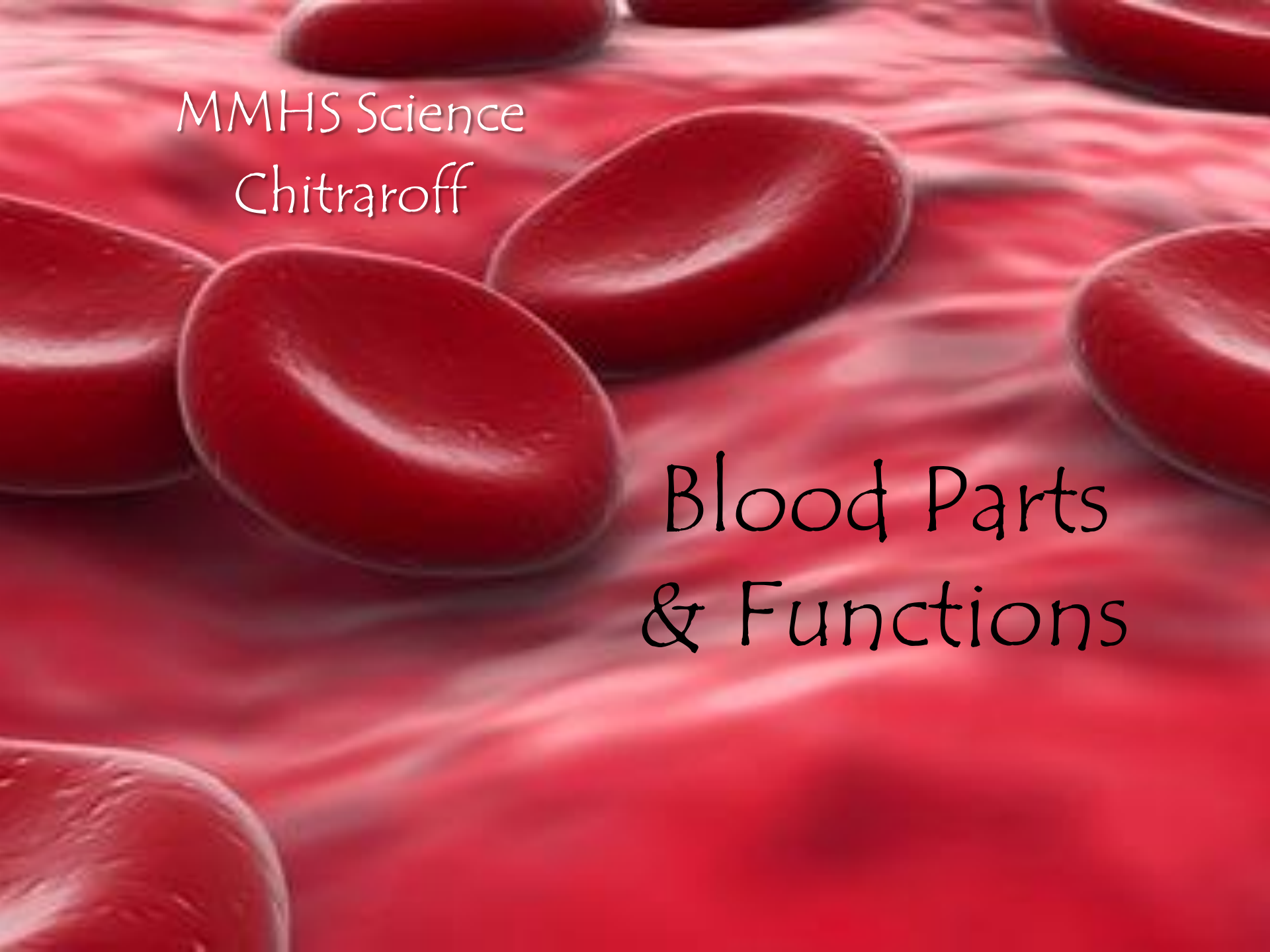
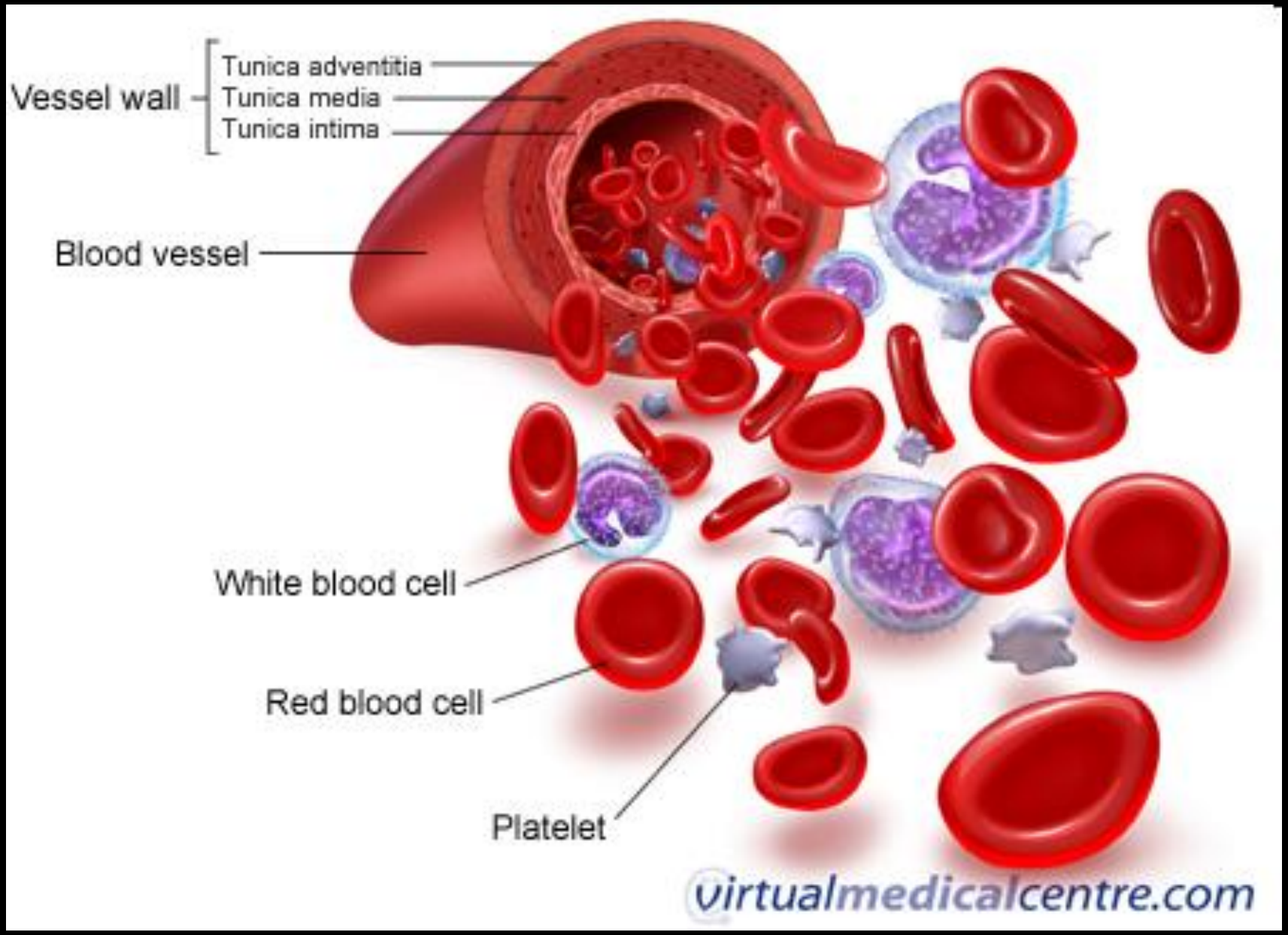

MMHS Science
Chitraroff
Blood Parts
& Functions

Characteristics of Blood

- Blood is a type of connective tissue
- Fluid which carries all body substances
- Average adult has between 5-6 L of blood in the body (9% of total body weight)
- Composed of cells (45%) and plasma (55%)
- Blood cells (=Erythrocytes, Leukocytes, and Thrombocytes)

What's
the
Difference?


Vessel wall
Tunica adventitia
Tunica media
Tunica intima
Blood vessel
White blood cell
Red blood cell
Platelet
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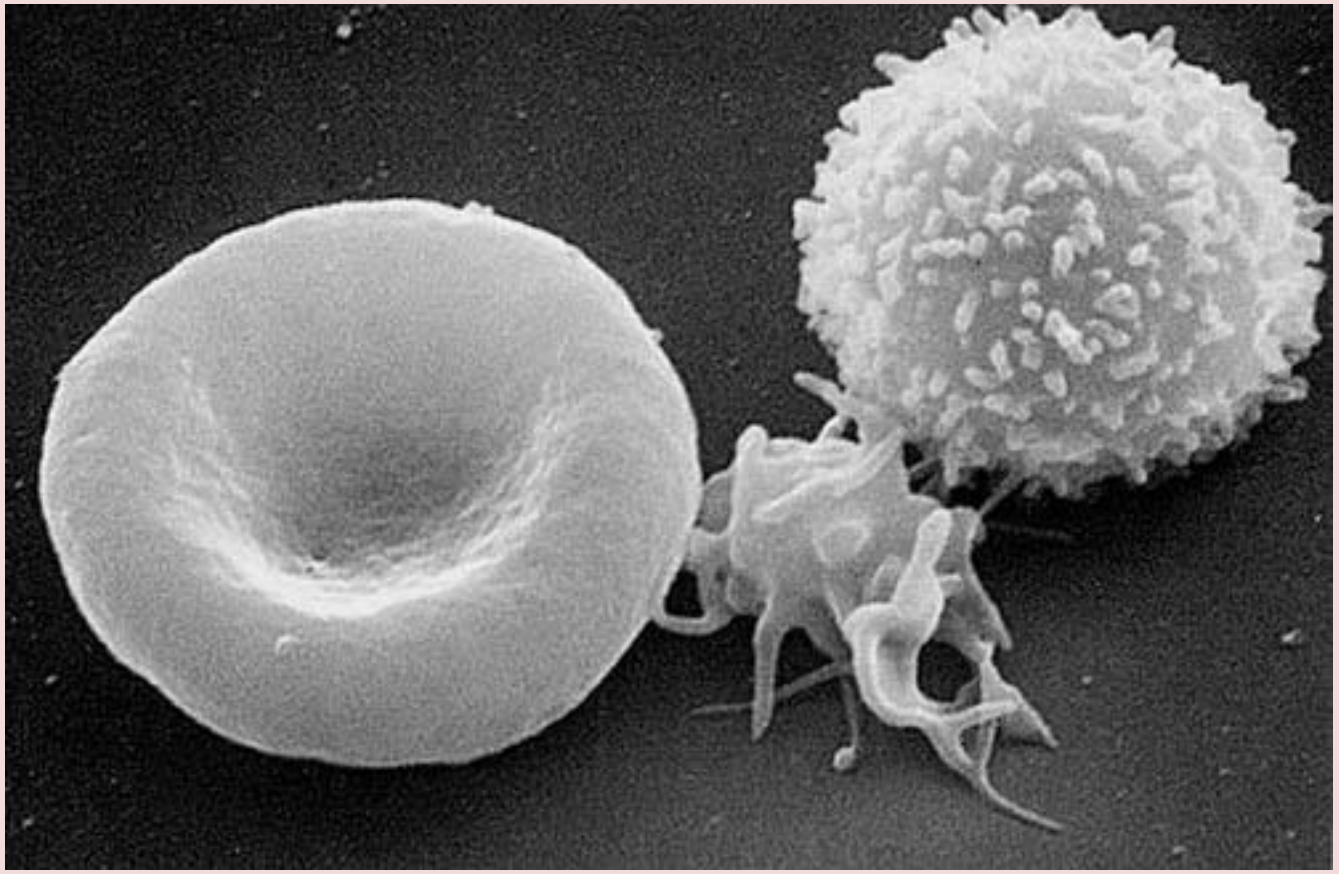
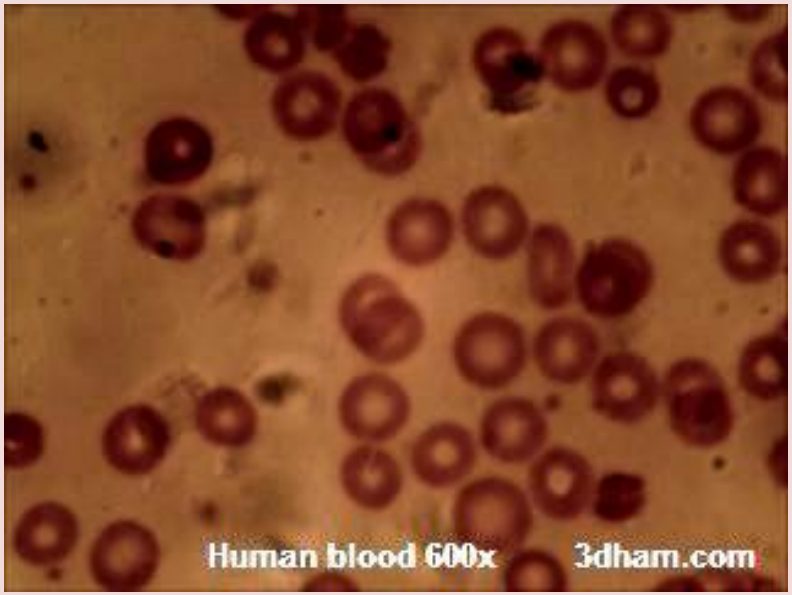
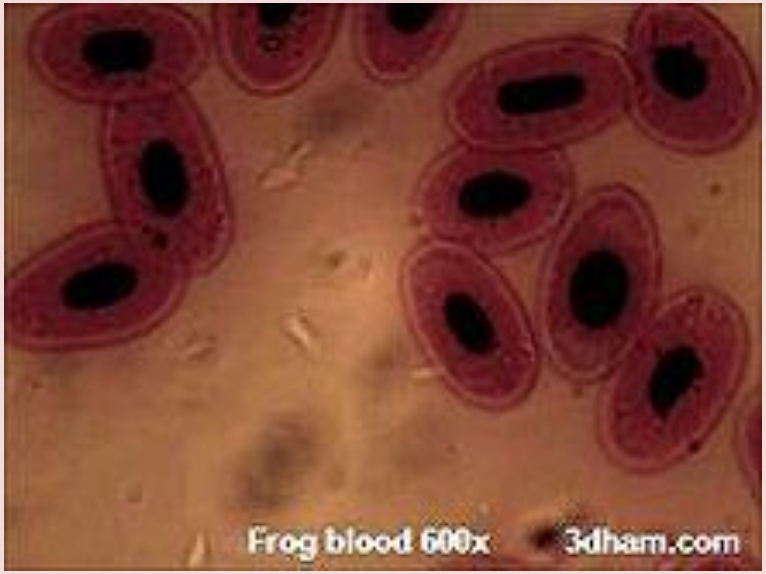
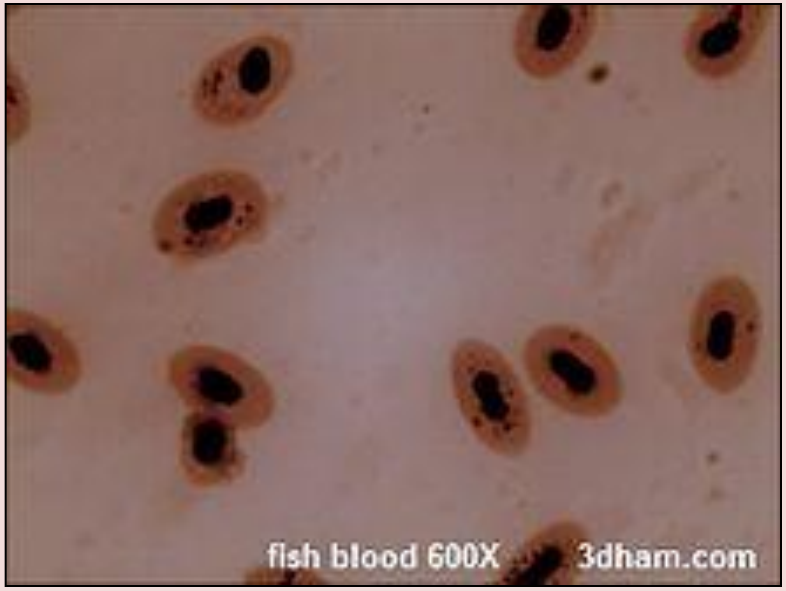


Erythro, Leuko, Thrombo: **Which is Which?**







Mammalian Vertebrate
vs.
Non-Mammalian
Vertebrate blood.

Blood Functions

1. Supply of oxygen to tissues (bound to hemoglobin, which is carried in RBC's)
2. Supply of nutrients such as glucose, amino acids, and fatty acids
3. Removal of waste such as carbon dioxide, urea, and lactic acid
4. Immunological functions, including circulation of white blood cells, and detection of foreign material by antibodies

Blood Functions

5. Coagulation (=clotting). Self-repair of damaged tissues.
6. Messenger functions: transport of hormones and the signaling of tissue damage
7. Regulation of body pH
8. Thermoregulation: Regulation of core body temperature
9. Hydraulic functions

Erythrocyte Characteristics

1. Total % of RBC = **Hematocrit (48% men; 38% women)**
2. Disc shaped (biconcave)
3. 25 trillion cell count in total blood volume.
4. Anucleate (can't synthesize proteins or divide)
5. RBC's produced in red bone marrow
6. Contains Hemoglobin
    1. a. Heme – contains iron and transports oxygen
    2. b. CO2 transported extracellular as Bicarbonate. (HCO3)
7. Can live up to 120 days
8. Removal of RBC's from blood stream by liver and spleen

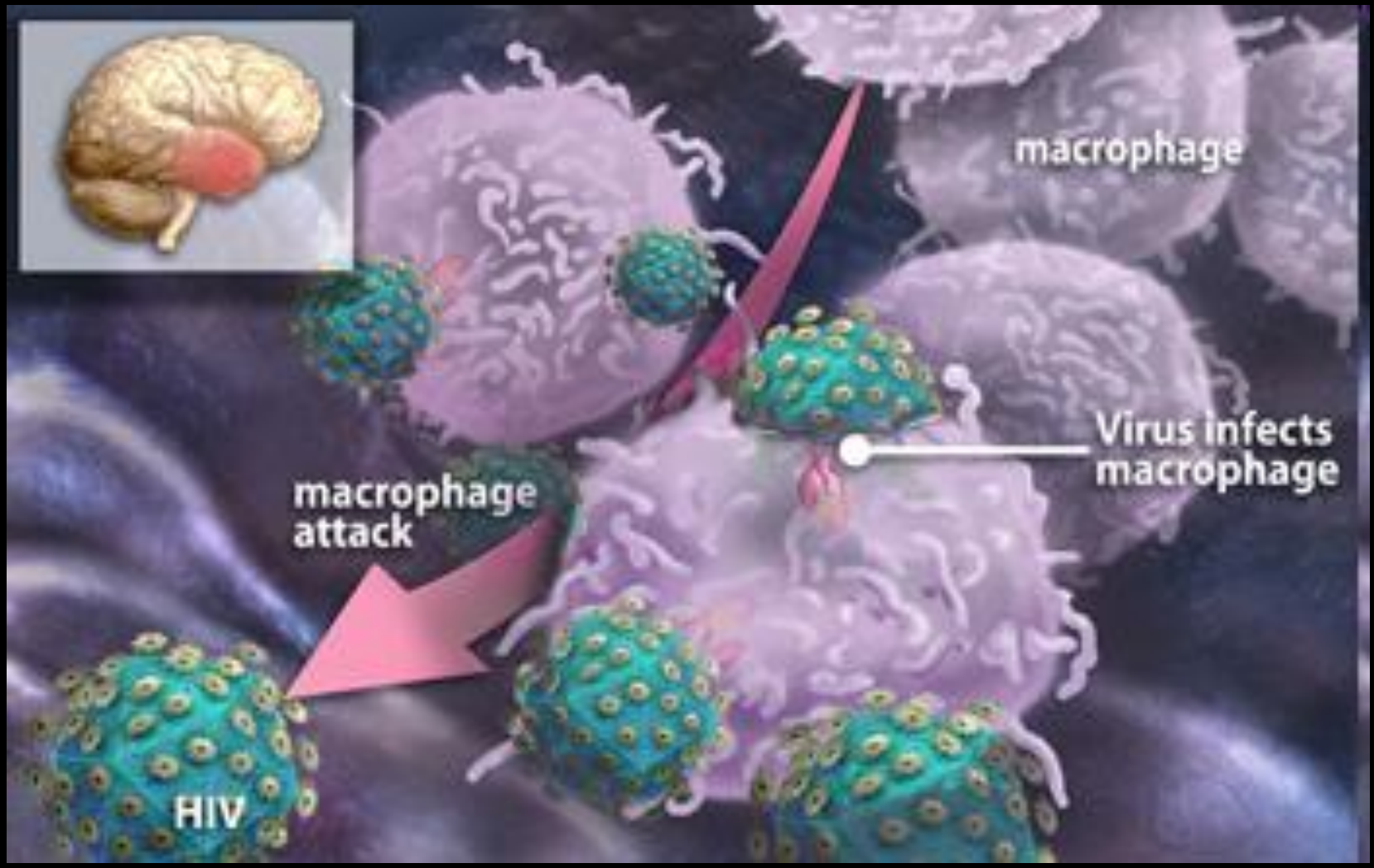
Leukocyte Characteristics

1. No hemoglobin so they are almost colorless
2. 1 WBC to every 600 RBC
3. Contain nuclei (=nucleate)
4. Produced in Red bone marrow
5. Capable of amoeboid movement
6. Found in blood and lymphatic systems

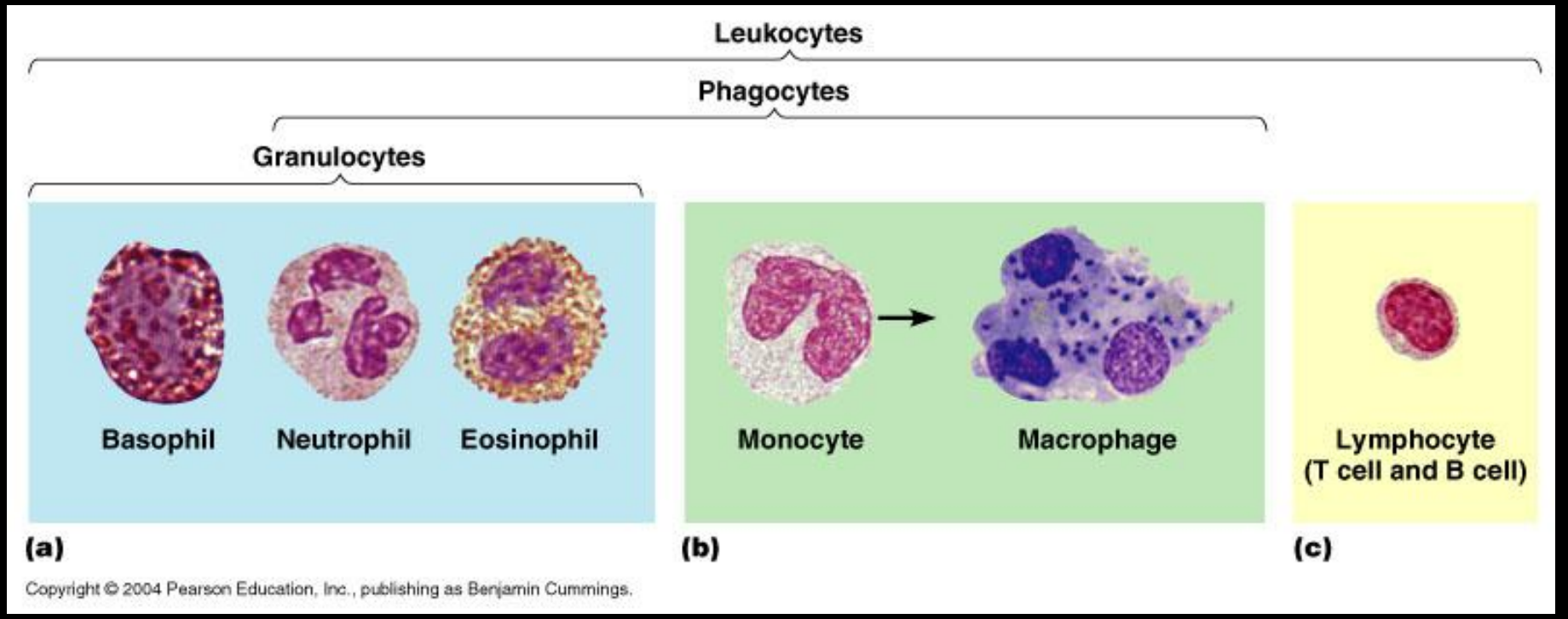
Leukocyte Characteristics

7. Lifespan of a few hours to a few days.
8. Protect against disease
   a. engulf bacteria by phagocytosis (form pus: WBCs, dead bacteria, and fluid)
9. 2 categories and 5 types
   a. granulocytes: stained granules in cytoplasm; include: neutrophil, eosinophil, basophil
   b. agranulocytes: non-stained granules; include: monocytes and lymphocytes

Immune Response



Granulocytes vs Agranulocytes



Thrombocyte Characteristics

1. A.K.A "platelets"
2. Not a complete cell: arise from shattered megakaryocytes
3. Small, irregularly-shaped cell fragments
4. Made in red bone marrow
5. Can live up to 10 days
6. Initiate the formation of clots

Plasma Characteristics

A. Sticky, straw-colored

B. Functions include: transporting nutrients, gases, and vitamins; helping regulate fluid and electrolyte balance; maintaining a favorable pH

C. Inorganic components of Plasma

1. 91% water

2 minerals and electrolytes

Plasma Characteristics

D. Organic Components of Plasma

1. 9% dissolved particles
2. 4 Types of Proteins
    a. **albumins** – make blood thick; keep water from diffusing out
    b. **globulins** – gamma globulins are antibody proteins; alpha and beta globulins transport lipids and fat soluble vitamins
    c. **fibrinogen** – function in blood clotting
    d. **prothrombin** – enzyme involved in blood clotting; produced in liver with vitamin K