

## Blood Composition

EQ: Why do some blood donation centers allow you to just make a plasma donation?

- I. General Blood Info
  - a. the average human has 4-6 liters of blood
  - b. it is a transporting fluid – only fluid tissue in the body
  - c. it carries vital substances to all parts of the body (nutrients, hormones, wastes, etc.)
- II. Components of Blood
  - a. plasma (55%)
    - i. liquid part of blood
    - ii. 90% Water
    - iii. plasma transports:
      1. soluble food molecules
      2. waste products
      3. hormones
      4. Antibodies
      5. Dissolved gases and chemicals
  - b. red blood cells (RBCs) (4-6 million /ml)
    - i. ~3 month life span
    - ii. transport oxygen
    - iii. specialized to do this by using the protein hemoglobin
    - iv. Also carry some CO<sub>2</sub>
    - v. Red blood cells (**Erythrocytes**) Specializations
      1. biconcave shape
        - a. increases the surface area so more oxygen can be carried
      2. no nucleus
        - a. extra space inside
      3. contain hemoglobin (Hb)
        - a. the oxygen carrying molecule
        - b. 250million molecules / cell
        - c. gives red blood cells their color
        - d. can carry up to 4 molecules of O<sub>2</sub>
        - e. associates and dissociates with O<sub>2</sub>
        - f. contains iron
  - c. white blood cells (4800-10,800/ml) Leukocytes
    - i. part of the immune system
    - ii. have a nucleus
    - iii. 4800-10800 per mm<sup>3</sup>
    - iv. 2 types based on function
      1. Lymphocytes
        - a. 20-25% of WBCs
        - b. Used in specific defense of the body
        - c. Two types – B and T cells
        - d. They produce antibodies
      2. phagocytes - Provide a non-specific response to infection
        - a. Monocytes
          - i. 3-8% of WBCs
          - ii. Active phagocytes
          - iii. Become macrophages inside tissues

- iv. Increase in numbers when body is infected w/  
pathogens
    - b. Neutrophils
      - i. 60 % of WBCs
      - ii. Most active
      - iii. Present in pus in wounds
    - c. Eosinophils
      - i. 2 % of WBCs
      - ii. Mainly attack parasites
    - d. Basophils
      - i. 1% of WBCs
      - ii. Important in Inflammatory Reaction
  - v. 2 Major Groups of WBCs based on staining
    - 1. Granulocytes
      - a. Neutrophils
      - b. Eosinophils
      - c. Basophils
    - 2. Agranulocytes
      - a. Lymphocytes
      - b. Monocytes
- d. Platelets (blood clotting)
  - i. platelets produce tiny fibrin threads
  - ii. these form a web-like mesh that traps blood cells.
  - iii. these harden forming a clot, or "scab."
  - iv. 150,000 to 400,000 per mm<sup>3</sup>