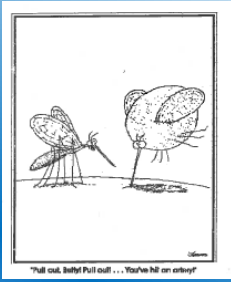


## THE BLOOD



Blood, Part 1 True Blood Crash Course A&P #29 - YouTube

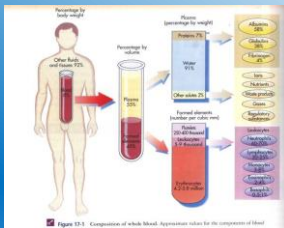
### FUNCTIONS

- transport nutrients, gases, wastes (urea, excess vitamins & minerals) & hormones
- maintain **water and pH** balance
- maintain **temperature** of the body
- major component of the **immune system**



### PARTS OF THE BLOOD

- human adult = 4 - 6 L of blood



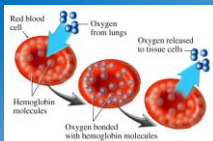
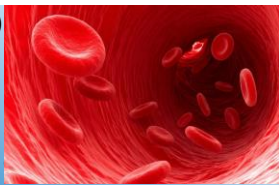
### a) Blood Plasma

- fluid portion of the blood (**90% water**)
- straw colored (**yellow**)
- contains: **nutrients, wastes, hormones & blood cells**
- function in **transport and maintaining body homeostasis**
- **serum** = refined blood plasma from animals
  - : contains no cells, clotting agents, or proteins, just antibodies (**fight disease**)



### b) Erythrocytes (Red Blood Cells)

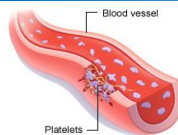
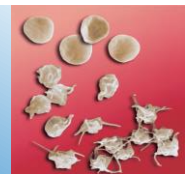
- most numerous in blood
- made in bone marrow
- function : **carry O<sub>2</sub>**
  - = accounts for the dish shape (**increase surface area**)
- contain **hemoglobin** which carries the (contains **iron** = makes them **red**)



- mature cells lose nucleus (**enucleated = more room for hemoglobin**)
- life expectancy: **~ 4 mos.** (many are ruptured squeezing through capillaries)
- removed by **spleen and liver**

### c) Platelets (thrombocytes)

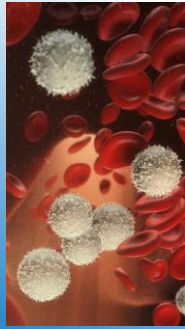
- smaller than red blood cells
- are also **enucleated and produced in the bone marrow**
- irregular shaped
- function: **to cause blood to clot**
- clotting process:



1. platelets **rupture** when they hit a rough surface
  2. activates **enzymes** which produce fibrin
    - = forms a **net or blood clot** over the wound
- hemophiliacs cannot produce **fibrin**

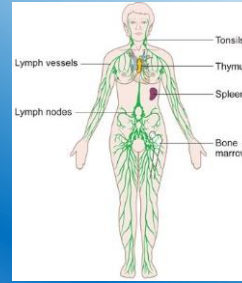
**d) Leukocytes (white blood cells)**

- part of immune system
- produced in **bone marrow, lymph tissues & glands**
- reserves found in **thymus gland & spleen**
- responsible for **identifying, battling & destroying antigens**
- = major component of the **immune system**
- there are many types of leukocytes including B-Lymphocytes (B-Cells), T-Lymphocytes (T-Cells), Macrophages, etc.



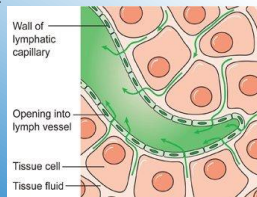
<https://www.youtube.com/watch?v=Tdx-U8S6ZMk>

**THE LYMPHATIC SYSTEM**



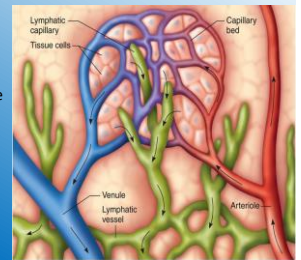
**• Function of the Lymphatic System**

- during gas and nutrient exchange 99% of blood volume returns from capillaries into the veins -- **1% does not**
- this excess fluid enters and becomes part of the **Extracellular Fluid (ECF)** found in the spaces between cells and tissues
- Lymphatic System = **absorbs this excess fluid and move it through the body**



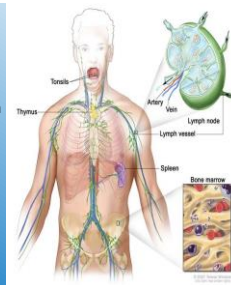
**• Parts of the Lymphatic System**

- a) Lymph**
  - = the **blood fluid** that passes through capillary walls into spaces around body cells
  - carries nutrients, white blood cells & platelets
  - removes wastes
- b) Lymphatic capillaries**
  - are wrapped around capillaries of the circulatory system
  - **absorb lymph**
- c) Lymphatic vessel**
  - large tube **connecting** lymphatic capillaries to a lymph node and lymph nodes to the main veins leading to the heart



**d) Lymph Node**

- enlargements of the vessels found in various areas of the body (groin, arm pit, neck, etc)
- contain special white blood cells **which clean** the lymph of bacteria and dead cells through phagocytosis (**engulfing**)
- used to diagnose an infection : if your body is fighting an infection, the lymph nodes collect more bacteria and dead cells than normal causing them to **swell**

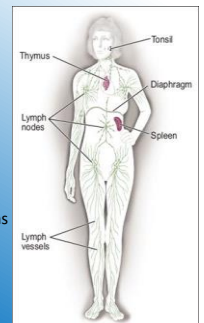


**e) Thymus Gland**

- the main organ of the lymphatic system, found in the upper chest region
- function = **mature and store white blood cells**

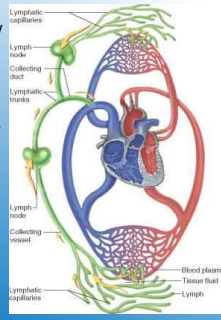
**f) Spleen**

- largest organ of the lymphatic system found in the upper left abdominal cavity
- function = **filter** blood of damaged cells & pathogens
- also **stores and matures** lymphocytes



#### • HOW DOES LYMPH FLOW?

- 1) lymph vessels contain **valves** to prevent backflow  
= lymph flows only in one direction: **to the heart**
- 2) **contraction of skeletal muscles** and **osmotic pressure** cause lymph to flow from lymphatic capillaries & vessels through lymph glands to the major veins leading back to heart  
= **is not pumped**



#### • IMPORTANCE OF LYMPHATIC SYSTEM

- major component of **immune system**
- blockage of lymph vessels causes **edema** and eventually **elephantitis**



#### Organ of Immune System

