

**Table 18.8 The White Blood Cells (Leukocytes)****Neutrophils**

Percent of WBCs	60%–70%
Mean count	4,150 cells/ $\mu$ L
Diameter	9–12 $\mu$ m

**Appearance\***

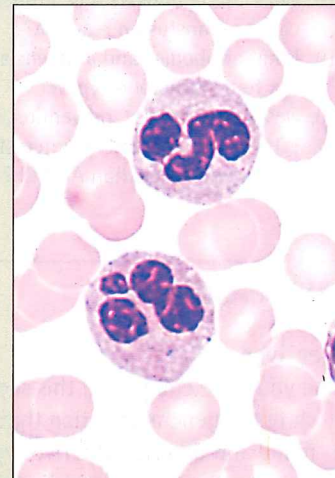
- Nucleus usually with 3–5 lobes in S- or C-shaped array
- Fine reddish to violet granules in cytoplasm

**Differential Count**

- Increases in bacterial infections

**Functions**

- Phagocytosis of bacteria
- Release of antimicrobial chemicals

**Neutrophils****Eosinophils**

Percent of WBCs	2%–4%
Mean count	165 cells/ $\mu$ L
Diameter	10–14 $\mu$ m

**Appearance\***

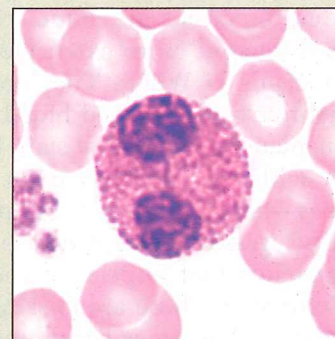
- Nucleus usually has two large lobes connected by thin strand
- Large orange-pink granules in cytoplasm

**Differential Count**

- Fluctuates greatly from day to night, seasonally, and with phase of menstrual cycle
- Increases in parasitic infections, allergies, collagen diseases, and diseases of spleen and central nervous system

**Functions**

- Phagocytosis of antigen-antibody complexes, allergens, and inflammatory chemicals
- Release enzymes that weaken or destroy parasites such as worms

**Eosinophil****Basophils**

Percent of WBCs	< 0.5%–1%
Mean count	44 cells/ $\mu$ L
Diameter	8–10 $\mu$ m

**Appearance\***

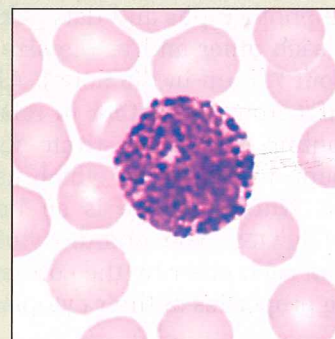
- Nucleus large and U- to S-shaped, but typically pale and obscured from view
- Coarse, abundant, dark violet granules in cytoplasm

**Differential Count**

- Relatively stable
- Increases in chicken pox, sinusitis, diabetes mellitus, myxedema, and polycythemia

**Functions**

- Secrete histamine (a vasodilator), which increases blood flow to a tissue
- Secrete heparin (an anticoagulant), which promotes mobility of other WBCs by preventing clotting

**Basophil**

(continue)

Table 18.8 The White Blood Cells (Leukocytes) (continued)

**Lymphocytes**

Percent of WBCs	25%–33%
Mean count	2,185 cells/ $\mu$ L
Diameter	
Small class	5–8 $\mu$ m
Medium class	10–12 $\mu$ m
Large class	14–17 $\mu$ m

**Appearance\***

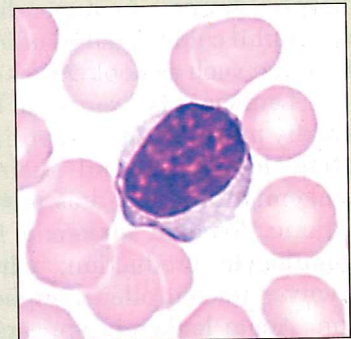
- Nucleus round, ovoid, or slightly dimpled on one side, of uniform dark violet color
- In small lymphocytes, nucleus fills nearly all of the cell and leaves only a scanty rim of clear, light blue cytoplasm
- In larger lymphocytes, cytoplasm is more abundant; large lymphocytes may be hard to differentiate from monocytes

**Differential Count**

- Increases in diverse infections and immune responses

**Functions**

- Several functional classes usually indistinguishable by light microscopy
- Destroy cancer cells, cells infected with viruses, and foreign cells
- “Present” antigens to activate other cells of immune system
- Coordinate actions of other immune cells
- Secrete antibodies
- Serve in immune memory



Lymphocyte

**Monocytes**

Percent of WBCs	3%–8%
Mean count	456 cells/ $\mu$ L
Diameter	12–15 $\mu$ m

**Appearance\***

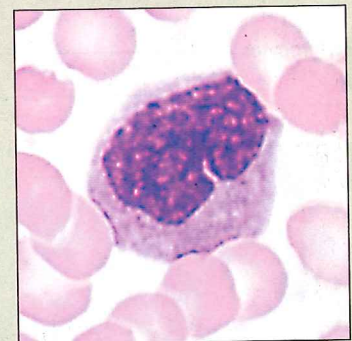
- Nucleus ovoid, kidney-shaped, or horseshoe-shaped; light violet
- Abundant cytoplasm with sparse, fine granules
- Sometimes very large with stellate or polygonal shapes

**Differential Count**

- Increases in viral infections and inflammation

**Functions**

- Differentiate into macrophages (large phagocytic cells of the tissues)
- Phagocytize pathogens, dead neutrophils, and debris of dead cells
- “Present” antigens to activate other cells of immune system



Monocyte

\*Appearance pertains to blood films dyed with Wright's stain.

diseases as measles, mumps, chicken pox, poliomyelitis, influenza, typhoid fever, and AIDS. It can also be produced by glucocorticoids, anticancer drugs, and immunosuppressant drugs given to organ transplant patients. Since WBCs are protective cells, leukopenia presents an elevated risk of infection and cancer. A count above

10,000 WBCs/ $\mu$ L, called **leukocytosis**,<sup>20</sup> usually indicates infection, allergy, or other diseases but can also occur in response to dehydration or emotional disturbances. More

<sup>20</sup>leuko = white + cyt = cell + osis = condition