

# Eosinophils

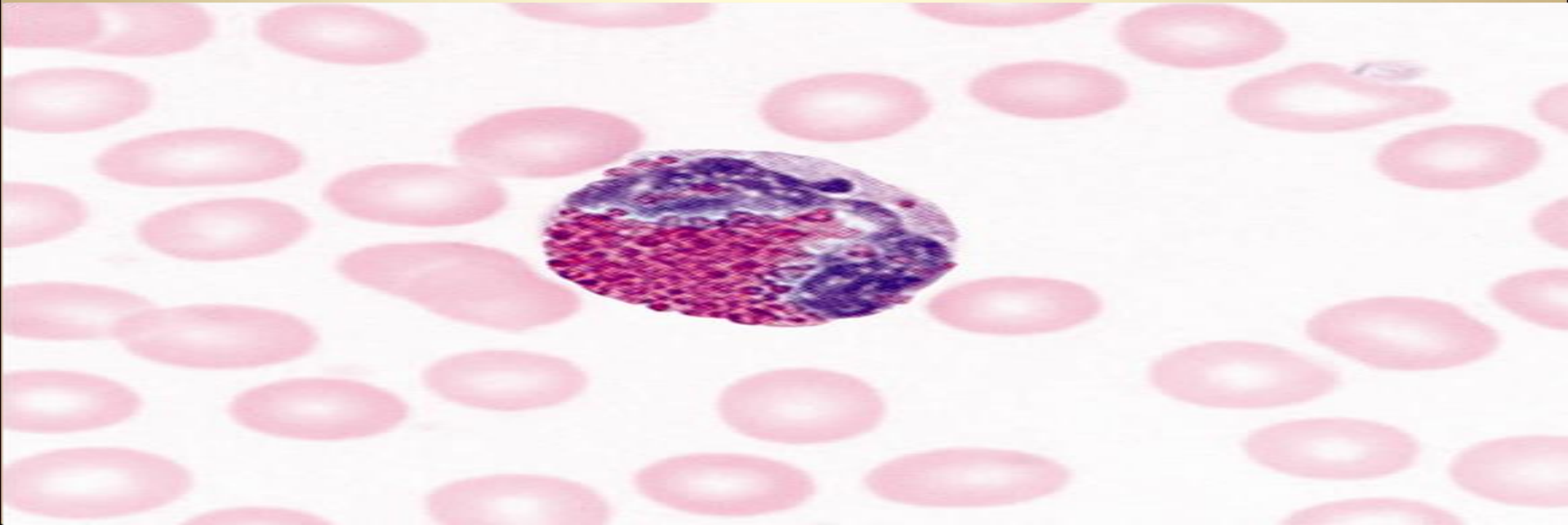
Eosinophils are much less numerous ( 2 to 3 percent of total WBC ).

Cell morphology :

(3) Morphology of eosinophils :-

(1) The cytoplasm stains pale blue and contains coarse round , pinkish red cytoplasmic granules .

(2) The nucleus is two lobed (segmented) connected by coarse clump chromatin



## Functions :

(1) They are important in controlling infection by its parastical activity : Eosinophils have parasiticial action by production of antibody and / or complement .

(2) They participate in the regulations of allergic and acute inflammatory responses by secretion of prostaglandins that inhibit the mast cell release of histamine and inactivate free histamine by eosinophil histaminase enzyme .

(3) Eosinophils also participate in coagulation and fibrinolysis through the activation of factor VII (the extrinsic pathway of the blood coagulation) and plasminogen .

Eosinophilia : is observed in :-

- Parasitism .
- Allergic conditions .
- Eosinophilic leukemia .
- Diseases of certain body tissues or organs rich in mast cells as skin, lungs, uterus and intestine.

Eosinopenia : is observed in :-

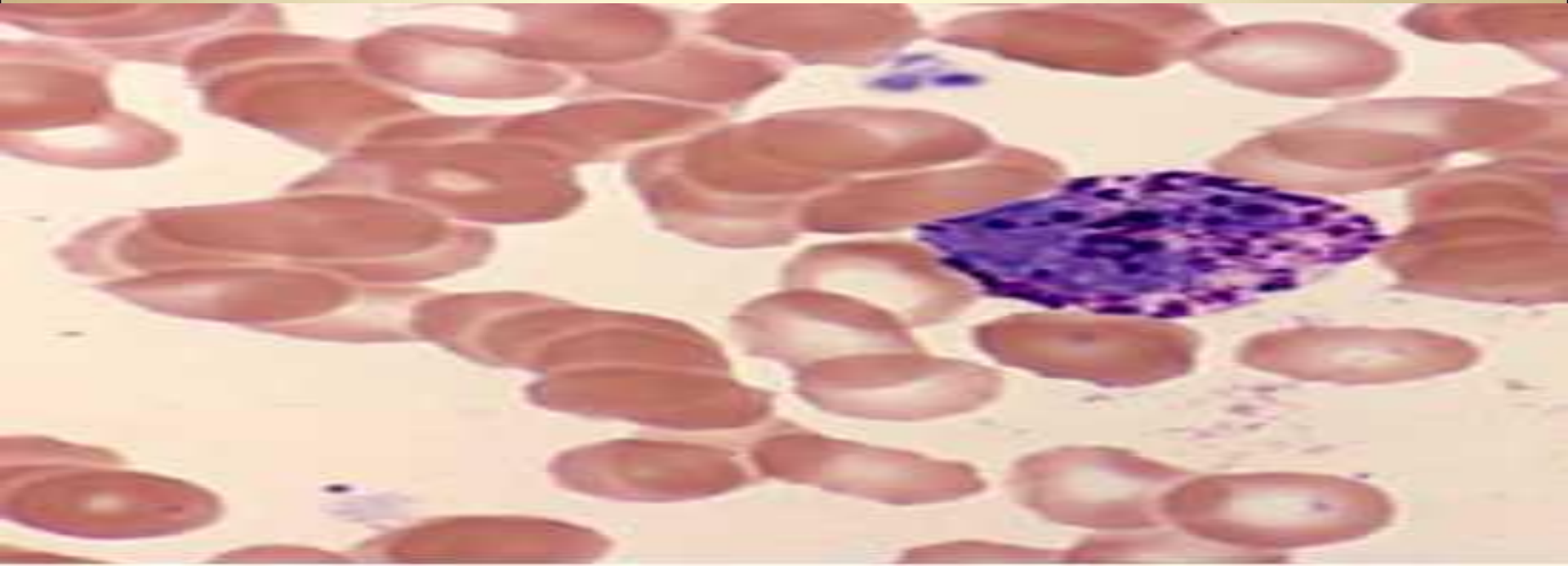
- Acute infection .
- Corticosteroids or epinephrine release .

# Basophils

the least numerous in leukocyte population (0.5 percent of total blood WBCs).

Cell morphology :-

Basophils have intense basophilic granules fill the cytoplasm and mask the segmented nucleus.



Functions :

1-The immediate allergic reactions (Hypersensitivity) :

IgE antibodies have a tendency to become attached to the plasma membrane of basophils and mast cells.

When a specific antigen reacts with the antibodies on the plasma membrane of these cells causes massive release of heparin, histamine, bradykinin, serotonin and lysosomal enzymes .

These liberated substances are responsible for the hypersensitivity reactions, such as

(1)Vasodilation of blood vessels

(2)Increased capillary permeability

(3)Influx of eosinophils attracted by a “eosinophilic chemotactic factor“ . liberated from basophils and mast cells .



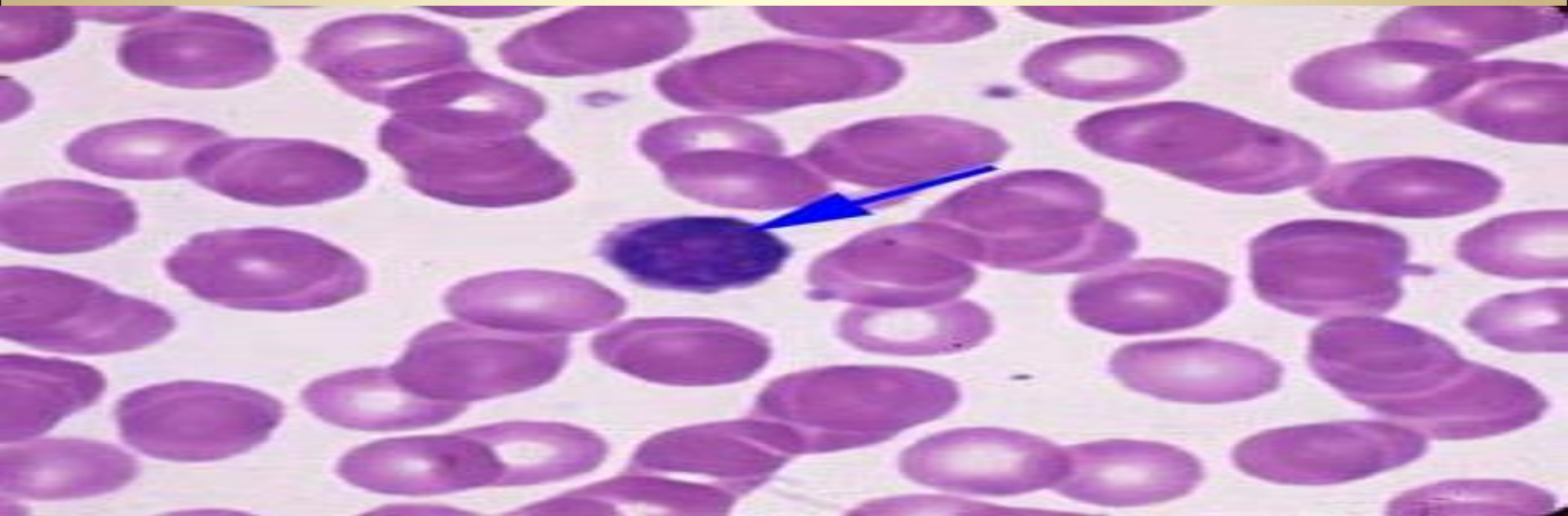
# Lymphocytes

Morphology of lymphocytes :-

Lymphocytes vary in size from small to large.

(1)The cytoplasm stains pale blue and not contains cytoplasmic granules .

(2)The nucleus is generally round and almost fill the cell, leaving only a narrow rim of cytoplasm.



## Functions

(1) Lymphocytes, smaller and less mobile than macrophages to respond to chemotaxis .Not phagocytic, they are associated with immune responses .

(2)Over 99% of lymphocytes are found in the tissues and the few percent in the blood are in transit. They constantly recirculate between tissues and blood by crossing the interepithelial passage in capillaries .

Two functional groups of lymphocytes are recognized:-

(1) B-lymphocytes for production of circulating antibodies capable of attacking invading agents (humoral immunity)

(2) T- lymphocytes that destroy foreign agents (cellular immunity) .

Both two types are derived from stem cells in bone marrow .

During fetal stage, they entrapped in the lymphoid tissues, the lymphocytes are “ preprocessed “ .

The T-lymphocytes are preprocessed in thymus gland, whereas B-lymphocytes it happens

(1) in the bone marrow in man.

(2) in the peyer’s patches of sheep and swine .

(3) in the bursa of Fabricius in birds .

These preprocessed lymphocytes are transported to lymphoid tissues .

To produce antibodies

some B lymphocytes are activated through

(1) primary response by antigens from macrophages

(2) helper T cells .

As well and change to plasma cells which are rapidly divided and produce great quantity of antibodies .

Other activated B lymphocytes are not change into plasma cells but they divided to increase the number of preformed dormant B lymphocytes .

Subsequent exposure to the same antigen (secondary response) causes a greater and longer production of antibodies from these memory cells.

Activated T lymphocytes produce other activated T cells and T lymphocytes memory cells .

There are three types of T lymphocytes:-

(1) T lymphocytes cytotoxic.

(2) T lymphocytes helper.

(3) T lymphocytes suppressor .

# Monocytes

the largest of the mature leukocytes in the blood .

# Monocytes

Morphology of monocytes :-

(1)The cytoplasm stains pale blue and not contains cytoplasmic granules and commonly present vacuoles that vary in size and are frequently present in one side of the cell or along the cell periphery .

(2)The nucleus is a pleomorphic nucleus variable in shape . It is often board, irregular and without lobulation.



# Monocytes

## Functions

- 1-In blood, it is temporary ( half – life 10 hours ), mobile and immature cell that has very little ability to fight infectious agents .
- 2-Mature monocytes show diapedesis, ameboid activity and chemotaxis .
- 3-Outside the blood vessels, monocytes are activated as they increase in diameters as much as five fold and their cytoplasm fill with granules of lysosomes and mitochondria, then they are called tissue **macrophages** .



Monocytosis : Is observed in the followings :-

- Corticosteroids administration in dogs .
- Chronic infection or inflammation .
- Monocytic and myelomonocytic leukemias.
- Granulomatous diseases.

Monocytopenia : Is observed in the following :-

- Acute infection or inflammation.