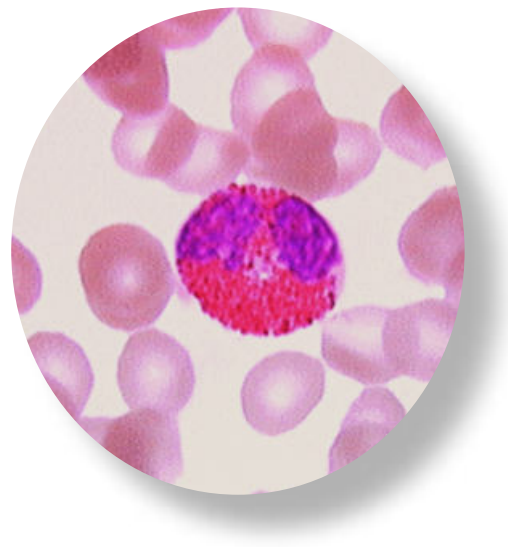
WBCs

Learning Objective

- Eosinophil characteristics, functions and causes of variations in number
- Basophil & mast cells characteristics, functions and causes of variations in number
- Monocyte-Macrophages characteristics, functions and causes of variations in number

Eosinophils

- Size- 10-14µm, Nucleus - central or eccentric- 2-3 lobed **'spectacle shaped'** ;
coarse granules with bright brick red color;
Granules - large; coarse;

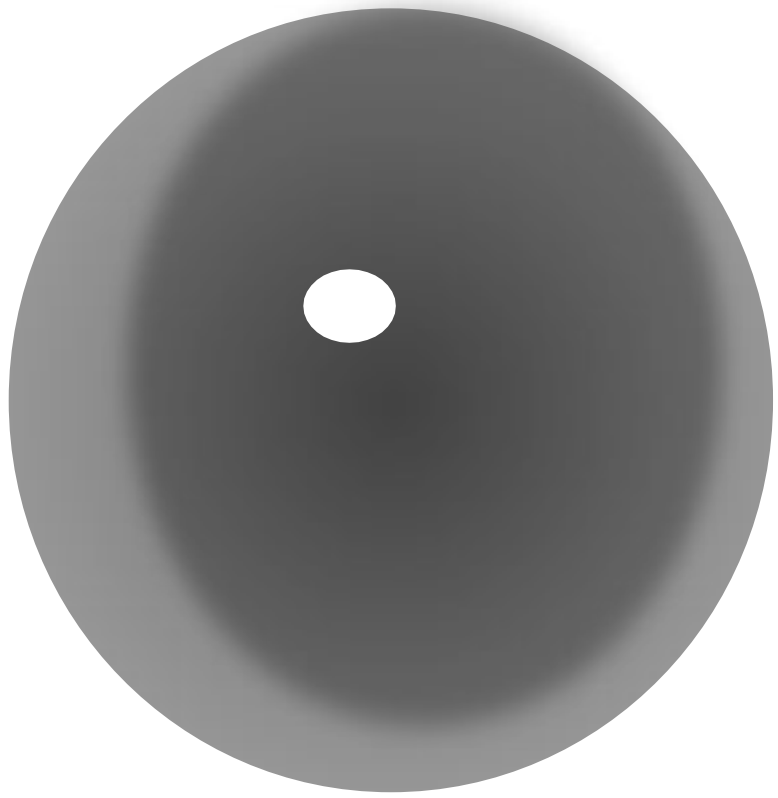


- Differential count : 1- 4% • Absolute count : 40 - 440/µl of blood

- They are especially abundant in tissues that come into contact with the external environment

Eosinophil-Granules

Contents in Granules



Functions of Eosinophils

- Defense against helminthic parasitic infestation (worm)
- Combat immediate hypersensitivity reactions (Allergy)

Major basic protein eosinophil cationic protein; these proteins are toxic to several parasites and to mammalian cells.
These proteins bind heparin and neutralize its anticoagulant activity as well.
Eosinophil-derived neurotoxin can severely damage myelinated neurons.

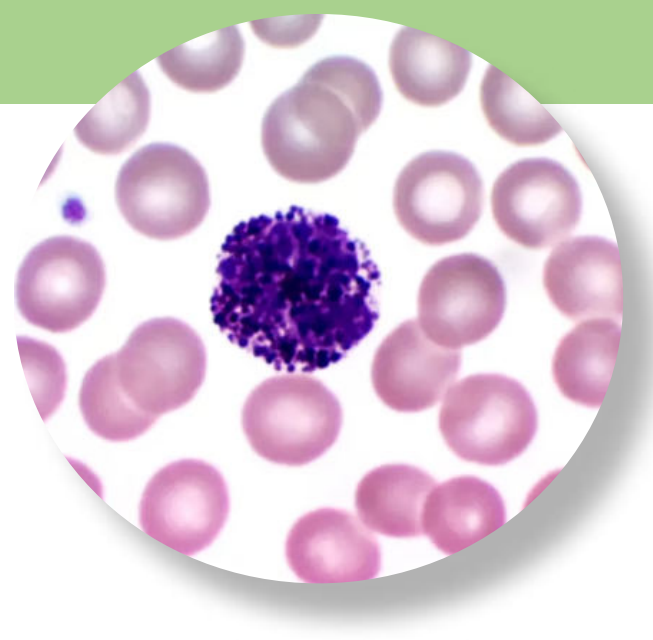
Easinophil- Causes of variation in Number

Eosinophilia :Increase in eosinophils= > 500/mm^3
Causes-

Eosinopenia : Decrease in eosinophils= < 50/mm^3
Causes-

Basophils & Mast Cells

Basophils



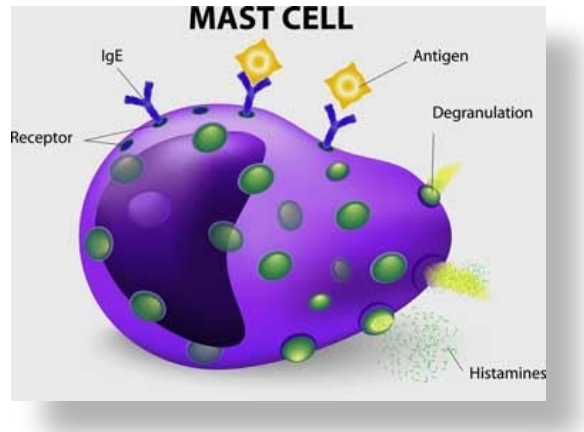
Size : 10-14µm; Nucleus : central; 2-3 lobes; overlaid with very coarse purplish blue granules

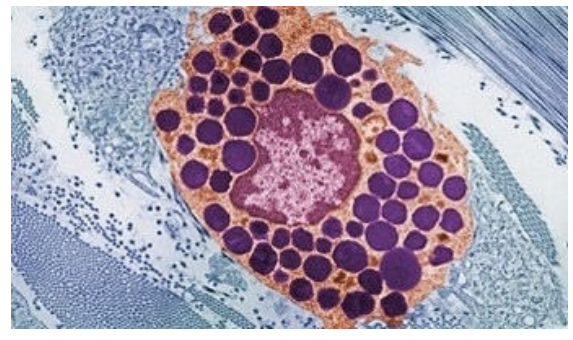
Normal values • Differential :0-0.1 • %Absolute :1 - 100/µl of blood

Granules Contents :

Mast Cells

Usually present in tissues with more propensity in mucosal and connective tissues
Round or elongated cells and nu is without segmentation
It is also formed in BM but absent in blood
Life span-few months
Quite similar to Basophil in Content and functions





Basophils & Mast Cells-Functions

Function: This cell along with mast cells have been associated with-

- Hypersensitivity reaction (Acute allergy)
- Systemic Hypersensitivity reaction (Anaphylaxis)

Especially in the persons having ATOPY tendency.

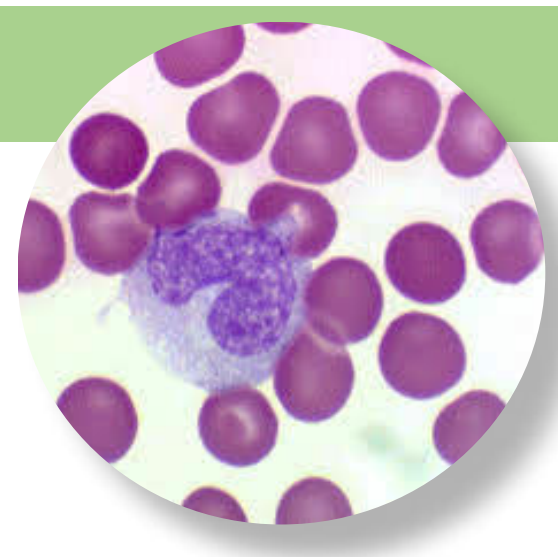
Basophil- Causes of variation in Number

Basophilia:
Causes-

Basopenia:
Causes-

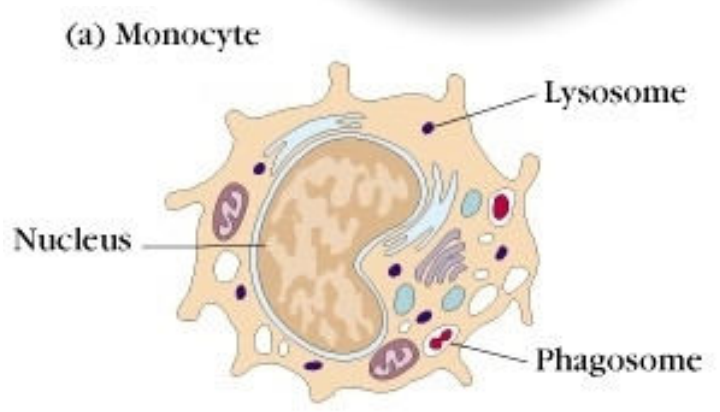
Monocytes – Macrophages system

Monocytes-Macrophages



Monocytes)4%–8(%, 12–18 µ,
Nucleus- • violet • large single • may be indented /horse -shoe/kidney/oval shaped
Cytoplasm- • Abundant • blue • amount is usually more than that of nucleus. • no visible granules.

▪Monocytes enter the blood from the bone marrow and circulate
for about 72 h. They then enter the tissues and become **'Tissue Macrophages'**



Monocytes-Macrophage System

Macrophages secrete a vast range of biologically active substances into their local milieu and to date, more than 50 substances secreted by macrophages have been reported.
Enzymes; enzyme inhibitors; plasma proteins such as complement components, coagulation factors, and apolipoprotein E; factors that regulate the functions of other cells such as interferon, interleukin 1, mitogens, and angiogenesis factor; and low molecular weight substances such as reactive metabolites of oxygen and derivatives of arachidonic acids.

Monocytes-Causes of variation in Number

Monocytosis
Causes:

Monocytopenia
Causes:

Self Assessment

They are especially abundant in tissues that come into contact with the external environment, such as mucosa of the
…….

MBP, ECP, EDN in eosinophils are important for ……

(Bronchus) ↑Cp permeability → local site inflammation → Wheezing, cough with secretion, swollen bronchial lining and bronchoconstriction→Difficulty in breathing (Bronchial Asthma). This is sequence for…… action.

Self Assessment

Monocytes is ……% in blood and diameter is ……..µ.

……. are important as antigen presenters cells to …… Cells.

Formation of ……..occur in macrophages.

By osteoclast- ……..occurs to renew old bone from new bone

Thank you