

Types of Adult Stem Cells:

- Hematopoietic Stem Cells (Blood Stem Cells)
- Mesenchymal Stem Cells.
- Neural Stem Cells.
- Epithelial Stem Cells.
- Skin Stem Cells

Blood cell types	Men	Women
RBC	4.5 - 6.0	4.0 to 5.0
	million/microliter	million/microliter
WBC	4.5 - 11 thousand/ microliter	4.5 to 11 thousand/ microliter
Platelet	150 - 450 thousand/ microliter	150 - 450 thousand/ microliter
Hematocrit	42% to 50%	36% to 45%
Hemoglobin	14 - 17 grams/100 milliliters	12 - 15 grams/100 milliliters

White Blood Cell Differential Normal Range

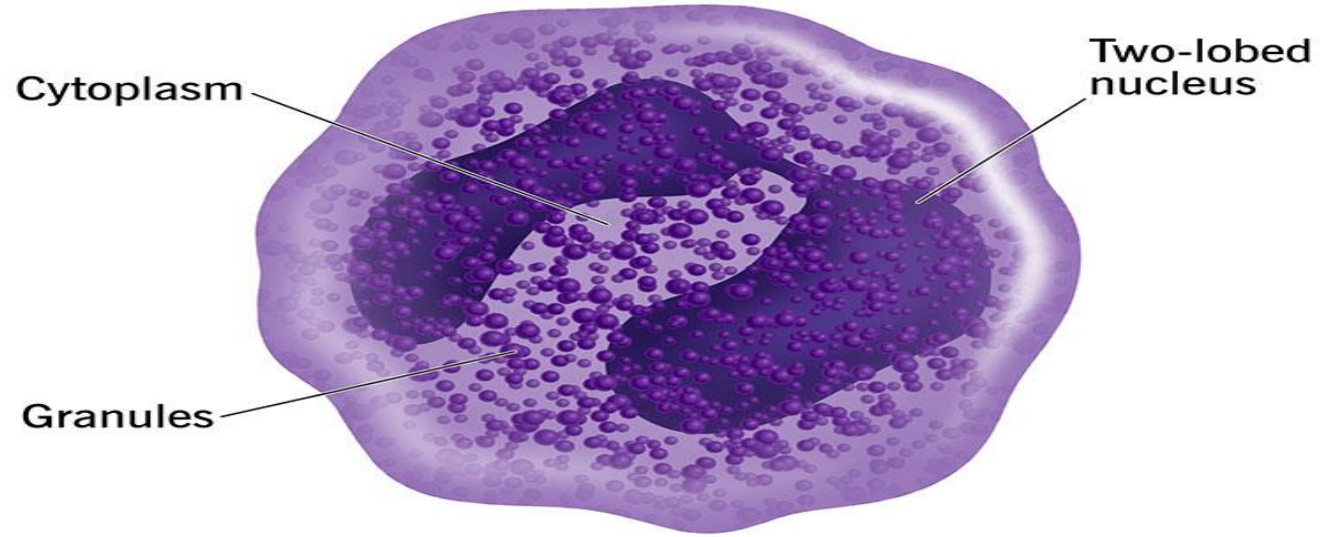
Cell Type	Count/Microliter	Percentage
Neutrophils	2,000-7,000	40%-70%
Lymphocytes	1,500-4,000	20%-40%
Monocytes	200-800	2%-8%
Eosinophils	40	1%-6%
Basophils	Less than 10	Less than 1%

LEUKOCYTOSIS

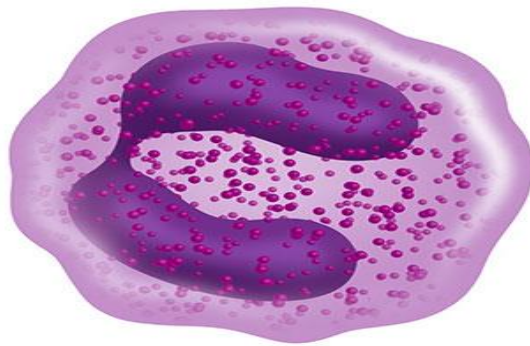
- **Leukocytosis is a white blood cell count above the normal range in the peripheral blood.
> 11000/cmm**



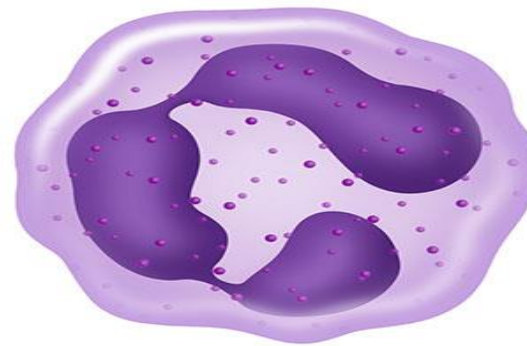
Basophils



Basophil



Eosinophil



Neutrophil

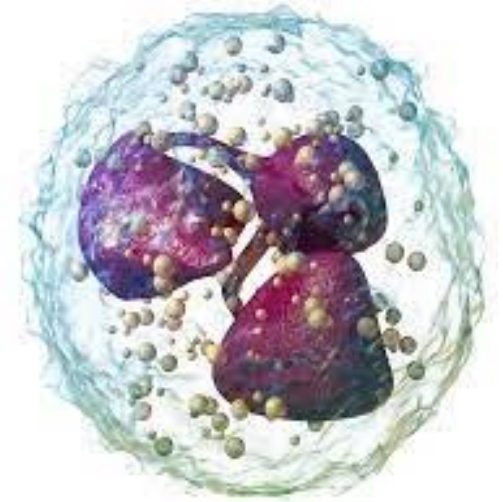
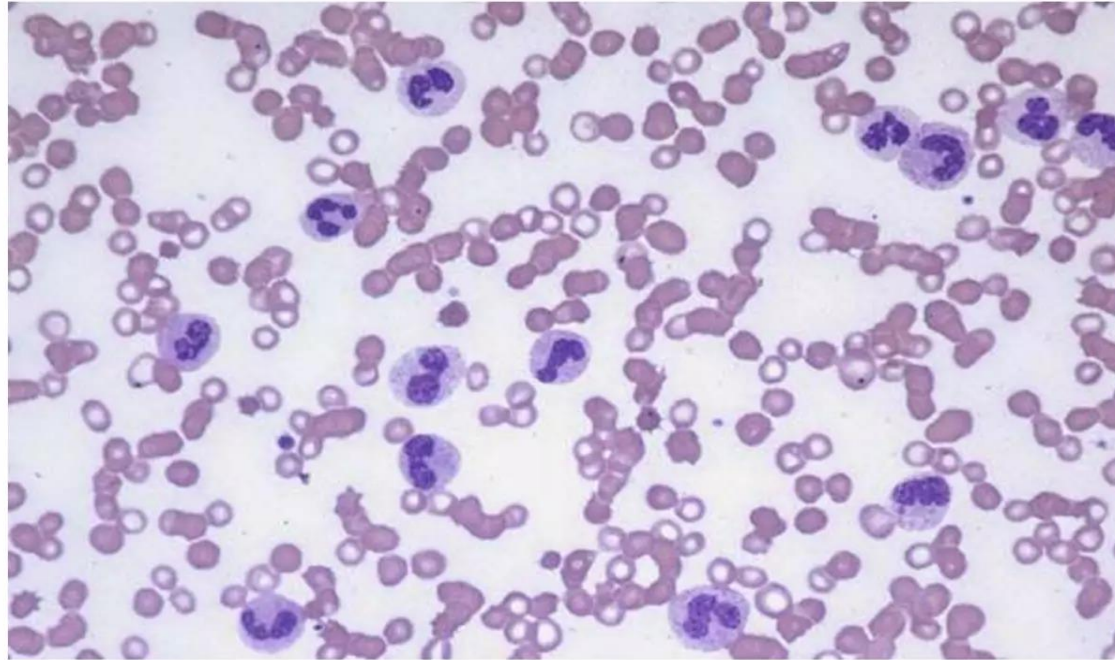
TYPES OF LEUKOCYTOSIS

- There are five types of leukocytosis
 - Neutrophilia
 - Eosinophilia
 - Basophilia
 - Manocytosis
 - lymphocytosis



NEUTROPHILIA

- Neutrophilia (or neutrophil leukocytosis) describes a high number of neutrophil granulocytes.
- Increase in the number of neutrophils and/or its precursors $>7,000/\text{cmm}$



CAUSES

- Malignancy
- Chronic myelogenous leukemia
- Appendicitis
- Splenectomy
- Some parasitic infections
 - Hepatic amoebiasis
 - Pneumocystis carinii

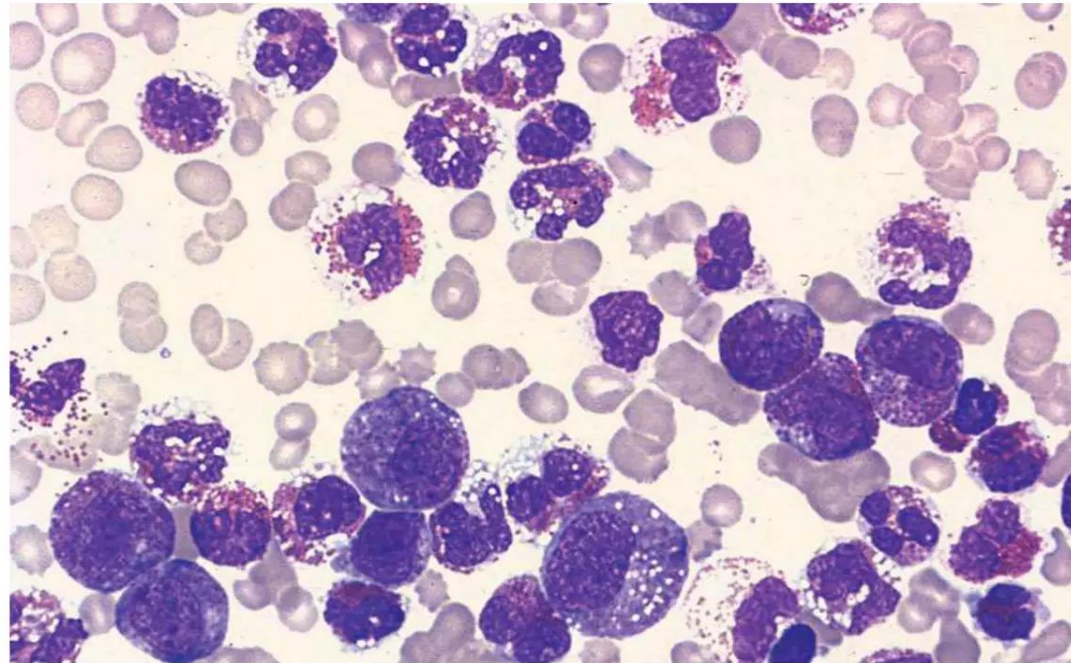




a Clinical picture of a histologically neutrophilic urticarial dermatosis

EOSINOPHELIA

- Eosinophilia is a condition in which the eosinophil count in the peripheral blood exceeds, mean $> 400/\text{cmm}$



CAUSES

- Allergy
- Tumors
- Infections
- Malignancy
- Skin disorder
- GIT disorders
- Hypereosinophilic syndrome
- Parasitic and fungal diseases
- Endocrine disorders
- Autoimmune diseases



CLINICAL MANIFESTATION



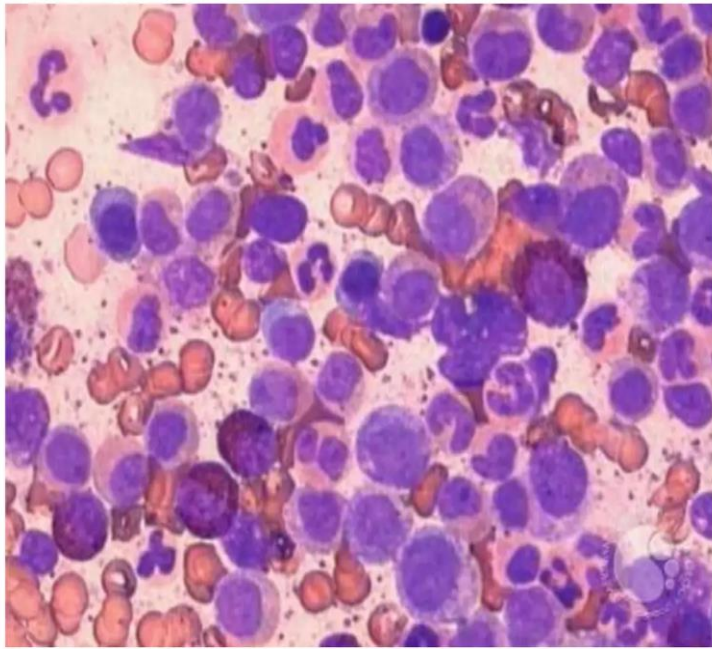
Spectrum of cutaneous and soft tissue manifestations observed in patients with CD3⁻CD4⁺ T cell associated eosinophilia



A drug-induced hypersensitivity syndrome with eosinophilia

BASOPHILIA

- Basophilia is a condition where the basophil quantity is abnormally elevated $> 100/\text{cmm}$ in peripheral blood.



Basophils are a type of white blood cell that works closely with your immune system to defend your body from allergens, pathogens and parasites. Basophils release enzymes to improve blood flow and prevent blood clots.

Histamine enlarges your blood vessels to improve blood flow and heal the affected area. physical symptoms of an allergic reaction like itchy skin, a runny nose and watery eyes.

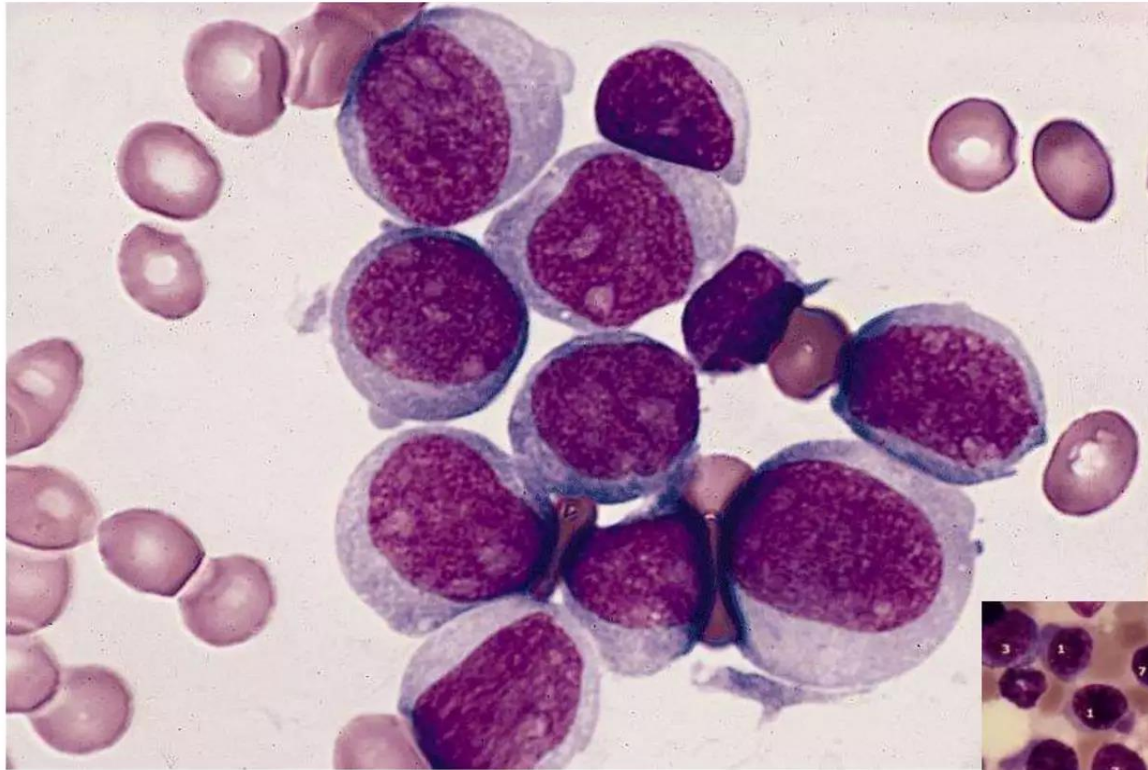
Heparin is an enzyme that prevents blood from clotting too quickly.

CAUSES

- Myeloproliferative Neoplasms (MPN)
- Carcinoma
- Lymphoma
- Allergy
- Inflammatory Conditions
- Infections
 - Influenza
 - Chickenpox
 - Tuberculosis
 - Smallpox
- Iron Deficiency
- Endocrinopathy

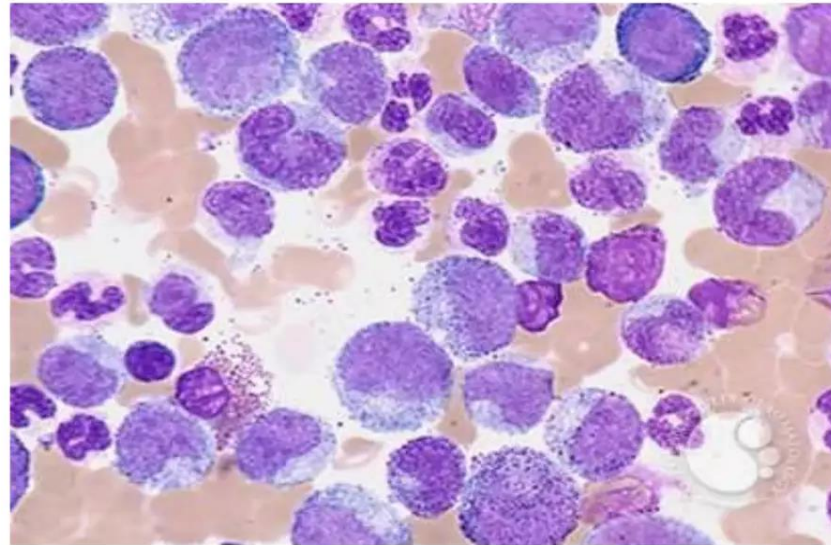


MICROSCOPIC APPEARANCE



MANOCYTOSIS

- **Monocytosis** is an increase in the number of monocytes circulating in the blood. In humans, 800/cmm is regarded as at the upper limit of normal; monocyte counts above this level ($> 800/\text{cmm}$) are regarded as monocytosis.

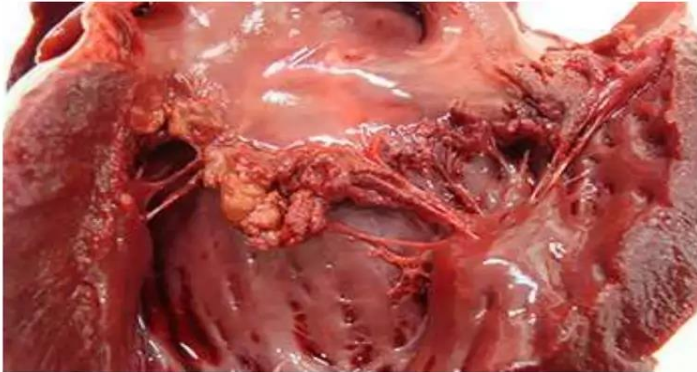


CAUSES

- Bacterial infections
 - Tuberculosis
 - Brucellosis
 - Listeriosis
 - Endocarditis
 - Syphilis
- Viral infection
 - Kala azar
 - Malaria
 - Rocky MSF
- Monocytic & myelomonocytic leukaemia
- Hodgkin's disease
- Autoimmune disease



CLINICAL MANIFESTATION

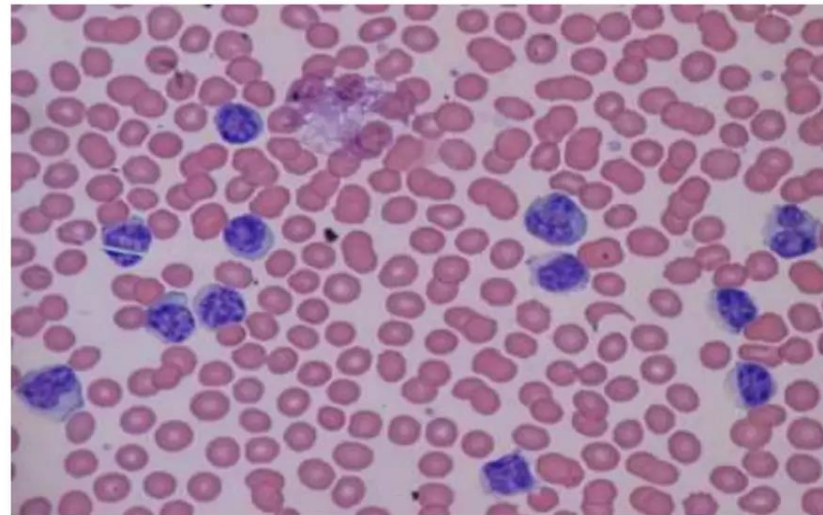


Endocarditis, rocky mountain syndrom, Hodgkin's syndrom



LYMPHOCYTOSIS

- **Lymphocytosis** is an increase in the number or proportion of lymphocytes in the blood. In adults, absolute lymphocytosis is present when the absolute lymphocyte count is $> 4000/\text{cmm}$, in children $> 7000/\text{cmm}$, in infant $> 9000/\text{cmm}$.

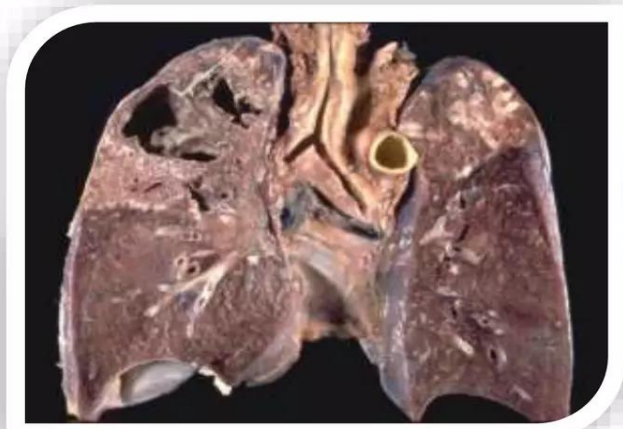


CAUSES

- Acute viral infection
 - Mononucleosis
 - Hepatitis
 - Cytomegalo
 - Rubella
 - mumps
- Protozoal infection
 - Toxoplasmosis
 - American trypanosomiasis
- Bacterial infection
 - Tuberculosis
- Chronic and acute lymphocytic leukemia
- Splenomegaly
- Post splenoectomy



CLINICAL MANIFESTATION



American trypanosomiasis, Molluscum contagiosum, Tuberculosis, Splenomegaly

