



Leukocytes (white cells)

Lect:(4)

Function of WBCs

1-Seek and Destroy” Functions:

- Destroy invading microorganisms
- Destroy abnormal cells (ie: cancer)

2-Clean up cellular debris (phagocytosis)

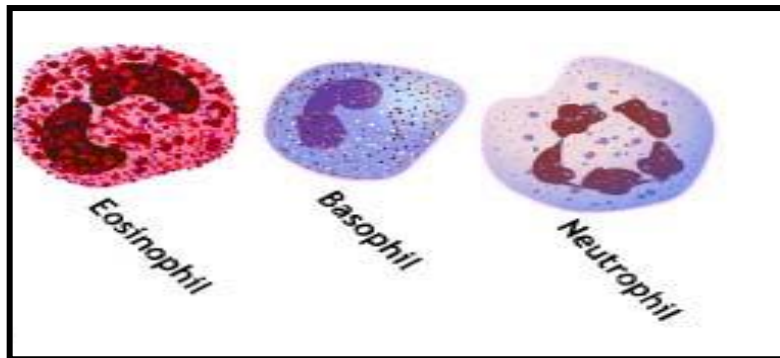
- Assist in injury repair

3-Each WBC has a specific function

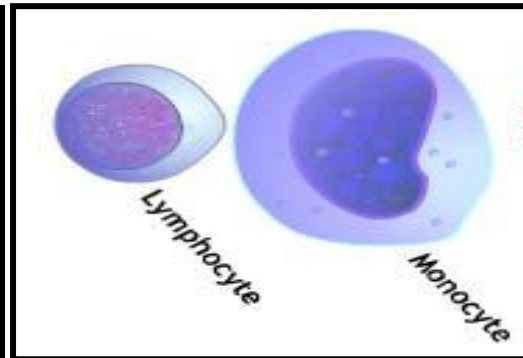
Types of WBC's

Are classified in 2 main classes

A-Granulocytes



B- Agranulocyte



A-Granulocyte Functions (NEB)

1-Neutrophils

- increased numbers in bacterial infections
- phagocytosis of bacteria
- release antimicrobial chemicals



2-Eosinophils

- increased numbers in parasitic infections,
- allergies, diseases of spleen, and CNS
 - phagocytosis of antigen-antibody complexes, allergens, and inflammatory chemicals
- release enzymes to destroy large parasites

3-Basophils

- increased numbers in chicken pox, sinusitis, diabetes
- secrete **histamine** (vasodilator)
- speeds flow of blood to an injured area
- secrete **heparin** (anticoagulant)
- promotes the mobility of other WBCs in the area

B-Agranulocyte Functions

1-Lymphocytes

- increased numbers in diverse infections and immune responses
- destroy cells (cancer, foreign, and virally infected cells)
- “present” antigens to activate other immune cells
- coordinate actions of other immune cells
- secrete antibodies and provide immune memory

2-Monocytes

- increased numbers in viral infections and inflammation
- leave bloodstream and transform into macrophages
- phagocytes pathogens and debris
- “present” antigens to activate other immune
- cells - **antigen presenting cells (APCs)**



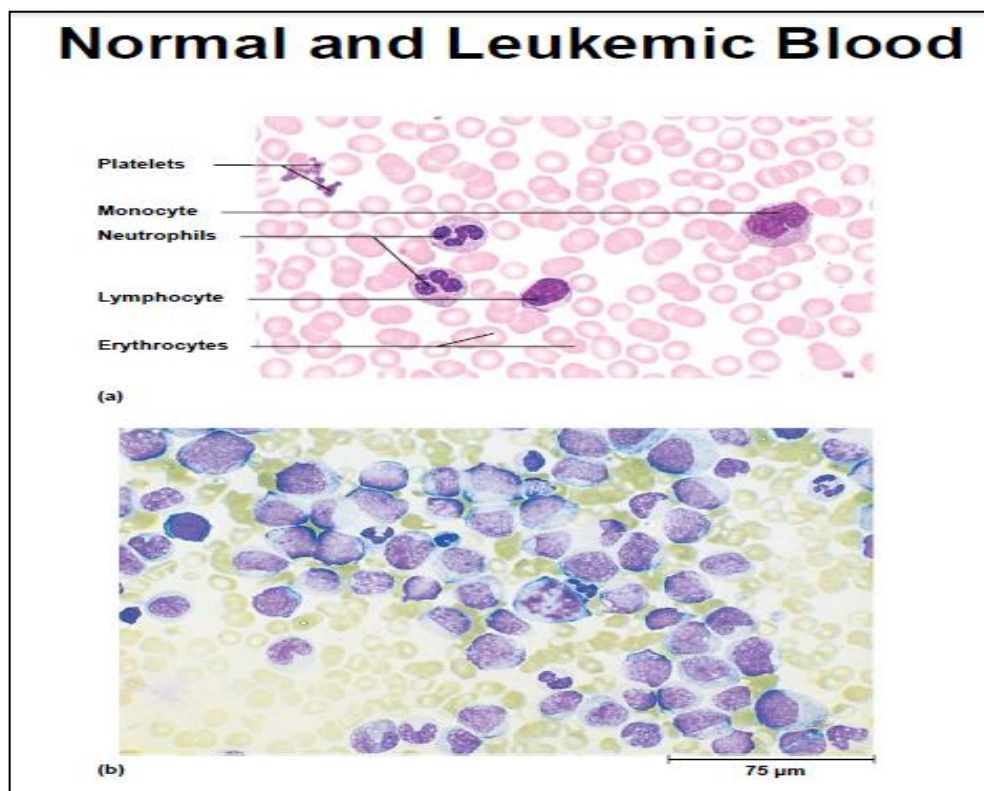
Leukocytosis and Leukopenia

- A total WBC count above 11,000 cells/mm³ is referred to as **leukocytosis**. Leukocytosis generally indicates that a bacterial or viral infection is stewing in the body.
- The opposite condition, **leukopenia**, is an abnormally low WBC count. It is commonly caused by certain drugs, such as corticosteroids and anticancer agents.

Leukemia

Leukocytosis is a normal and desirable response to infectious threats to the body. By contrast, the excessive production of abnormal WBCs that occurs in infectious mononucleosis and leukemia is distinctly pathological.

In leukemia, the bone marrow becomes cancerous, and massive numbers of WBCs are turned out rapidly. Although this might not appear to present a problem, the "newborn" WBCs or leukemic cells, especially the very undifferentiated cells, are usually nonfunctional, so that they cannot provide the usual protection against infection associated with white blood cells.





Q:What is the predominant blood leukocyte during health in the domestic animals?

In cats, dogs, and neonatal ruminants, neutrophils are the most abundant leukocyte, followed by lymphocytes. In mature ruminants, lymphocytes are the predominant leukocyte, with fewer neutrophils. In horses and pigs, numbers of neutrophils and lymphocytes are approximately equal. Eosinophils occur in very low numbers on blood smears from healthy animals.

Type of animals	Neutrophils	Lymphocytes	Eosinophils
In cats, dogs, and neonatal ruminants	++++	++	=
In mature ruminants,	++	++++	=
In horses and pigs	=	=	=

Q:What are heterophils?

In some small mammals the specific granules in neutrophils stain eosinophilic, so their neutrophils are termed *heterophils*. In rabbits the granules in heterophils are very prominent.

In guinea pigs and hamsters the granules in heterophils are less prominent. In birds and reptiles the leukocytes considered the counterpart of neutrophils are also called heterophils. The heterophils of birds and reptiles contain large, prominent eosinophilic granules that are fusiform or round.

