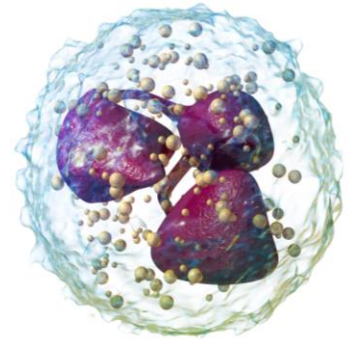




- Neutrophils:

- They are the most abundant leukocytes in the blood (composing 62% of all WBCs).
- They are mainly present in the blood stream so they provide the fastest immune response in the body against infectious agents and foreign bodies.
- **Life span:** 4-5 hours in the circulation and 4-5 days in the tissues.
- **Main function:** highly-selective phagocytosis (by engulfing the infectious agent and then digesting it with proteolytic enzymes secreted from lysosomes). In addition, they have bactericidal function (by releasing oxidative agents and thus killing the bacteria or other antigens).

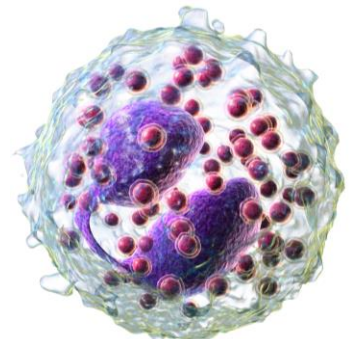


**Bacteria is engulfed ---> release of ROS & hypochlorite ---> destruction of bacteria ---> residual components are released.**

- **Moving from circulation to tissues by:** diapedesis
- **Moving in the tissue by:** amoeboid motion which will direct them to the inflamed or injured tissue that is releasing chemotactic agents (ex. IL-8).
- **They also release NET (Neutrophil Extracellular Trap):** forming a network (or a net) with antimicrobial granules in it that will prevent infectious agents from further spreading. This happens when neutrophils are going to die.
- **α1-antitrypsin deficiency:** elastase which is present in the granules of neutrophils will not be digested. Therefore, this will result in pulmonary emphysema.

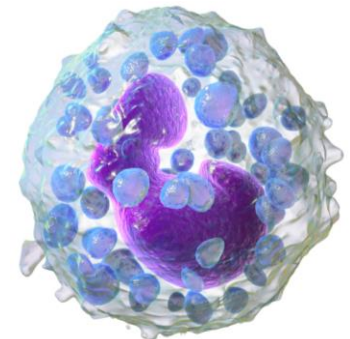
- Eosinophils:

- They compose 2% of all WBCs.
- They are found in the connective tissue of GIT.
- They are considered as activators of helper T-cells and they aid in suppressing infection by phagocytosis.
- **Main function:** in allergic reactions (example: asthma) & parasitic infections (example: schistosomiasis). Note: in allergic reactions, eosinophils aid in activation of mast cells which will result in the release of different cytokines and chemokines.
- **Eosinophils can also be seen in conditions such as:** leukemias, GERD, collagen vascular disease.



- Basophils:

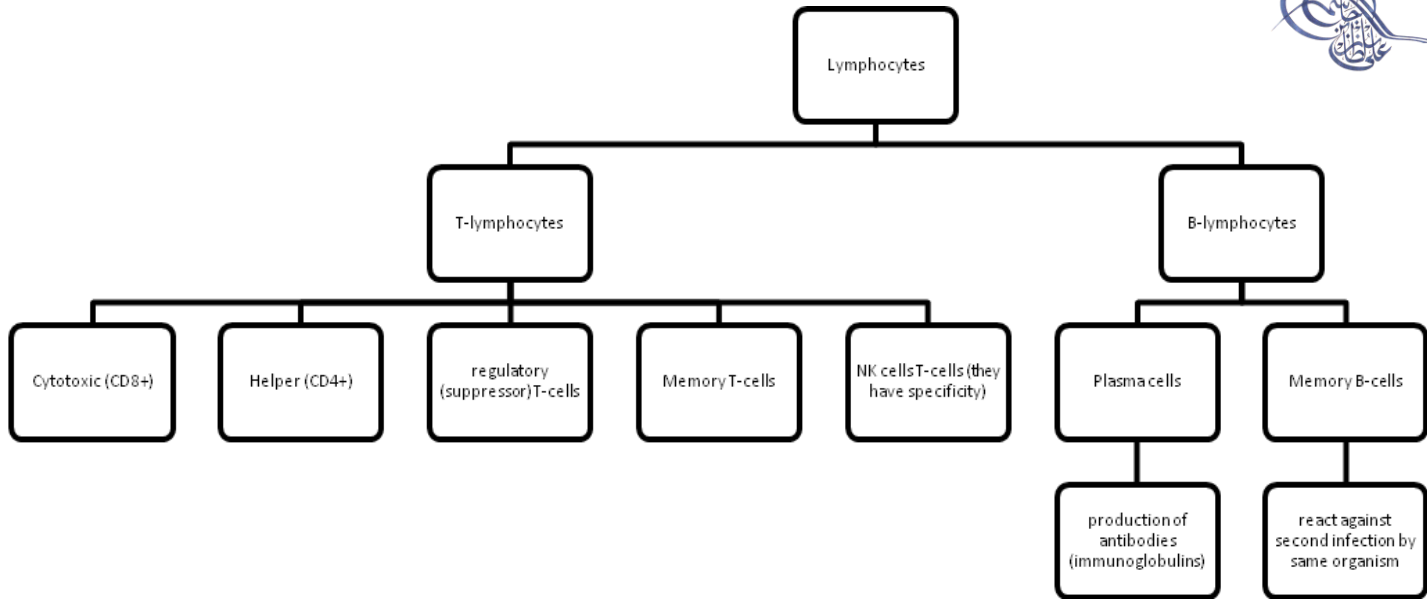
- They compose 0-1% of all WBCs
- Least numerous granules.
- **Main function:** in allergic body reactions. They are going to release:
  - ✓ *Histamine:* will always be present in urticaria (hives).
  - ✓ *Heparin:* which will inhibit blood clot formation.
- **Note:** in allergic reactions, once basophils bind to IgE antibodies they will rupture releasing their cytokines (large quantities of histamine, bradykinine, serotonin & heparin).



- Monocytes/macrophages:

- They compose 5% of all WBCs.
- They are the first line of defense against pathogens (in inflammatory reactions).
- They are present nearly in all tissues including: liver, spleen, lymph nodes, lungs & brain.
- **Life span:** 10-12 hours in circulation (called monocytes) – months in tissues (called macrophages).
- They are involved in the production of sex hormones.
- Also, they are important in the development of blood vessels network (retina).
- They act as antigen-presenting cells.





- **NK cells:**

- Innate immunity.
- They have no specificity.
- Directed against virus-infected cells and tumor cells.