

Differential leukocyte (WBC) count

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■ Differential leukocyte (WBC) count

- The (**white blood cell** differential count) determines the number (or the percentage) of each type of white blood cell, present in the blood
- They are **neutrophils**, **lymphocytes**, **monocytes**, **eosinophils** and **basophils**.
- The biological functions of WBCs include: defense and protection against microbial infections or any foreign substances, and the production of immunoglobulins.

Materials

1. 2 ordinary glass slides (one used as spreader)
2. Leishman or geimsa stain
3. Distilled water
4. Cedar oil
5. lancet, spirit



Reporting a Differential Count

**Ways to
report the
values**

By relative % of each WBC type

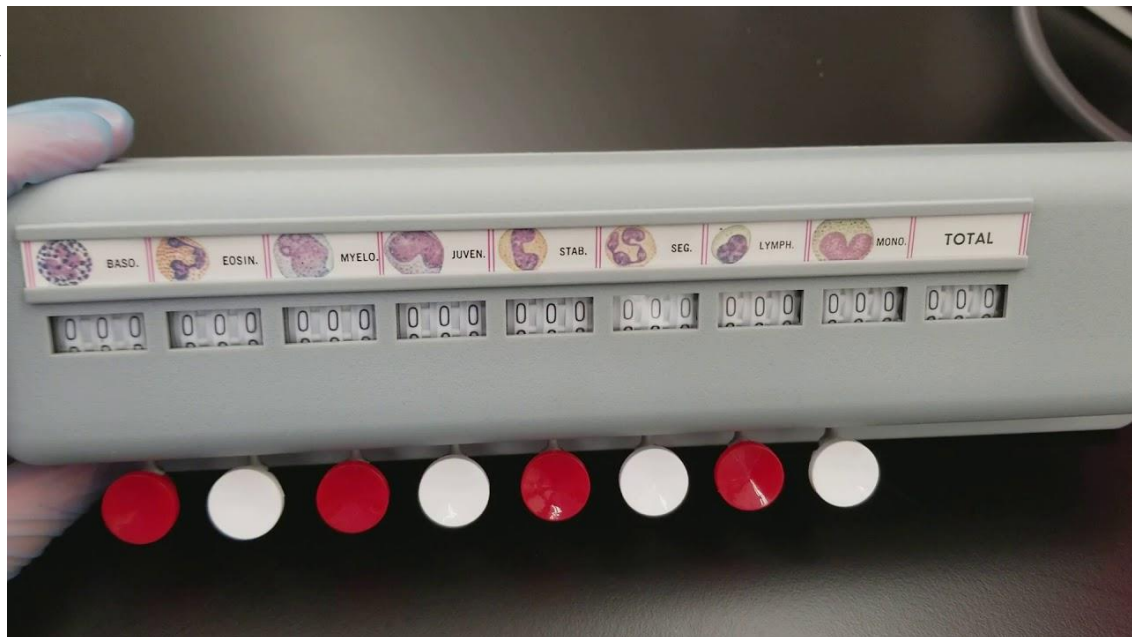
By **absolute** number of each WBC type
(more CORRECT)

(% of each cell type **x** total WBC number)

The procedure

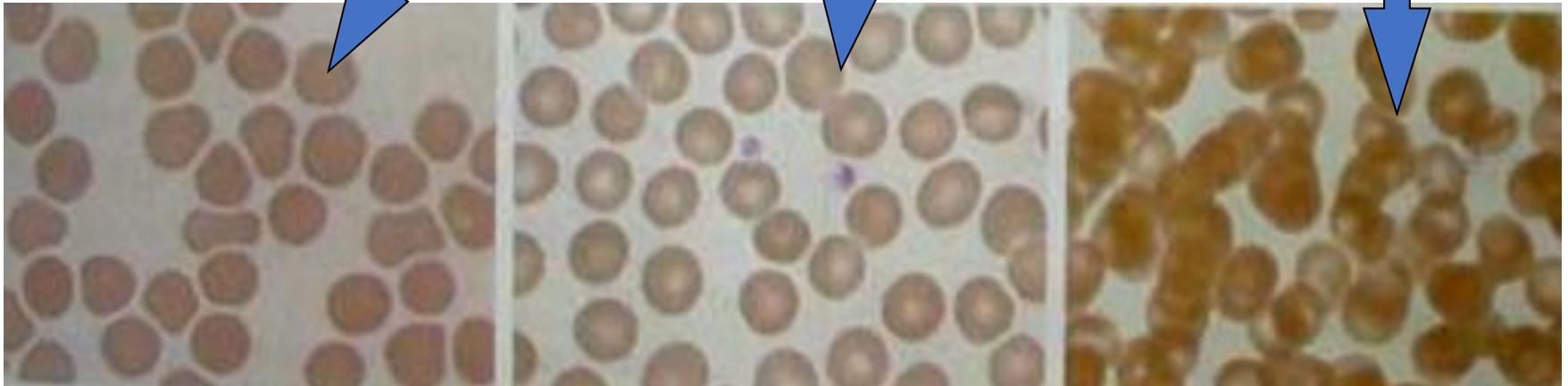
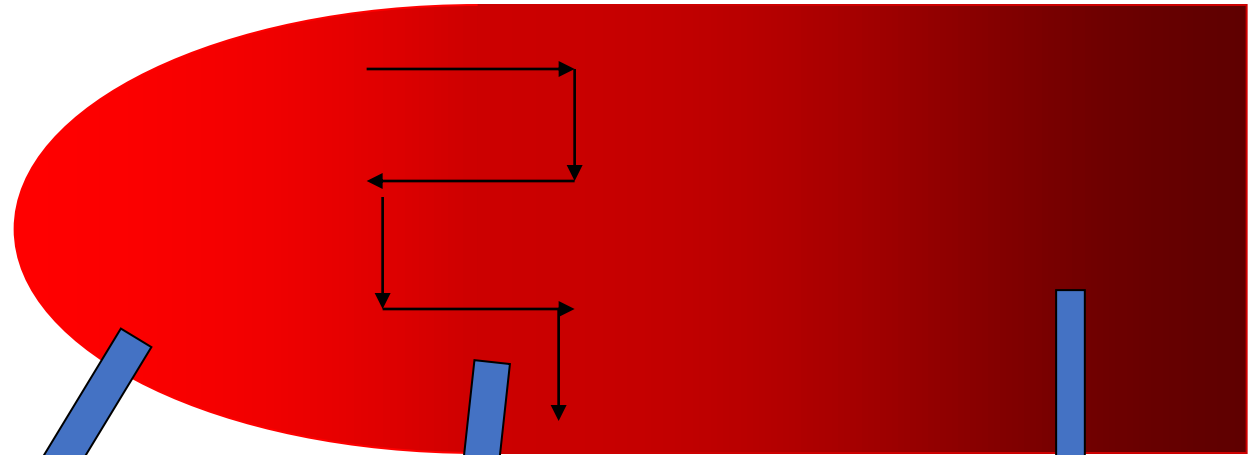
1. **Prepare** 2 clean slides, put a small drop of blood from the finger on one end of the clean and dry slide.
2. **Put** the slide on the surface of your bench.
3. **Apply** the edge of the 2nd slide to drop of the blood (angle 45), allow blood to **spread** along the edge of the spreader
4. **Move** the spreader slide slowly to make a blood film.

- Dry the blood film and Cover the blood film with leishman or Geimsa stain (leave for **2 min.**)
 - Note → Dilute (not wash) the stain with distilled water (leave it for **10 min**).
 - Wash the stain of the slide with D.W and dry it.
- Apply a drop of (*cider oil*) on one end of the blood film & using power **100×** objective lens examines your slide and start counting WBC



Counting direction:

Observe one field and record the number of WBC according to the different type then turn to another field in a zigzag direction
*avoid repeat or miss some cells



- Prepare a table & label it with the 5 different types of WBC
- Count a total of 100 WBC
- Find the percentage of each type

Calculation

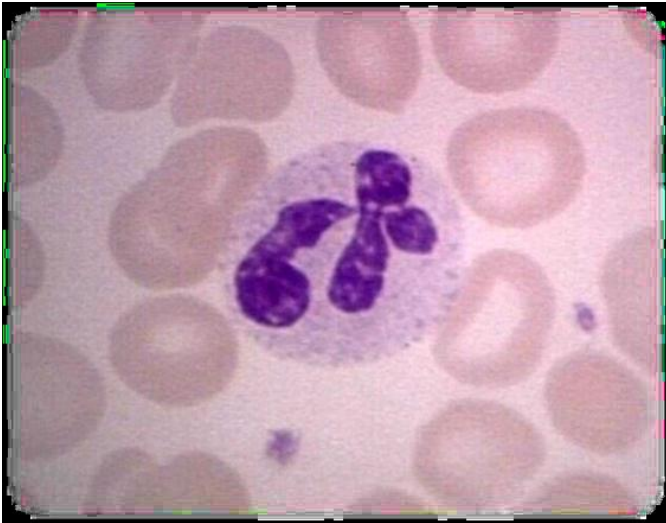
N	E	B	M	L

Neutrophils



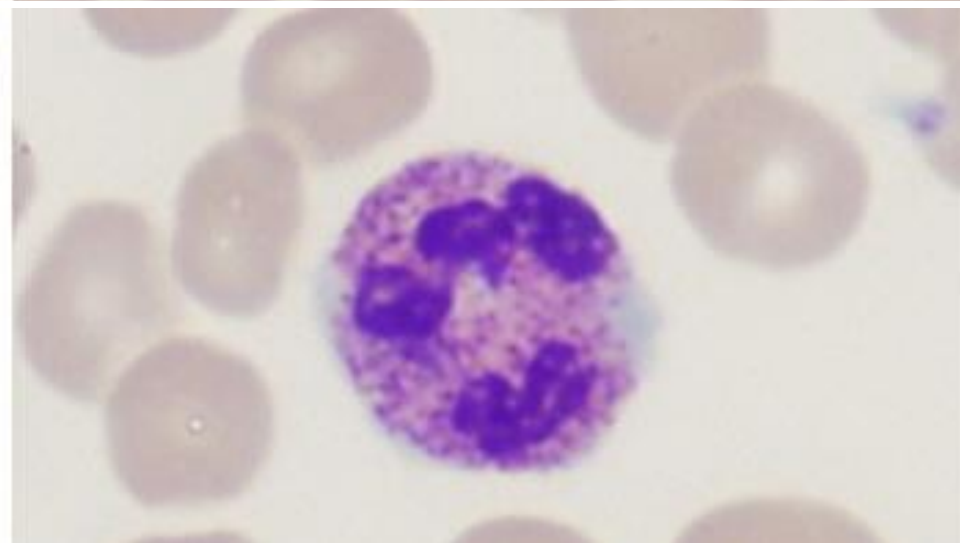
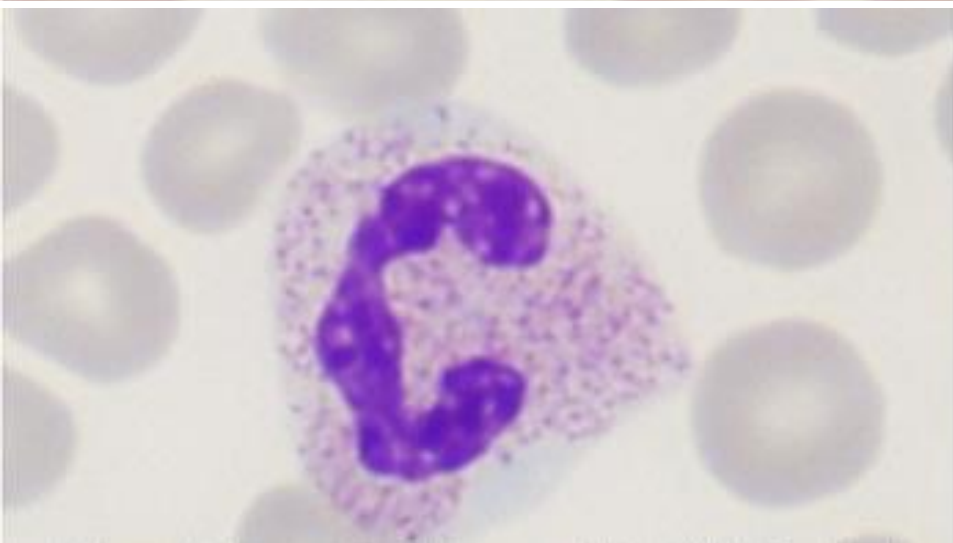
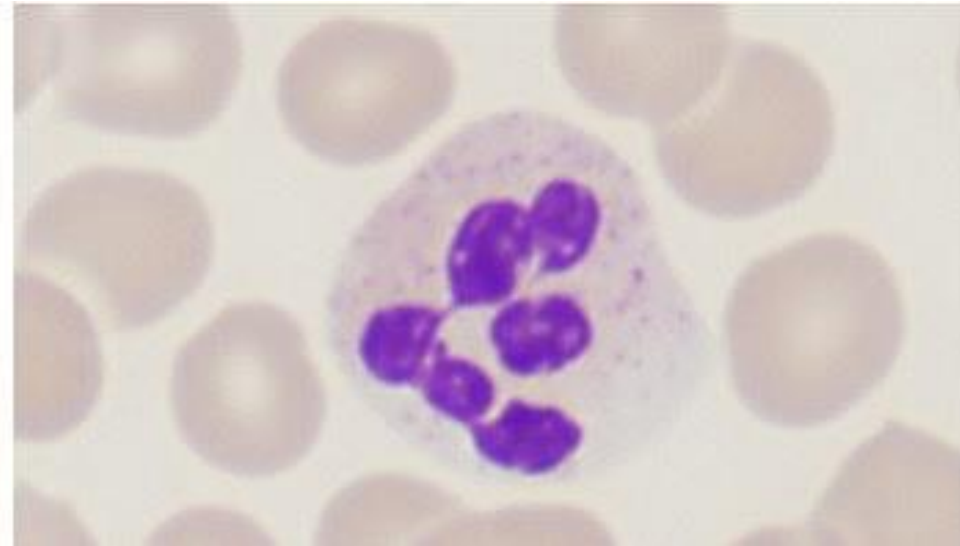
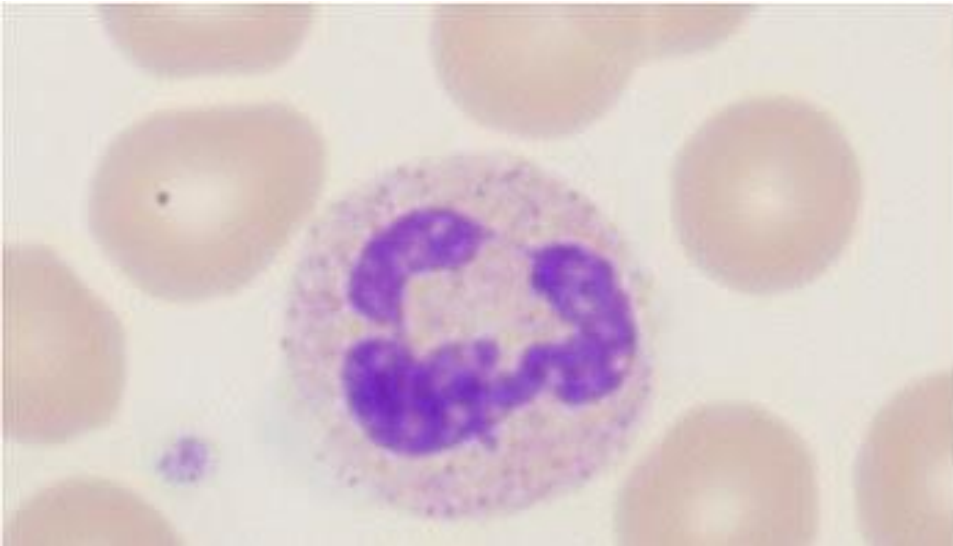
- **Cytoplasm:** pink and Granular

• **Nucleus:** dark purple blue dense chromatin, 2-5 lobes

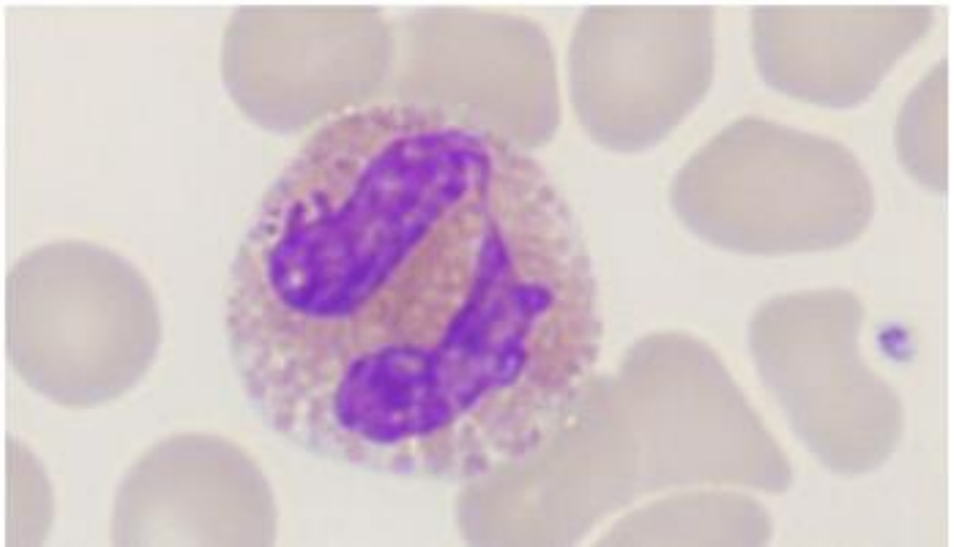
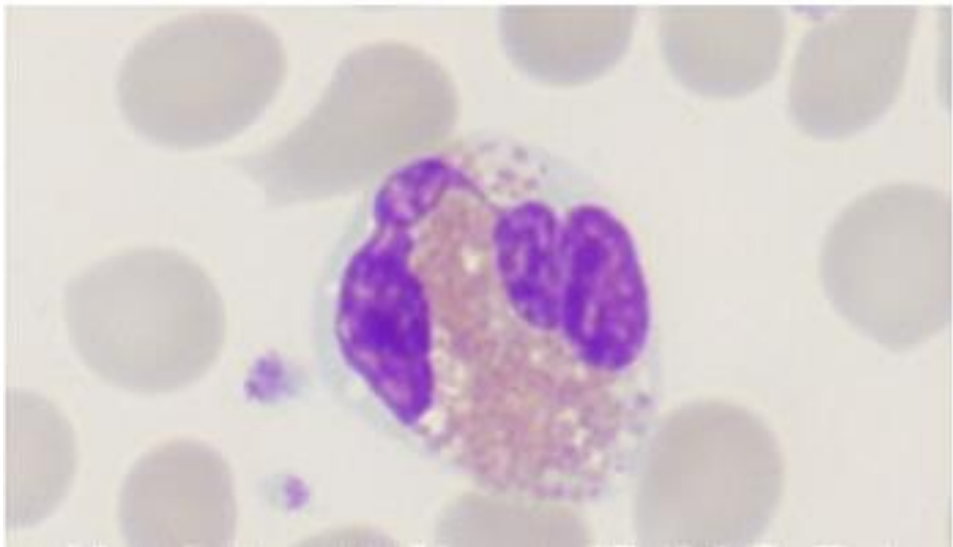
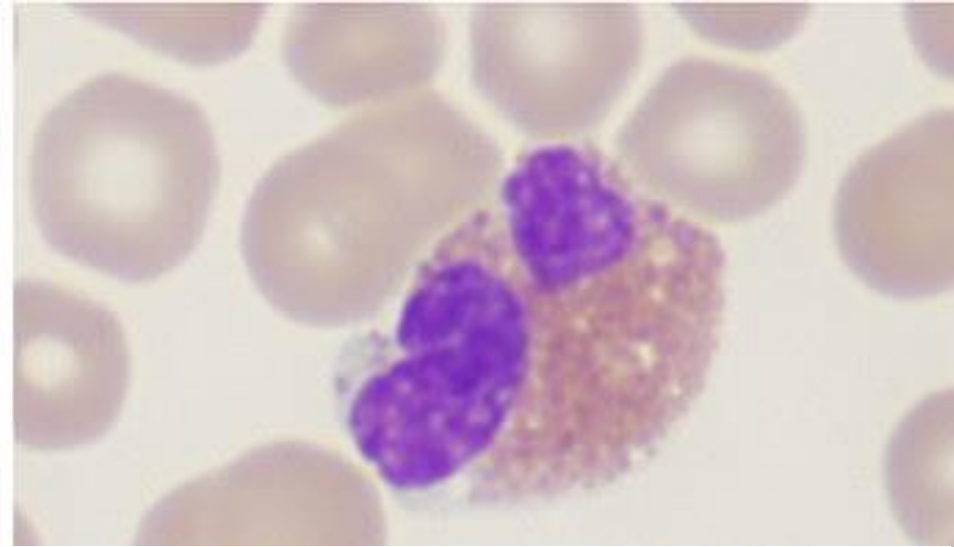
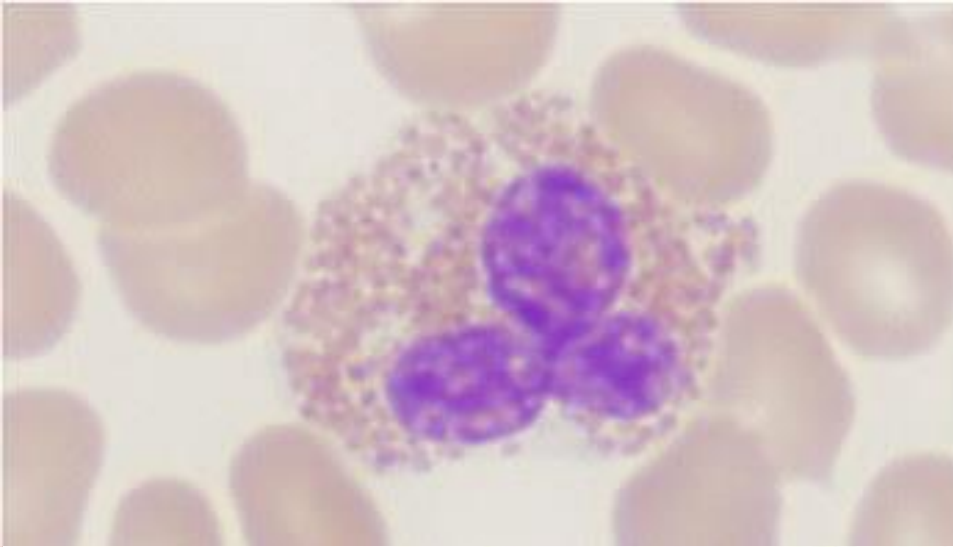


mature neutrophil usually having (3-5) lobes.

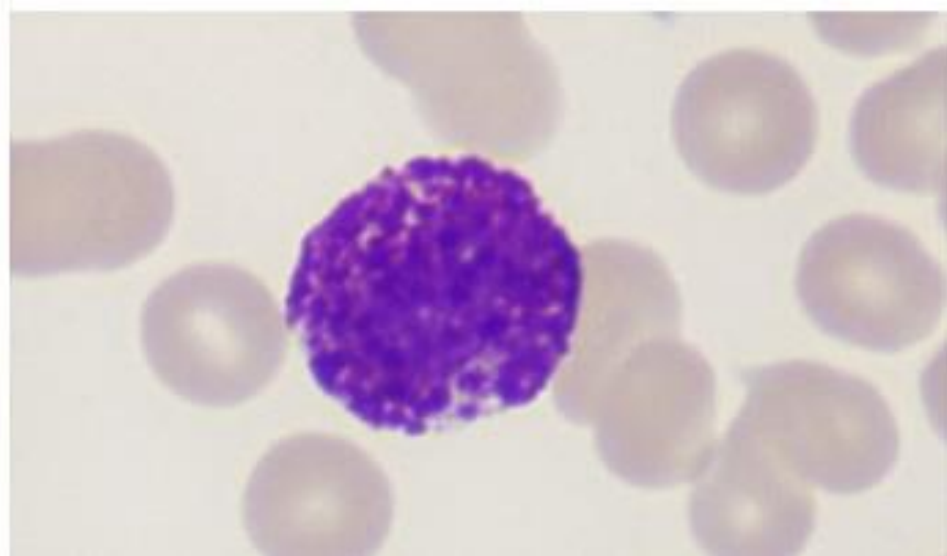
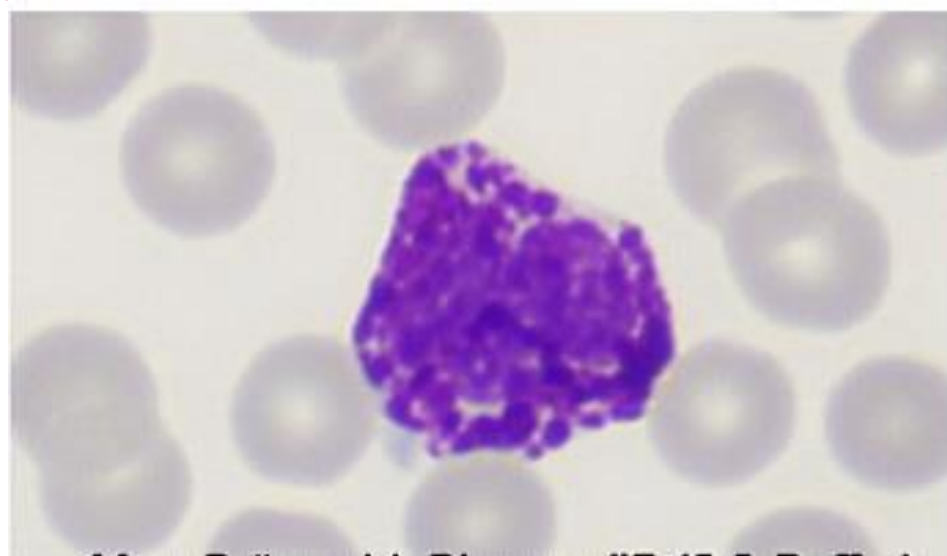
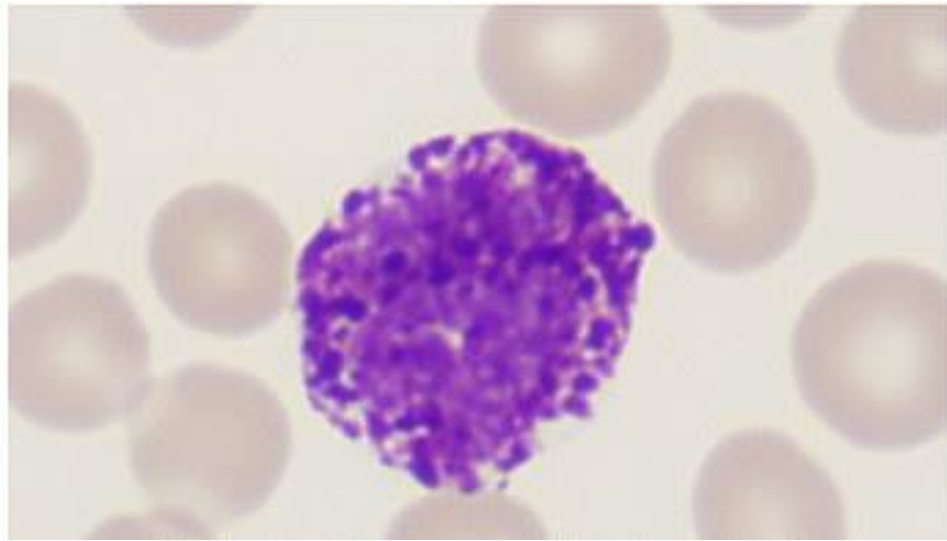
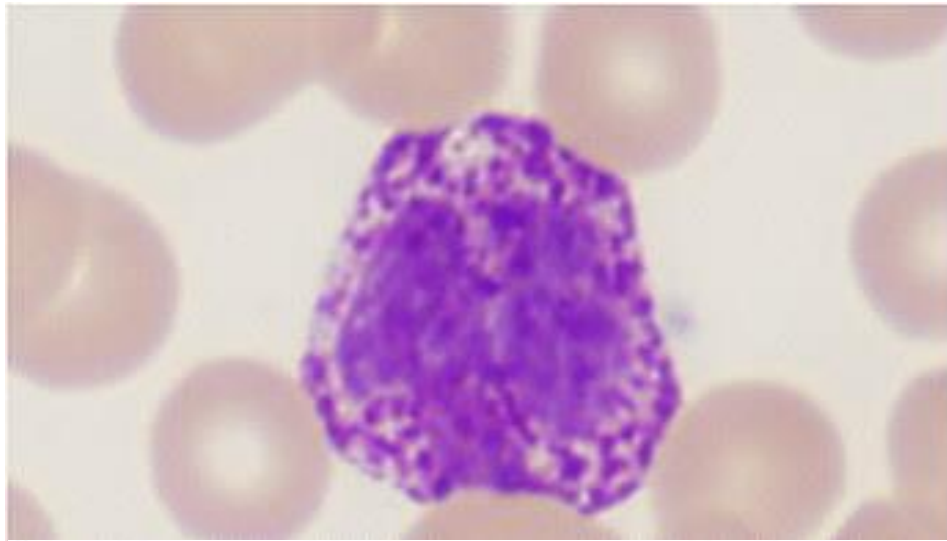
neutrophil



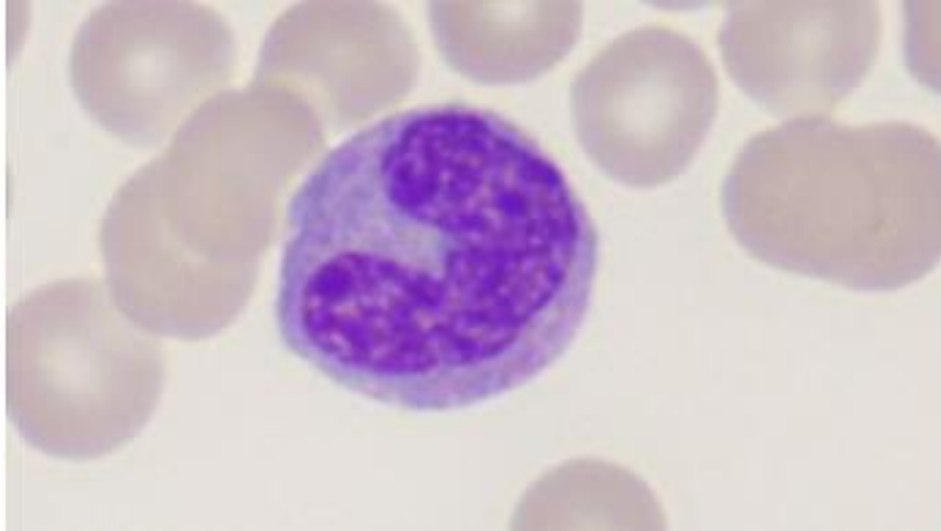
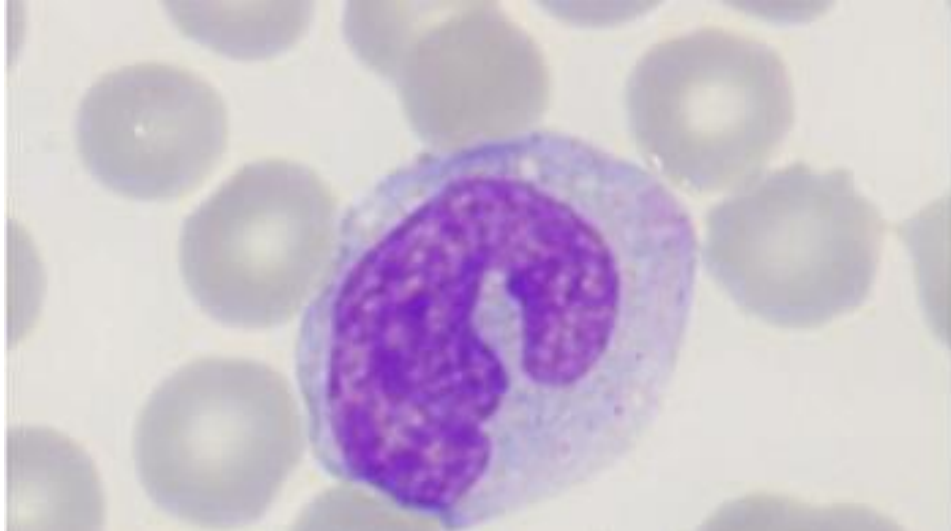
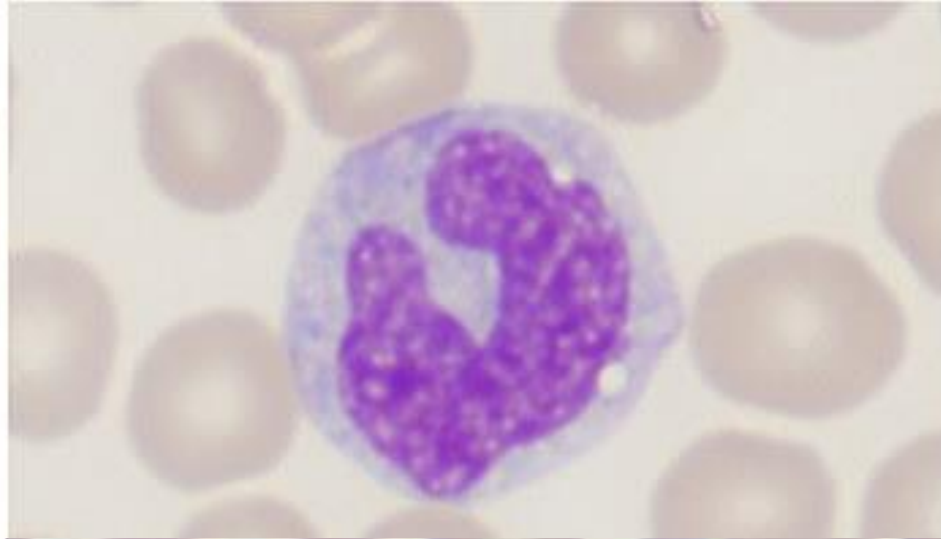
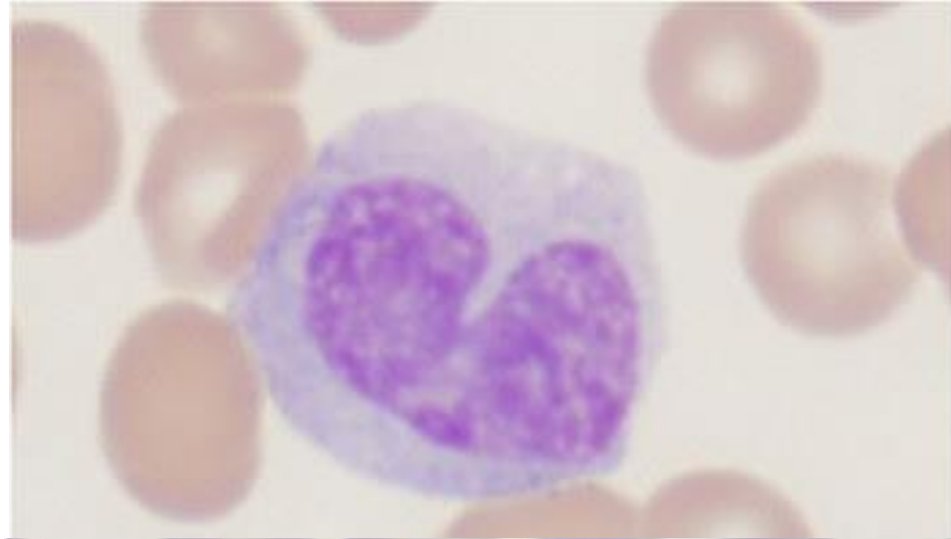
Eosinophil



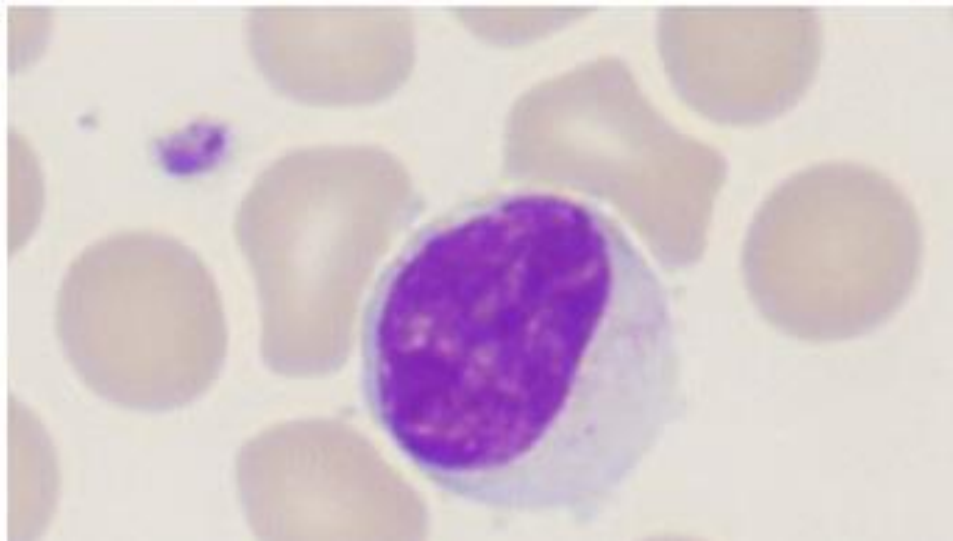
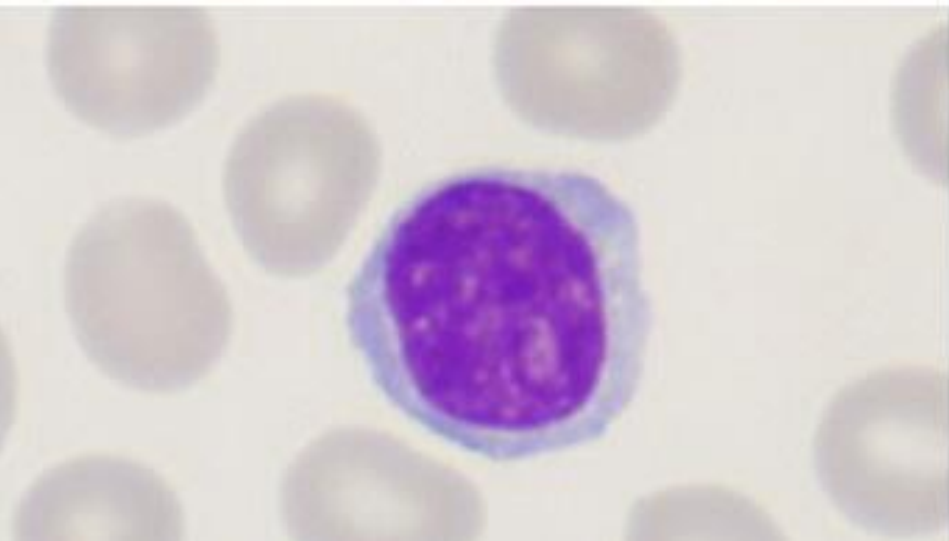
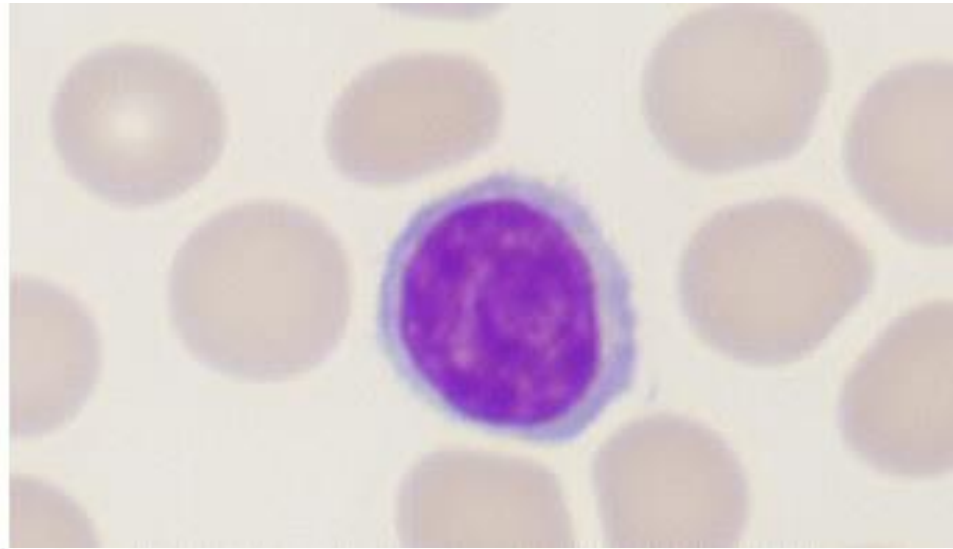
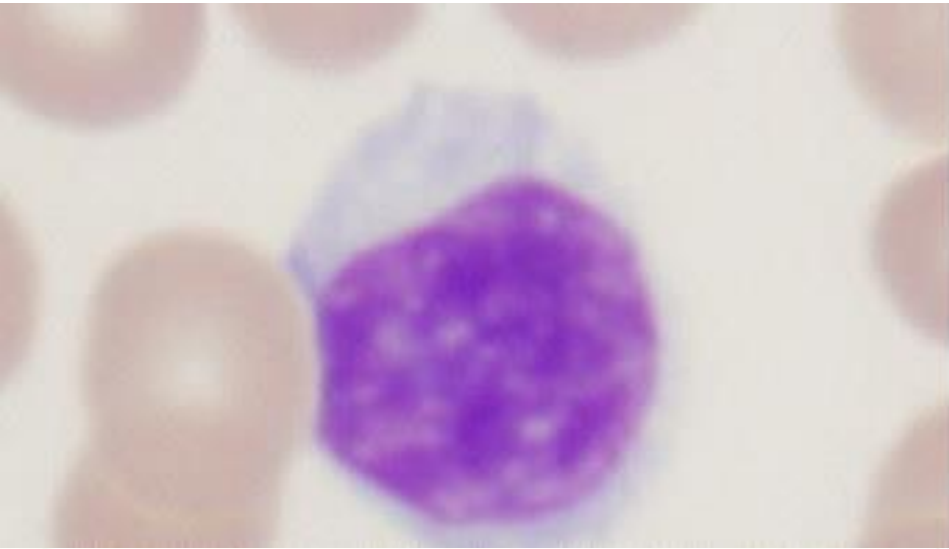
Basophil



Monocyte



Lymphocyte



Differential count: DLC

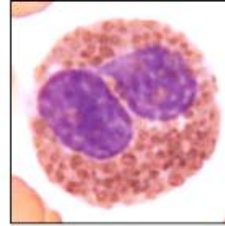
Neutrophils: 62-68%

Eosinophils: 1-4%

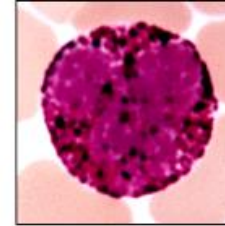
Basophils: 0-1%

Monocytes: 4-7%

Lymphocytes: 25-30%



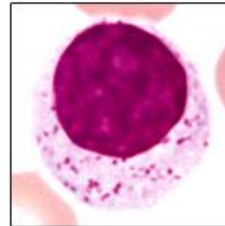
(a) Eosinophil



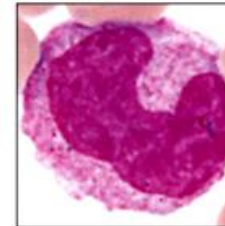
(b) Basophil



(c) Neutrophil



(d) Small lymphocyte

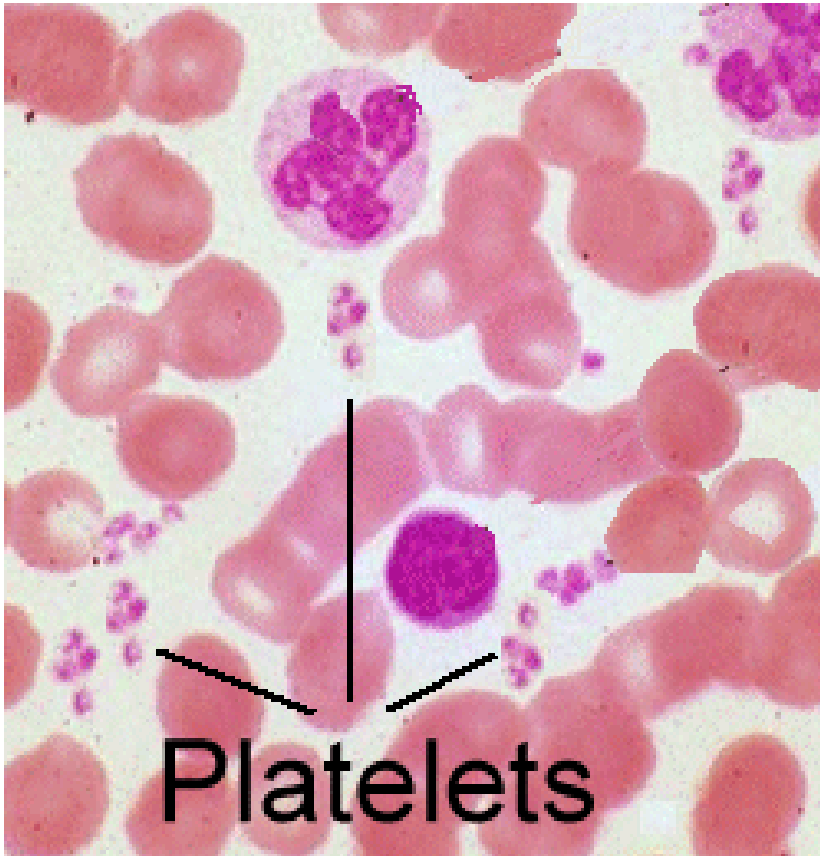


(e) Monocyte

All **LM** 1420x

19.07

Cell Type	Birth	1 mo	6 yr	14 yr
Total WBC x 10³ /μL	10-26	5-19.5	4.3-13.5	4.5-11.0
Neutrophils %	37-57	25-35	45-55	50-65
Lymphocyte %	25-35	50-65	35-45	30-40
Monocyte %	3-9	2.5-7.5	0-8	0-10
Eosinophil %	1-3	1-4	1-4	0-4
Basophil %	0-1	0-1	0-1	0-1



- **Leukocytosis**

- Leukocytosis is an **increase** in the number of white blood cells. It is caused by:

- **Chronic** infections
- **Inflammation**
- **Leukemia**
- **Allergy.**

- **Leukopenia**

- Leukopenia is a **decreased** white blood cell count. It is caused by:

- **Chemotherapy**
- **Radiation** therapy
- Some types of **cancer**
- **Malaria**
- **Tuberculosis**

• **Neutrophilia**

- Neutrophilia is an abnormal **increase** in the number of neutrophils. Some of its causes are:
 - **Acute** bacterial infection,
 - Chronic granulocytic **leukemia**
 - **Inflammation**
 - **Corticosteroid** therapy

• **Eosinophilia**

- Eosinophilia is an abnormal **increase** in the number of eosinophils. It is caused by:
 - **Allergies**
 - **Parasitic** infections
 - **Drug** sensitivity
 - **Skin** diseases.

• Basophilia

• An abnormal increase in the number of basophils is called basophilia. It occurs during:

- Chronic granulocytic **leukemia**
- Delayed **hypersensitivity** reaction
- **Hypothyroidism**
- **Nephrosis**
- Ulcerative **colitis**.

• Lymphocytosis

• An abnormal increase in the number of lymphocytes. It is caused by:

- **Viral** infections (infectious mononucleosis, hepatitis, cytomegalovirus)
- **Lymphoproliferative** disorders (chronic lymphocytic leukemia, lymphoma)

• Monocytosis

• Abnormal increase in the number of monocytes. It is caused by:

- Chronic myelocytic **leukemia**
- **Parasitic** infections
- **T.B.**
- Subacute bacterial **endocarditis**
- **Syphilis**