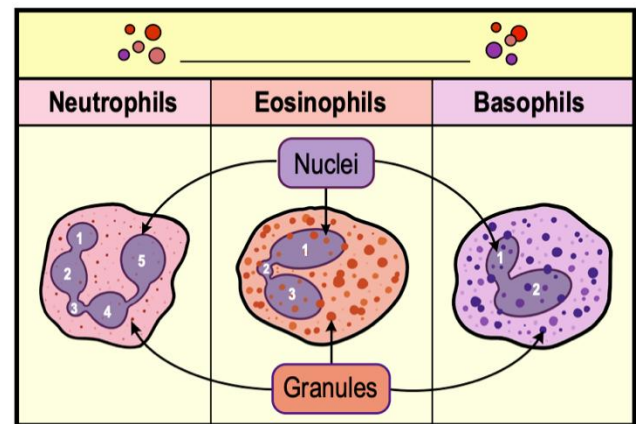
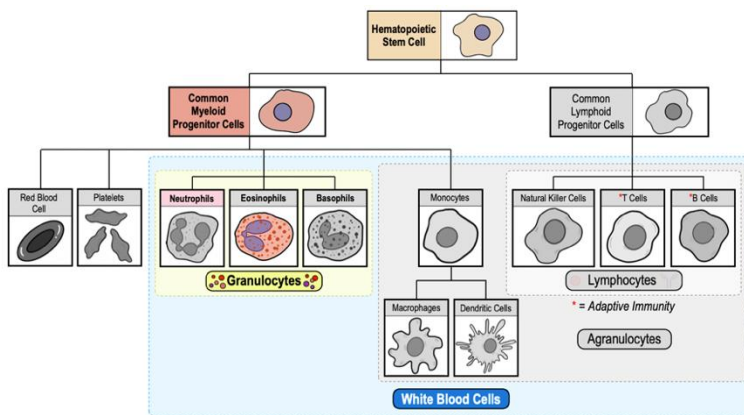


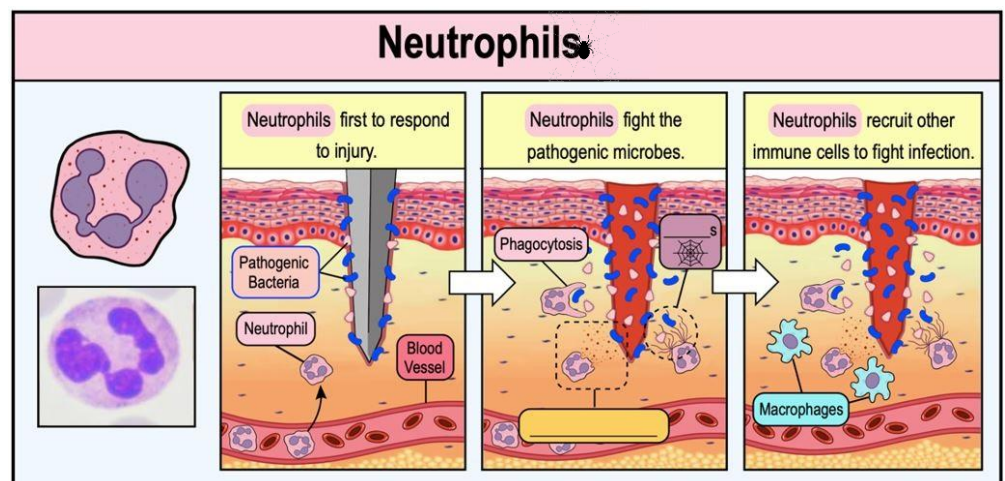
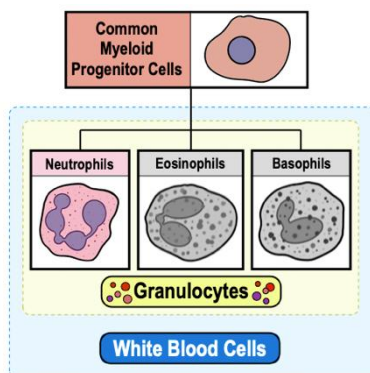
CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

- **Granulocytes:** white blood cells with visible cytoplasmic _____.
- **Granules:** contain compounds used for protective functions & are visible under a light microscope.
- There are _____ types of granulocytes named based on the staining properties of their granules:
 - 1) **Neutrophils:** have a nucleus with 5 lobes & small granules which do _____ stain well.
 - Also known as: **PolyMorphonuclear Neutrophils** (____s).
 - 2) **Eosinophils:** have 2-3 lobes in the nucleus & large granules that stain a _____ /orange color.
 - 3) **Basophils:** have a two-lobed nucleus & large granules that stain a dark _____ /purple color.



Neutrophils

- **Neutrophils** are the most _____ type of leukocyte in the blood (can make up to 70% of all leukocytes).
- Migrate to different locations via _____ stream & are often *first* to respond to infection or tissue damage.
- Granules contain variety of defensins & hydrolytic enzymes that _____ microbes.
- Granules can be _____ from the cell (**degranulation**) or used to destroy microbes during *phagocytosis*.
- **Phagocytosis:** process of _____ & digesting material including invading microbes (cell "eating").
- Can also release neutrophil extracellular traps (NETs) or webs of chromatin that _____ infecting microbes.



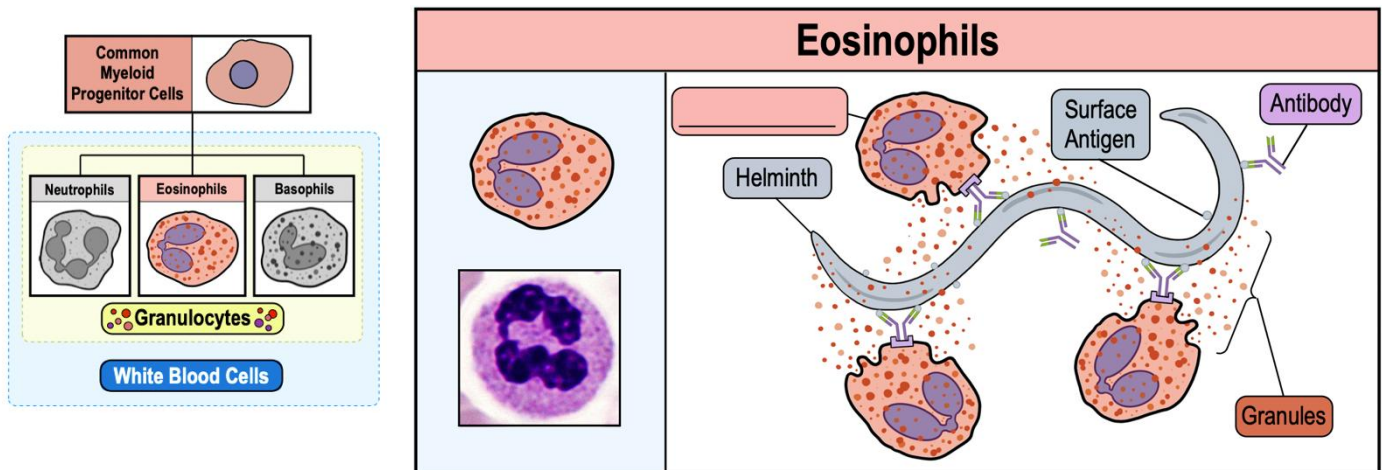
CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

PRACTICE: Which granulocyte is the first to respond to an infection, has hydrolytic enzymes in its granules, and possesses the ability of phagocytosis?

- a) Basophil.
- b) Eosinophil.
- c) Neutrophil.
- d) Macrophage.

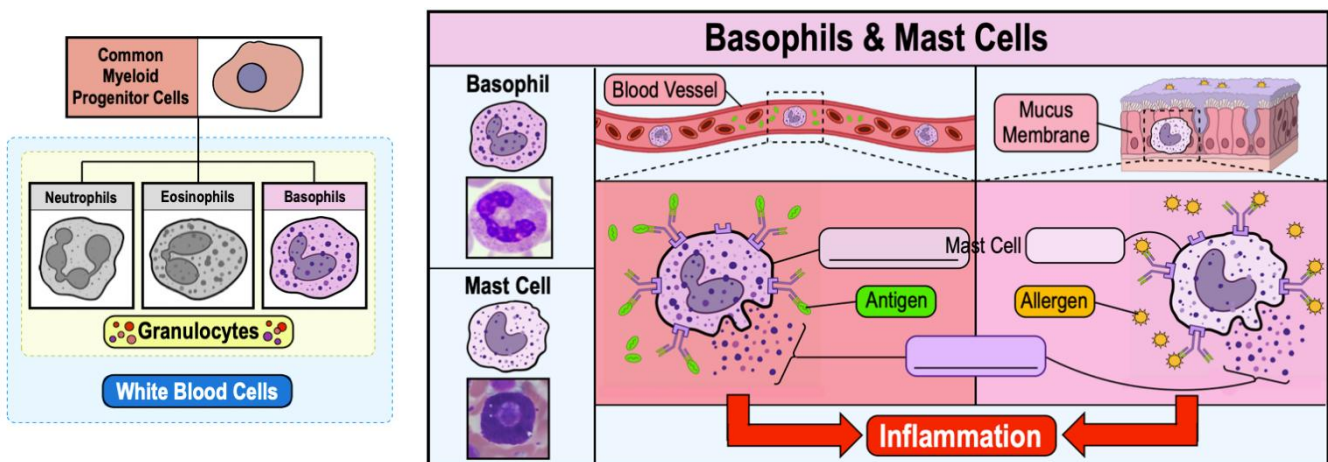
Eosinophils

- Primary role of **Eosinophils** is to protect against parasitic _____ (helminths).
 - Granules have antimicrobial substances that bind parasites & enzymes that disrupt membrane permeability.
 - Can also cause some symptoms associated with _____.



Basophils

- **Basophils**: are also involved in allergic reactions & inflammation response during infection.
 - Produce _____ that are released during inflammation to increase *capillary permeability*.
 - Allows other defense cells to easily _____ the bloodstream & enter an infected area of the host.
 - _____ **Cells**: similar in function to basophils but are found *inside tissues* rather than circulating the blood.
 - Detects tissue damage, *degranulates* to release *histamine*, which induces *inflammation*.



CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

PRACTICE: Which of the following is a phagocytic cell found in the human body?

- a) Eosinophil.
- b) Neutrophil.
- c) Basophil.
- d) T cell.

PRACTICE: Which of the following answers are characteristics or roles of granulocytes?

- a) Release of hydrolytic enzymes that damage bacterial cell membranes.
- b) Production and release of histamines which increases capillary permeability.
- c) Release antimicrobial substances that damage the membranes of parasites.
- d) Phagocytose invading microorganisms.
- e) All of the above.

PRACTICE: White blood cells are referred to as _____.

- a) Platelets.
- b) Erythrocytes.
- c) Leukocytes.
- d) Megakaryocytes.

PRACTICE: Two immune cells have very similar functions. Both immune cells release histamine and induce inflammation.

However, _____ cells reside in specific tissues, while _____ cells travel through the blood stream.

- a) Mast cells; Basophil cells.
- b) Basophil cells; Neutrophil cells.
- c) Granulocyte cells; Basophil cells.
- d) Eosinophil cells; Dendritic cells.

CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

PRACTICE: In type I allergic reactions, antibodies are produced and bind to:

- a) Mast cells.
- b) Neutrophils.
- c) Eosinophils.
- d) Monocytes.

PRACTICE: Granulocytes:

- a) Travel through the lymphatic system.
- b) Are the most numerous leukocyte in circulation.
- c) Develop in the thymus.
- d) Do not contain distinct granules in their cytoplasm.