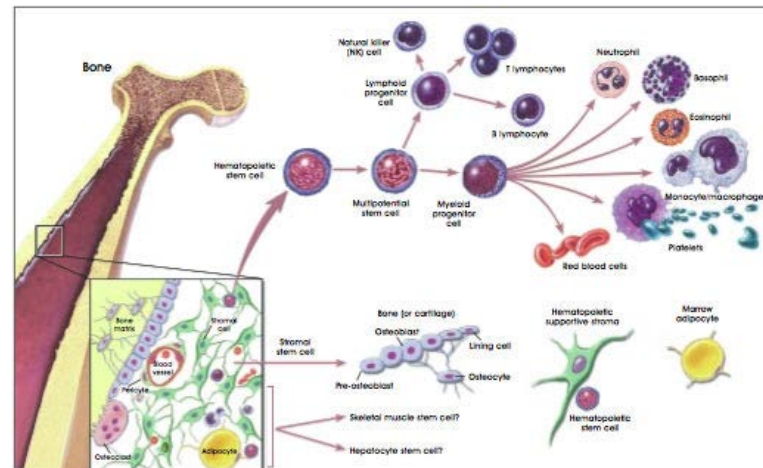
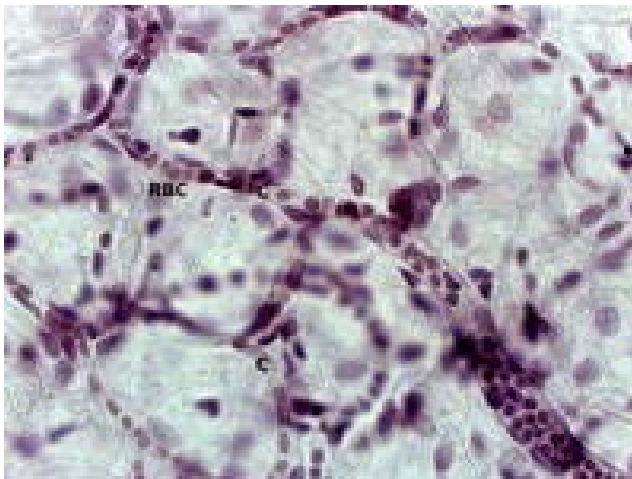


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<http://health.howstuffworks.com/blood.htm>

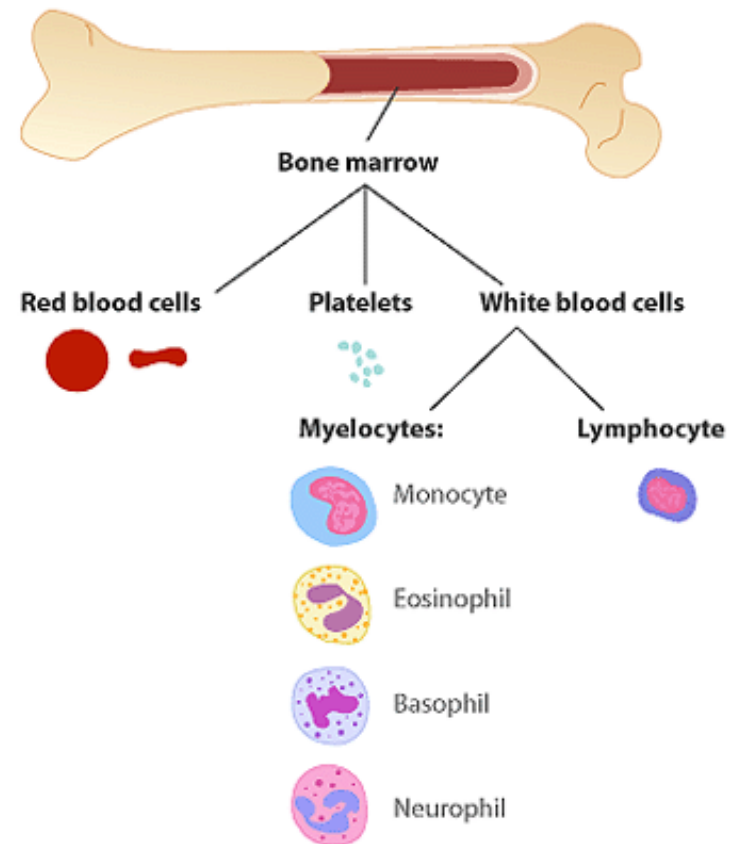
Red Blood Cell Facts

- Can be frozen for ten years
- TRANSPORT OXYGEN (main job)
- Help remove carbon dioxide
- Produced in bone marrow
- Travel single file through capillaries



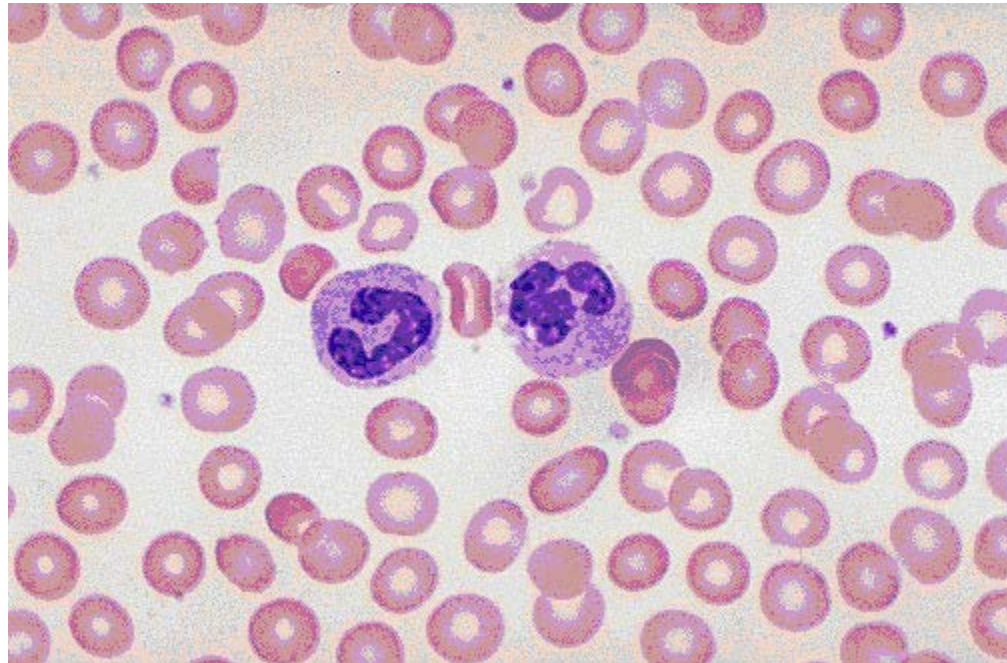
White Blood Cells (Leukocytes)

- Types
 - Monocyte
 - Neutrophil
 - Lymphocyte
 - Basophil
 - Eosinophil



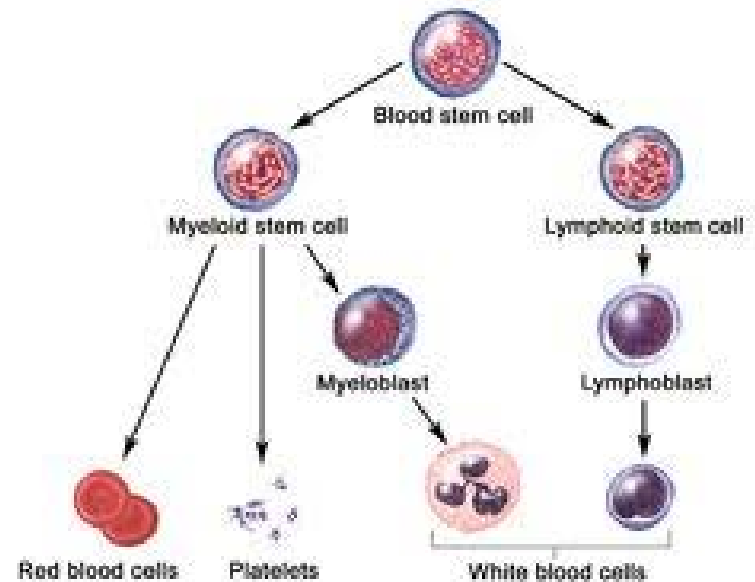
White Blood Cell Facts

- Largest of the **blood** cells
- Normally 5000 to 10,000 WBC per mL blood
- Variable life span – from a few days to years



White Blood Cell Facts

- Produced in bone marrow
- Part of the immune system
- Increase in # when infection or inflammation is present



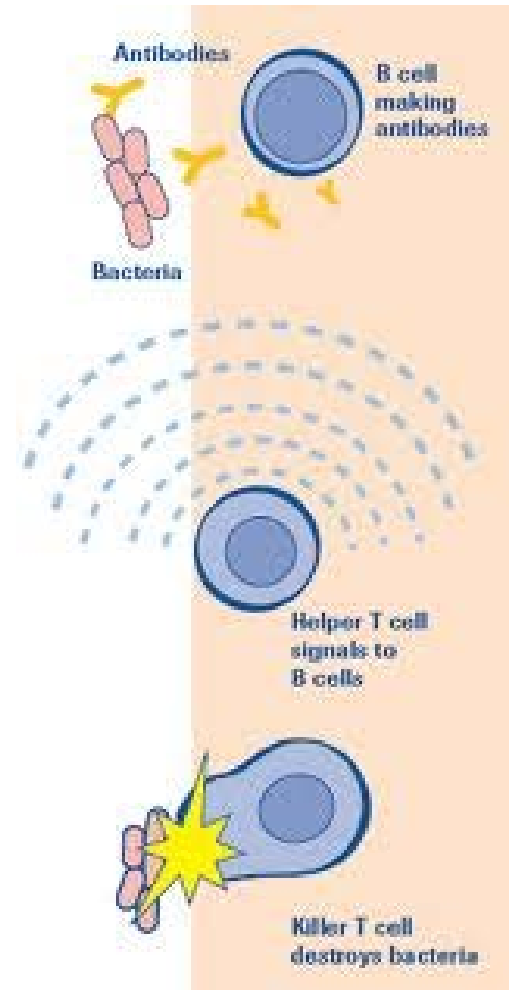
White Blood Cells—Functions

- “Eat” bacteria and other foreign materials, also dead or abnormal cells



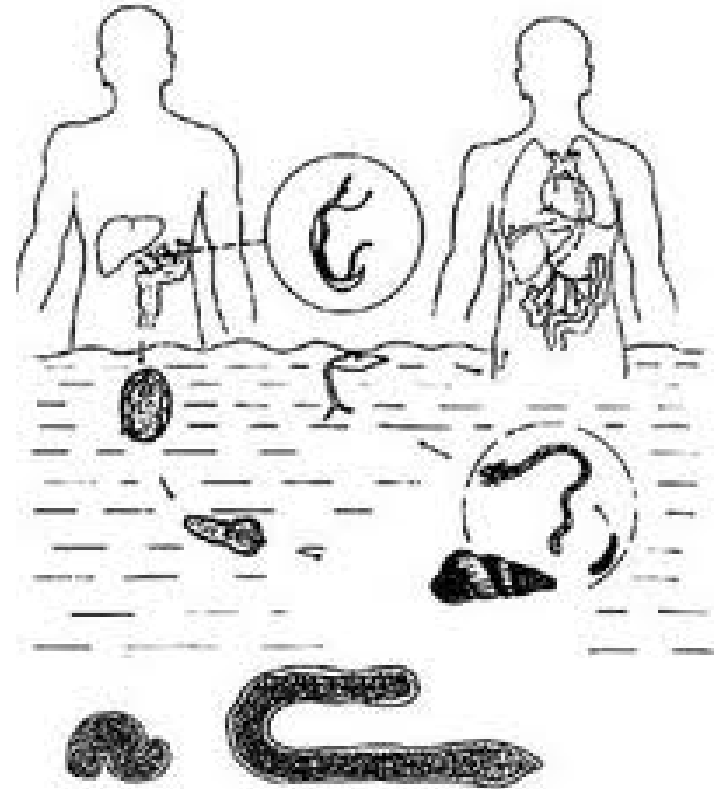
White Blood Cells—Functions

- Signal other immune cells that foreign material is inside body
- Produce antibodies (to fight disease)



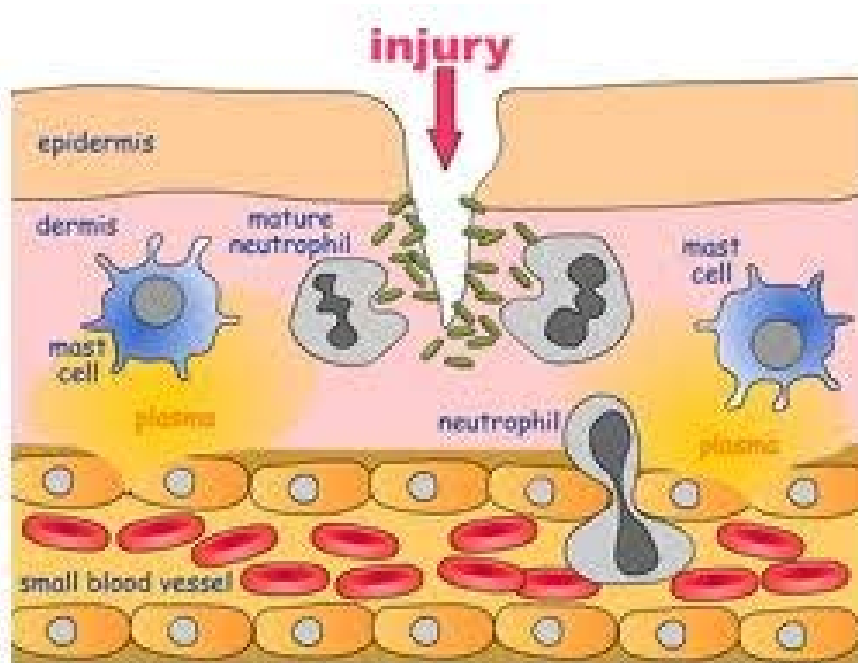
White Blood Cells—Functions

- Kill multicellular parasites (e.g. blood fluke)



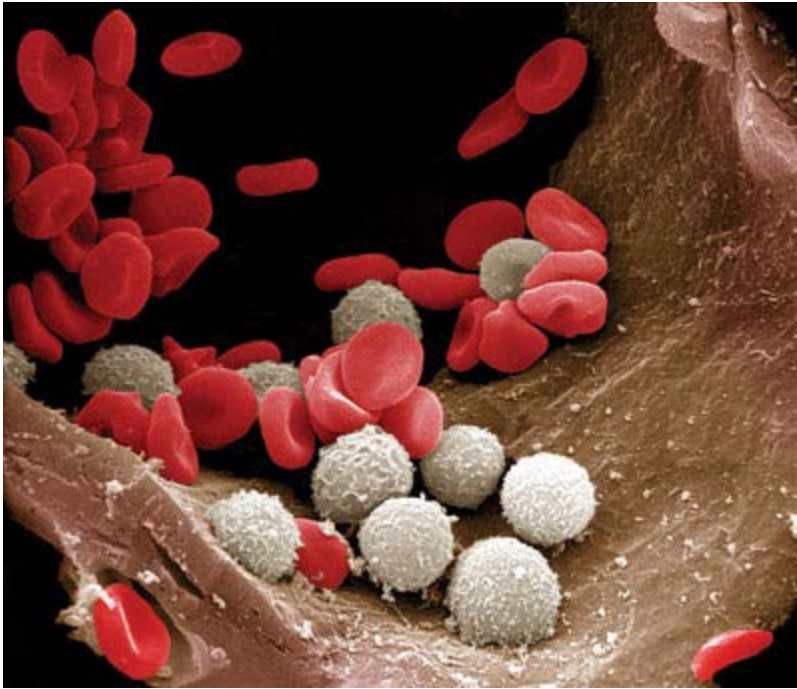
White Blood Cells—Functions

- Involved in inflammation response

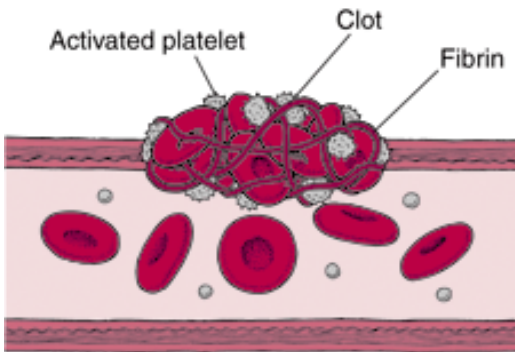
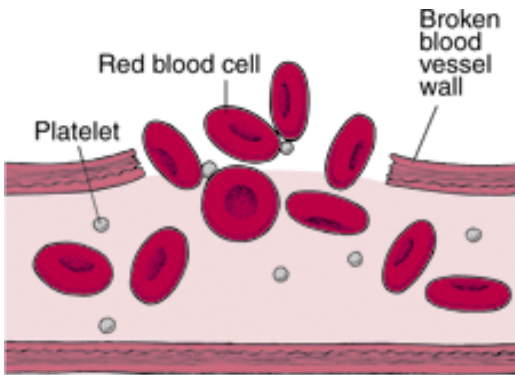


White Blood Cells—Functions

- Involved in allergic reactions

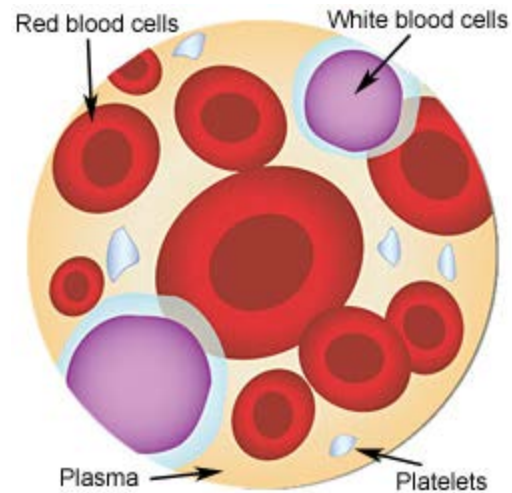


Platelets (Thrombocytes)



- Formed in bone marrow
- Not cells, are fragments of precursor cells
- Lifespan—10 Days
- Help blood clot by forming “platelet plugs.”
- Stimulate other clotting factors

Simulated Blood Smear



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<http://texasheart.org/HIC/Anatmy/blood.cfm?&RenderForPrint=1>