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# Blood & Lymph

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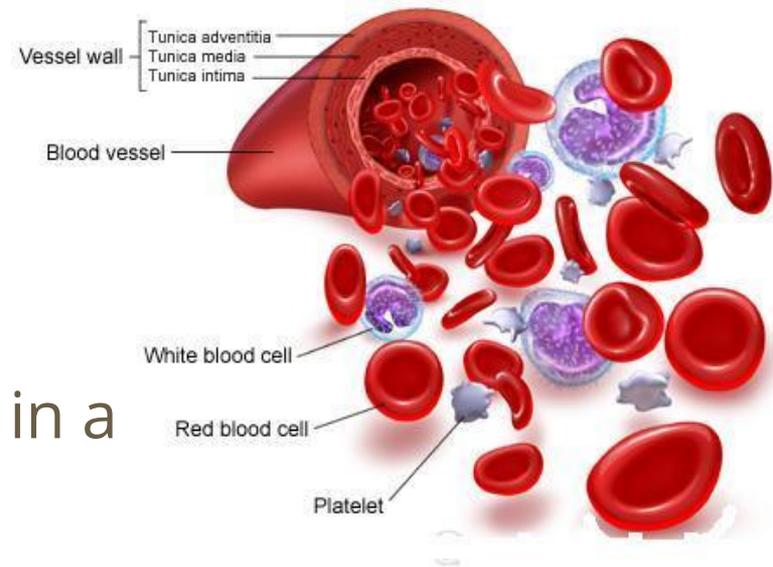
# Warm Up

1. Find your new seat.
2. Label your next open left page with a big “Unit 2: Blood & Lymph”.
3. Get a stamp for the blood chart from Wednesday and tape under the title.
4. Set up Cornell Notes for today with the essential question on the right hand page

EQ: How does the structure of blood cells relate to their functions.

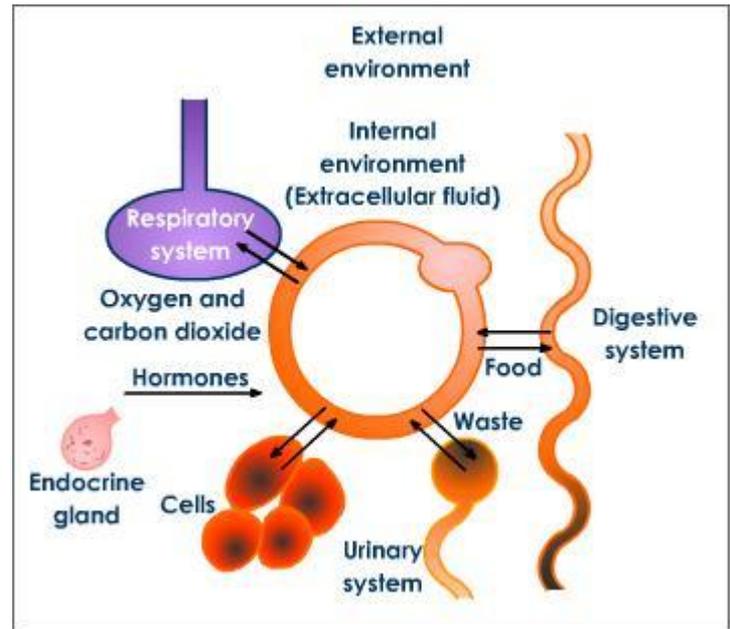
# Blood Anatomy

- Only tissue type that is fluid
  - Living blood cells suspended in a non-living matrix (plasma)
- Denser than H<sub>2</sub>O, pH ~7, temp 100.4 degrees F
- 8% of body weight
- 5-6 L total



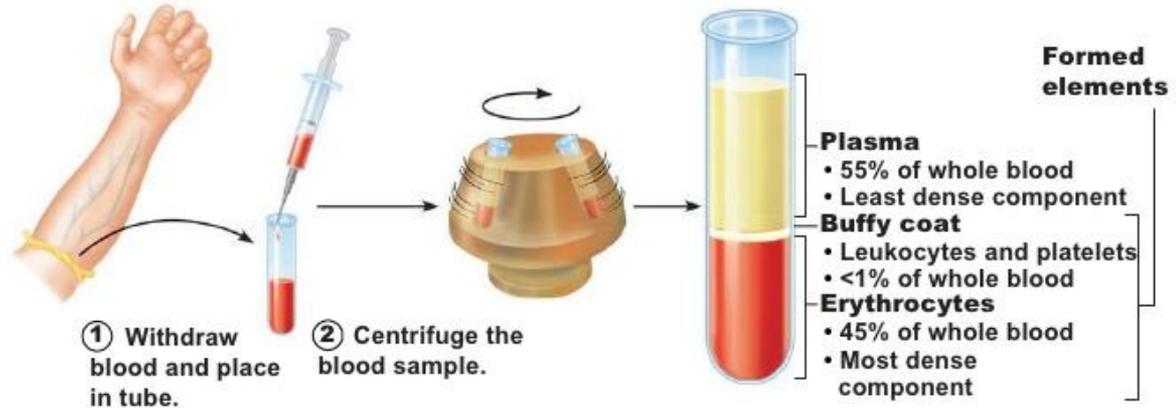
# Blood Functions

- Delivers oxygen
- Transports metabolic wastes
  - Cells → lungs or kidneys
- Transports hormones
- Prevents blood loss & infections
- Maintains: body temperature, pH, fluid volume
  - How can blood regulate temp & fluid volume??



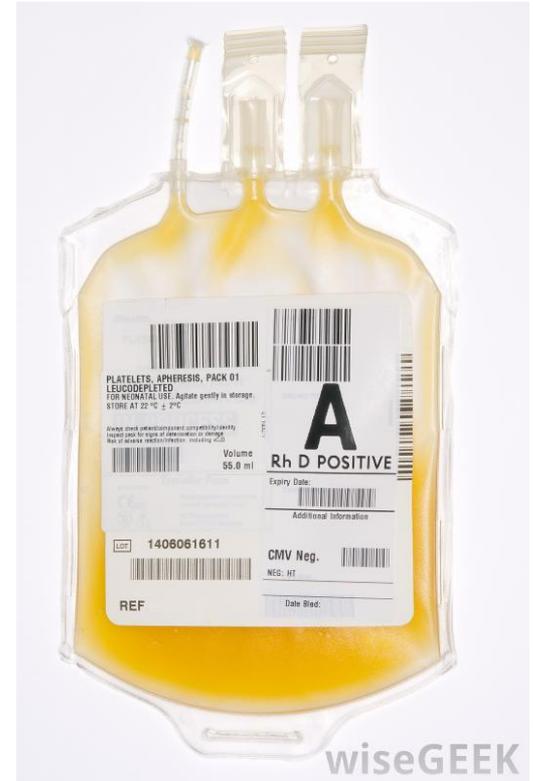
# Look at coloring sheet...

- ~45% of blood volume = erythrocytes
  - % is called hematocrit
- Leukocytes & platelets = 1% blood volume



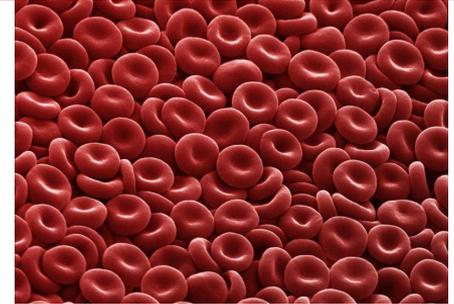
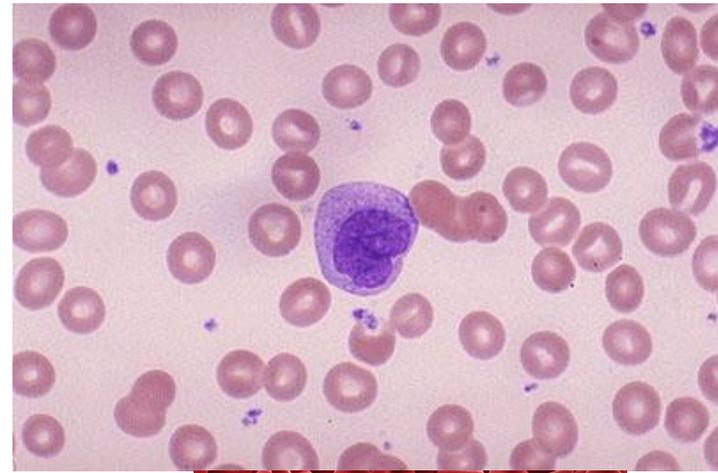
# Blood Plasma- NOT LIVING

- 90% H<sub>2</sub>O
- 10% dissolved gas, nutrients, wastes, hormones
- Plasma proteins- made by liver NOT USED as nutrients for cells
  - Albumin: acts as a shuttle for molecules & is blood buffer

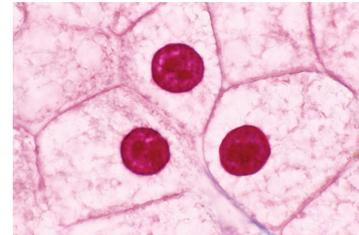


# Formed Elements- LIVING

- Most do not divide, they are made by other organs
- **Erythrocytes** -NOT TRUE CELLS, why?
  - Large surface area to volume ratio
  - 97% hemoglobin: protein that binds to oxygen (need iron to synthesize)
  - Lack mitochondria so they don't consume oxygen
  - Short life span, destroyed in spleen a.k.a Red blood cell graveyard

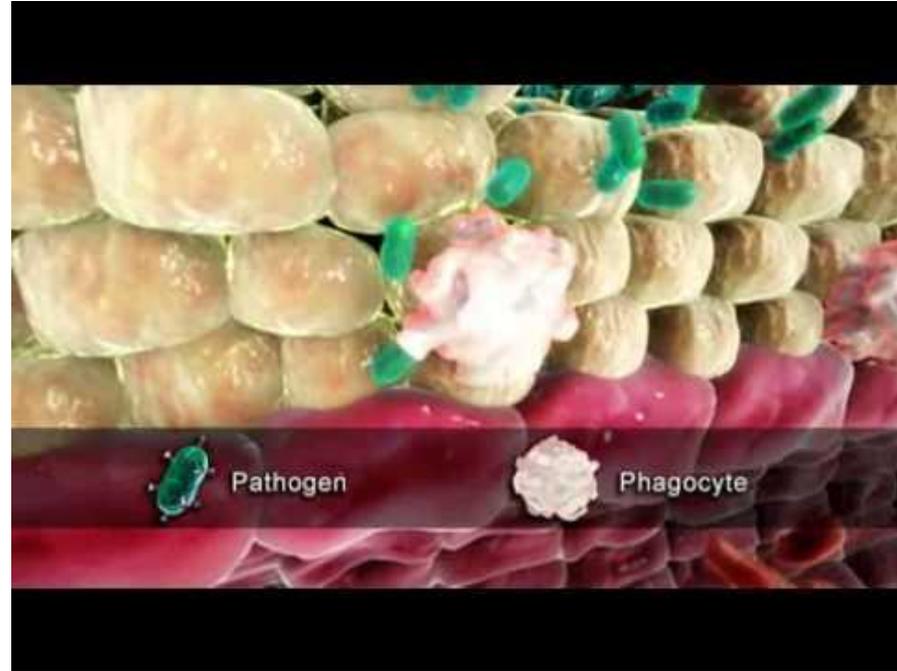


**NOT RBC**  
→ **animal**  
**cell**



# Formed Elements- LIVING

- **Leukocytes (white blood cells)**
  - Complete cells
  - Super power:  
diapedesis- move  
outside of blood stream
    - Inflammatory or  
immune responses

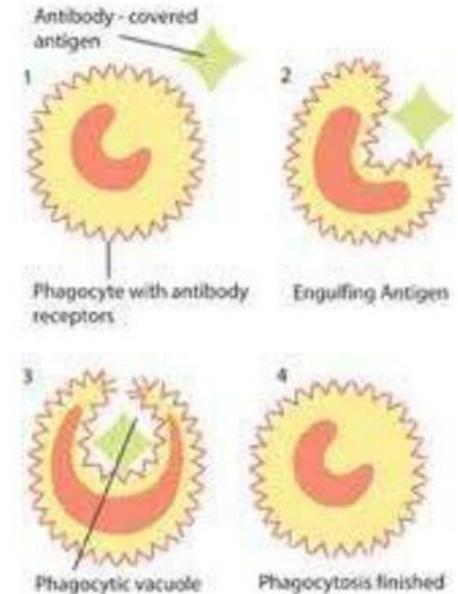


# Formed Elements- LIVING

- **Leukocytes**

- Neutrophils: bacteria slayer, phagocytize- engulf
- Basophils: histamine- inflammatory chemical
- Eosinophils: attack parasitic worms
- Lymphocytes: immune
- Monocytes: leave blood become macrophages in tissues

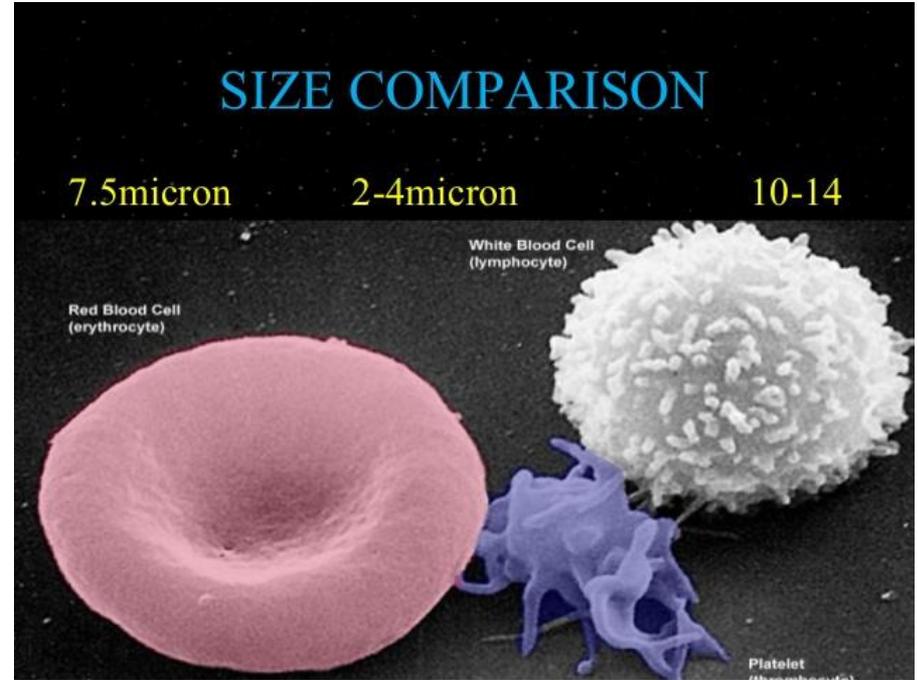
## Phagocytes



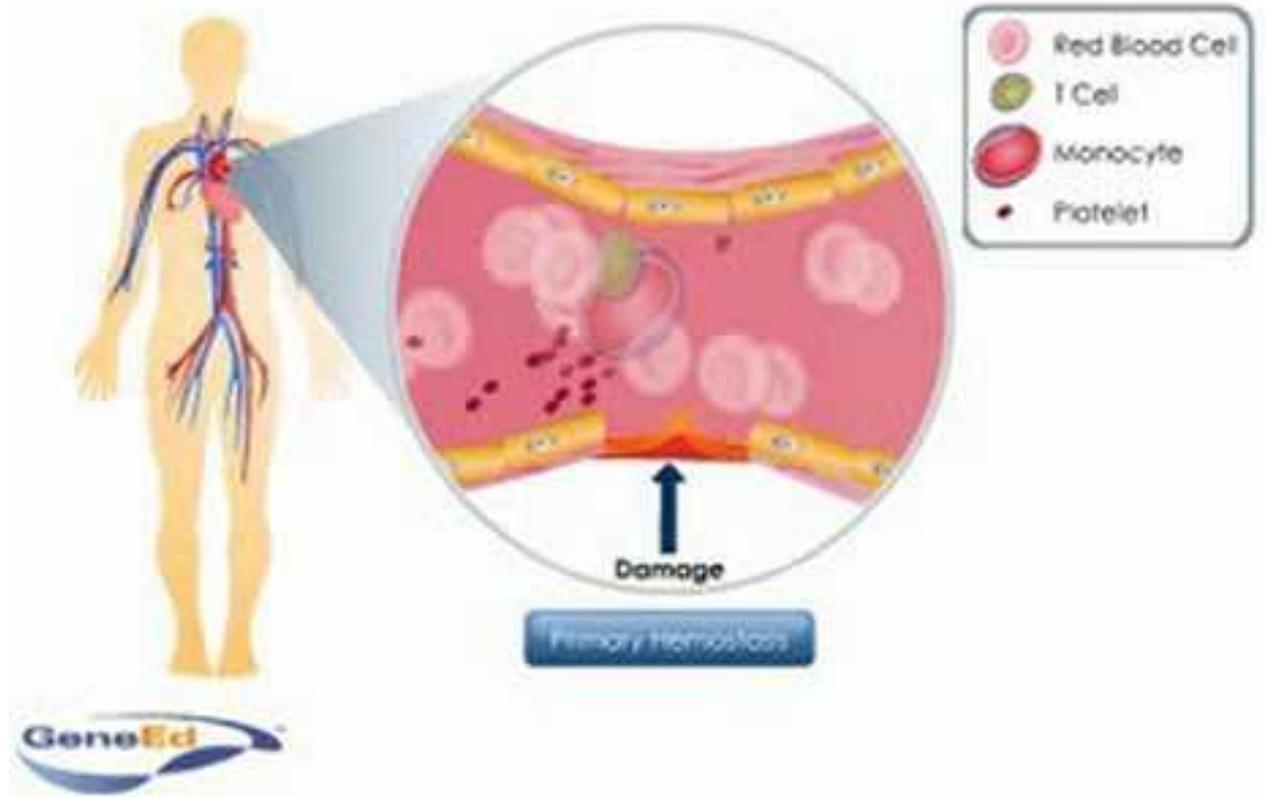
# Formed Elements- LIVING

- **Platelets**

- Cell fragments- not true cells (no nucleus)
- Essential for clotting
- Die in 10 days if not used



# Hemostasis & Blood Clotting



# **Blood Clotting Cartoon- Individual Project**

1. Draw a series of pictures (5 minimum) with a caption and dialogue between characters for each picture to show how the body responds to a cut.
2. Include the following vocabulary terms: vasoconstriction, platelet, red blood cell, fibrin, vascular spasm, blood loss (in relation to the vascular spasm), clotting factors, and coagulation.
3. Score: 1pt for each vocab word used and 5 pts for creativity.

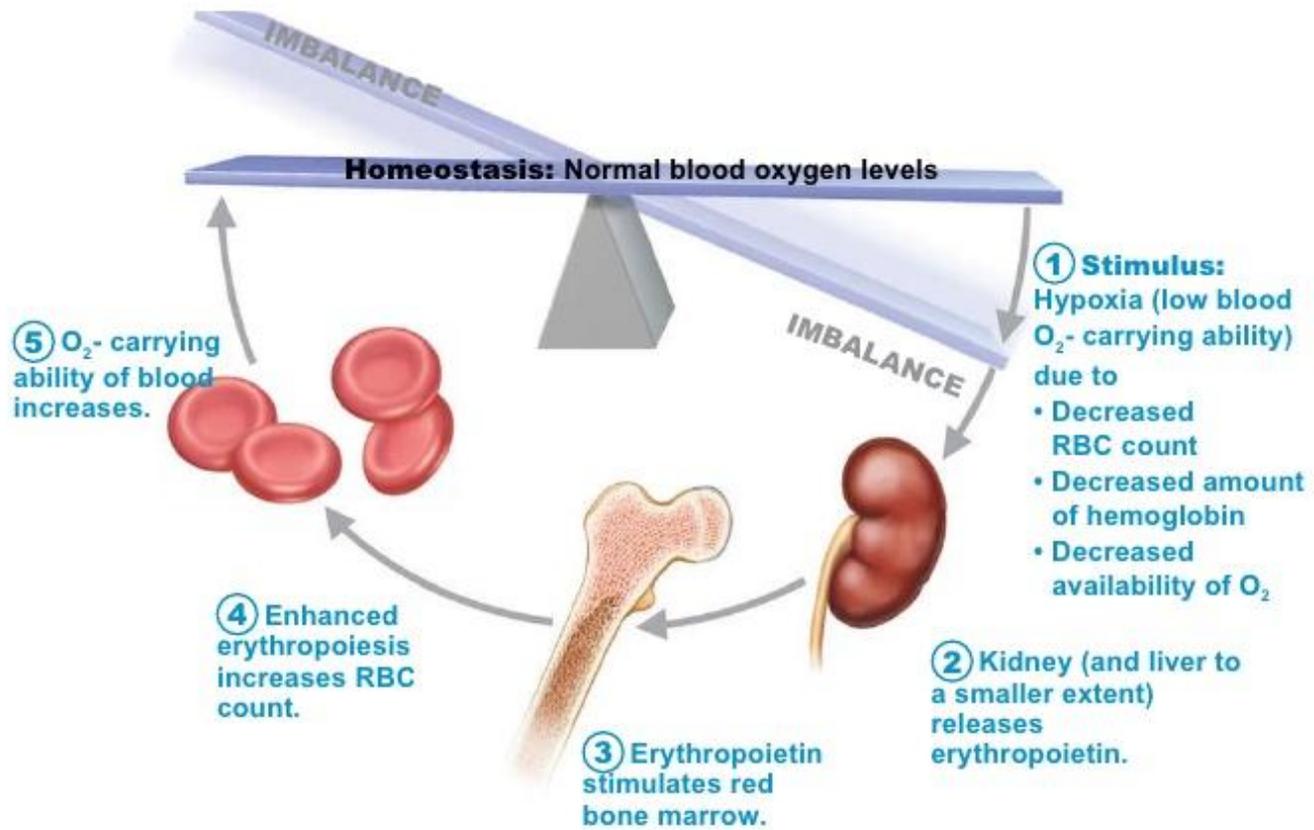
**Due: Monday**

# Warm Up Monday

What makes creates red blood cells? Think back to first semester...

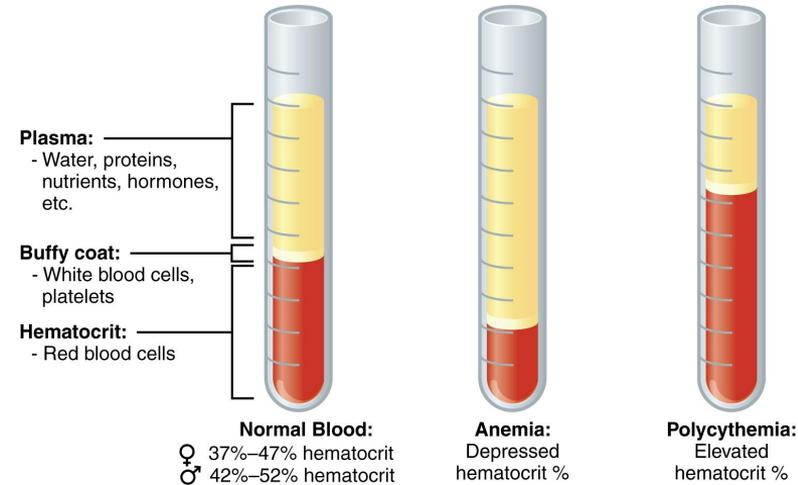
Knowing this, what would you predict the homeostatic control would be when your red blood cell count is low? What would your body do to maintain homeostasis? (Write out the stimulus, receptor, control center, & effector)

**EQ: How is homeostasis maintained in the blood and what happens if there is a homeostatic imbalance?**



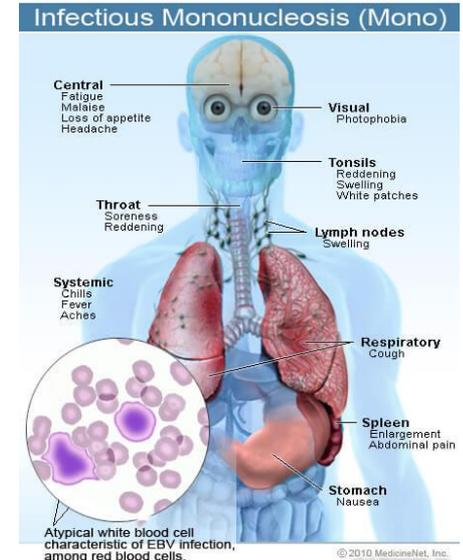
# Homeostatic Imbalances

- **Anemia:** Low-oxygen carrying capacity
  - Low RBC counts
  - Low hemoglobin content
  - Abnormal hemoglobin (sickle cell)
- **Polycythemia:** excess RBCs
  - Causes slow blood flow
  - Hematocrit- 80%, causing blood vessels to swell



# Homeostatic Imbalances

- **Leukemias:** cancer involving WBCs
  - Red bone Marrow infected by cancerous cells & produces irregular WBCs
  - These suppress production of RBCs
- **Mononucleosis:** “kissing virus”
  - Epstein-Barr virus
  - causes high #s of atypical monocytes



# Blood Transfusions

- Naturally, minimize effects of blood loss by..
  - Reducing volume of blood
  - Increasing RBC counts
- 15-30% blood loss- weakness
- >30%- sever shock
- Whole blood transfusion: substantial blood loss
- Packed RBCs: used to restore oxygen-carrying capacity
- Plasma expanders: increase volume with unknown blood type