

MODULE 2 L04

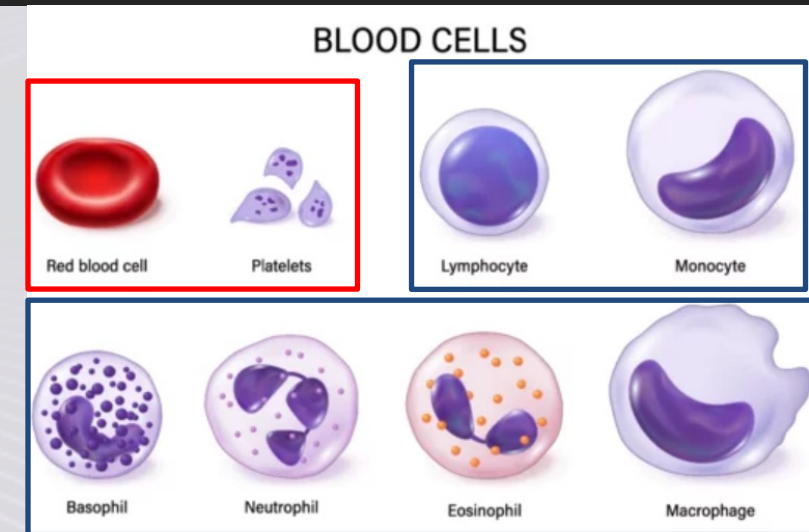
Granulocytes

Dr. Lisa Brinn
lbrinn@fiu.edu



White Blood Cells (WBCs)

- Also known as leukocytes
- Scattered throughout peripheral tissue
- Functions:
 - ❖ Help defend body against pathogen invasion
 - ❖ Help remove:
 - Toxins
 - Wastes
 - Abnormal or damaged cells
- Leukocytes characteristics
 - ❖ 3 contain nuclei of characteristic sizes and shapes
 - ❖ Are as large or larger than RBCs
 - ❖ Two main classes:
 - Granular leukocytes (granulocytes)
 - Have large granular inclusions in cytoplasm
 - Agranular leukocytes (agranulocytes)
 - Do not present with cytoplasmic granules visible with light microscope

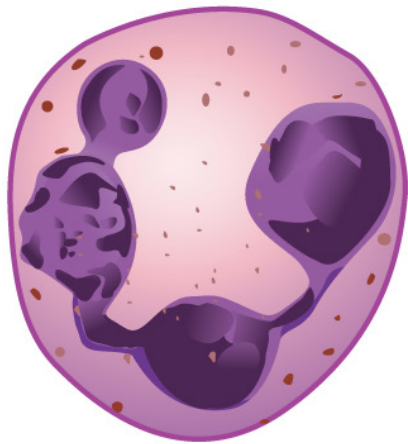


Leukocytes Quantities

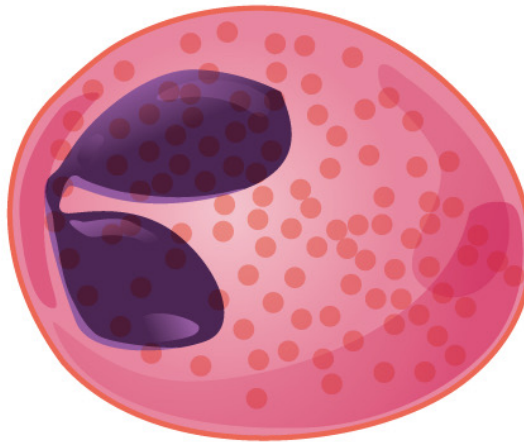
- Normal quantity:
 - ❖ 6000-9000 WBCs/ μ L
- Leukopenia
 - ❖ ↓ inadequate levels of leukocytes
 - Less than 2500/ μ L
 - Lymphopenia
- ❖ 3 Leukocytosis
 - ❖ ↑ excessive levels of leukocytes
 - More than 30,000/ μ L
 - Lymphocytosis

Granular Leukocytes

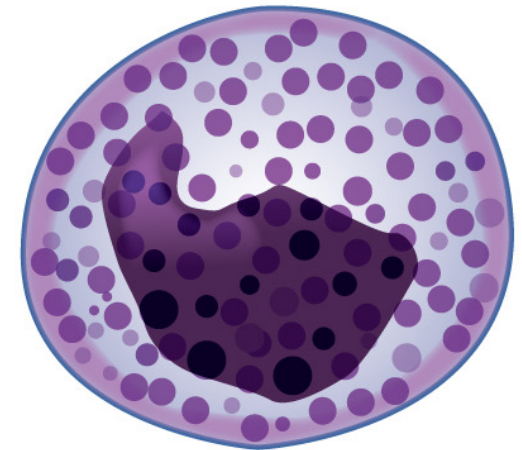
- Subdivided based on staining characteristics:
 - a. Neutrophils – neutral staining granules
 - b. Eosinophils – acidic red dye
 - c. Basophils – basic dye



Neutrophil



Eosinophil

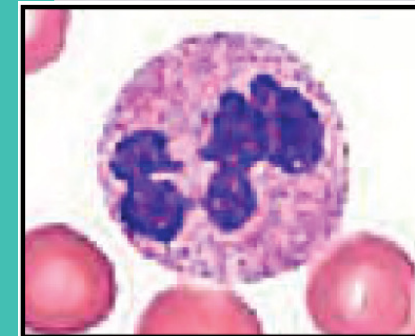
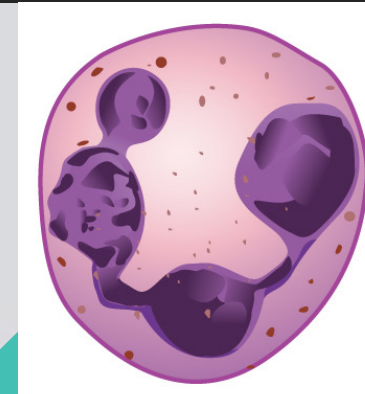


Basophil

a. Neutrophils

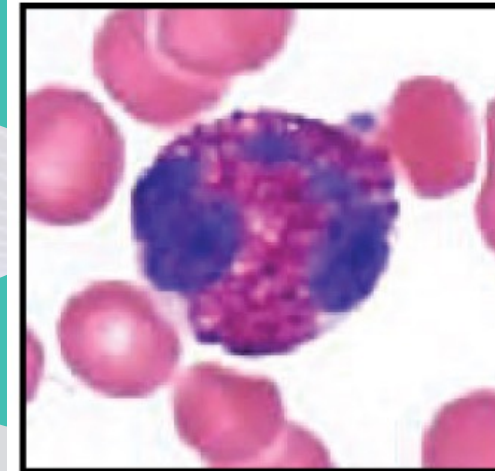
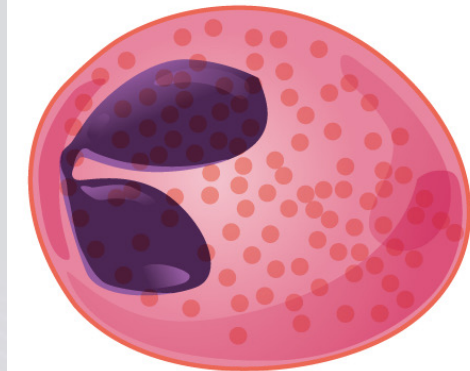
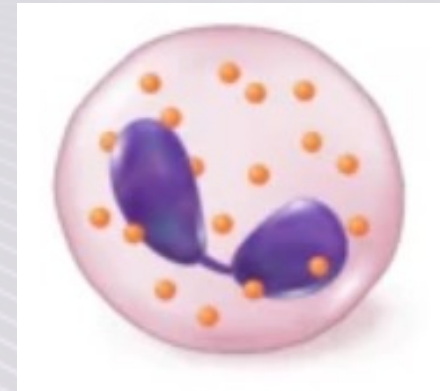
- Quantity
 - ❖ 50-70% of circulating WBCs
- Root of the word
 - ❖ Cytoplasm packed with pale, neutral-staining granules
 - Lysosomal enzymes
 - Bactericidal compounds
- Size
 - ❖ Twice as big as RBCs
- Nucleus
 - ❖ Dense
 - ❖ Contorted
 - ❖ Forming lobes

} Polymorphonuclear leukocyte (PMNs)
- Other characteristics:
 - ❖ Highly mobile
 - ❖ Active phagocytes
 - ❖ Short lifespan – 12 hours
 - Breakdown releases chemicals that attract:
 - Other neutrophils
 - Cells with antibiotic activity against pathogens



b. Eosinophils

- Quantity
 - ❖ 2-4% of circulating WBCs
- Root of the word
 - ❖ Granules stain with eosin
 - Acidic red dye
 - Also called acidophils
 - Deep red granules
- Size
 - ❖ Similar to neutrophils = twice as big as RBCs
- Nucleus
 - ❖ Bilobed (two-lobes)
- Other characteristics:
 - ❖ Active phagocytes
 - ❖ Short lifespan – 6-8 hours
 - Numbers increase dramatically during:
 - Allergic reaction
 - Parasitic infection
 - ❖ Attracted to injury sites
 - Release enzymes



c. Basophils

- Quantity
 - ❖ 1% of circulating WBCs
- Root of the word
 - ❖ Granules stain with hematoxylin
 - Basic dye
 - Deep purple-blue dye
- Size
 - ❖ Slightly larger than RBCs
- Nucleus
 - ❖ S-shaped
- Other characteristics:
 - ❖ Short lifespan – 18 hours
 - ❖ Migrate to sites of injury and release granules that contain:
 - Histamine - dilate blood vessels
 - Heparin – prevents blood clotting
 - Other chemicals that stimulate mast cells and attract other WBCs to injury site

