BLOOD PRACTICAL-2

TLC & DLC

Total and Differential Leucocytic Count

- Very important
- Extra information
- Terms

عن أبي هريرة- رضي الله عنه- قال: كان رسول الله - صلى الله عليه وسلم - يقول: «**اللّهمّ انفعني بما علّمتني، وعلّمني ما ينفعني، وزدني علما، والحمد لله على كلّ حال**» رواه الترمذي

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OBJECTIVES

To **practice the procedure** for differential leucocyte counting.

To know the **normal values** expected for the differential white cell count.

To understand the use of the differential white cell count in the **diagnosis of disease** processes.

To be able to identify the different **types of leucocytes under the microscope**

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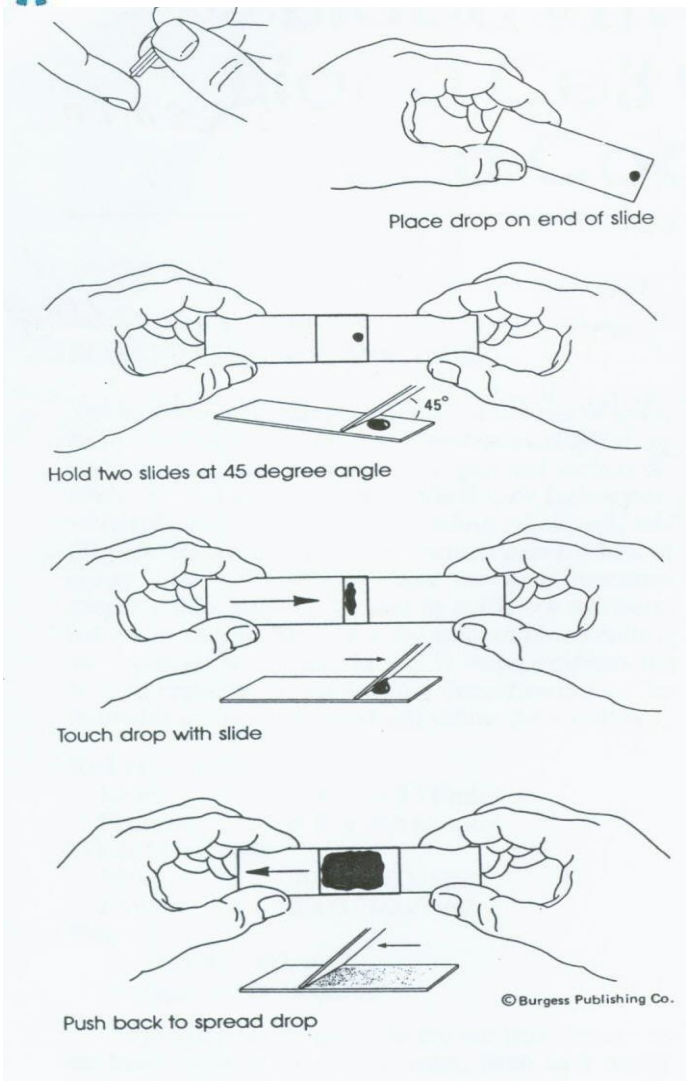
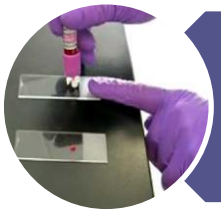
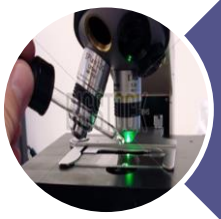
Reagents, apparatus and Procedure





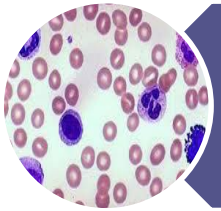
Using various dyes + Microscope slides.

- Prepare blood film and stain it with Wright's stain

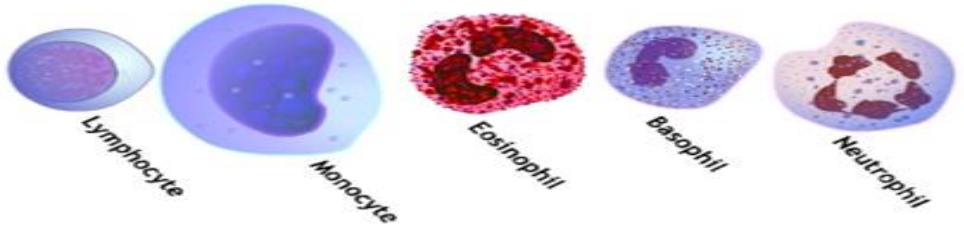


Using a microscope with an oil immersion objectives + Mineral or cedar oil

- Examine the slide under the oil immersion objective lens of the microscope



- Identify the different leucocytes (count about 100 cells) according to their histological characteristics.



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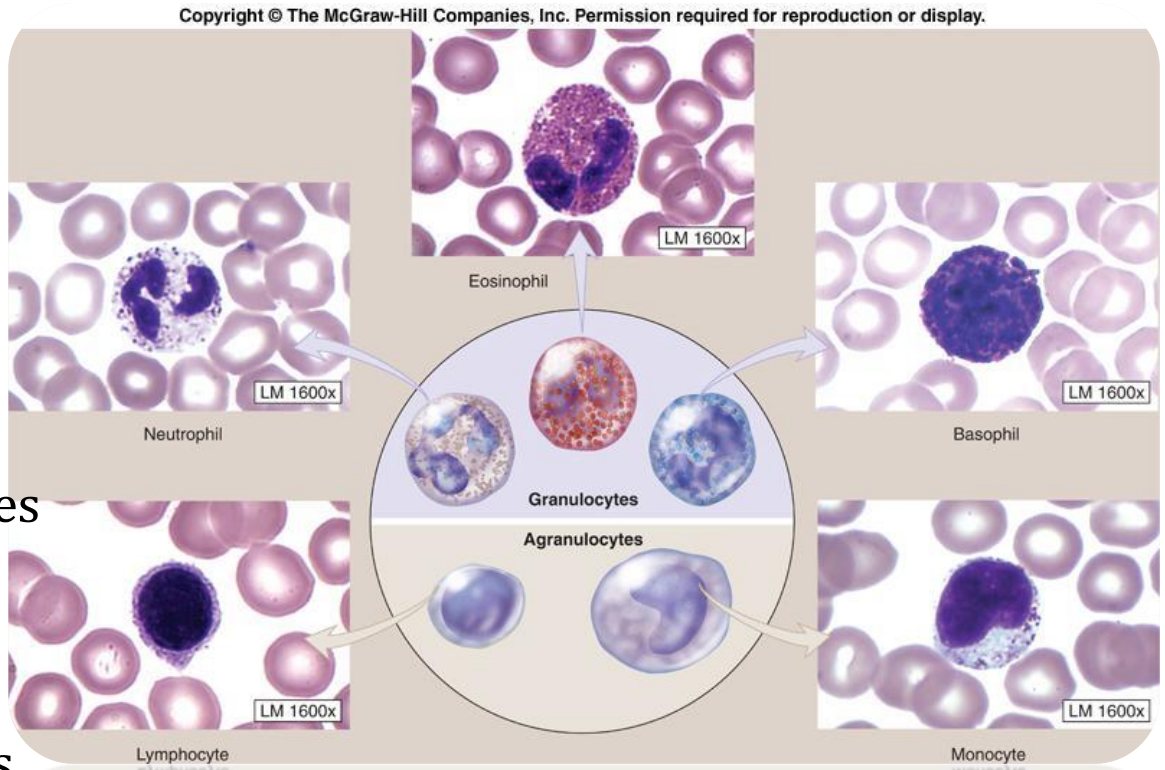
Classification of WBCs

- **WBCs**
  - Granular
    - Neutrophils
    - Eosinophils
    - Basophils
  - Agranular
    - Lymphocytes
    - Monocytes



you have to know how to differentiate between cells under the microscope

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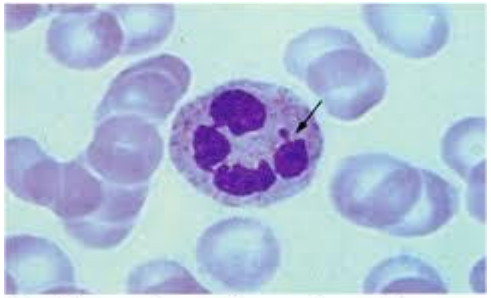
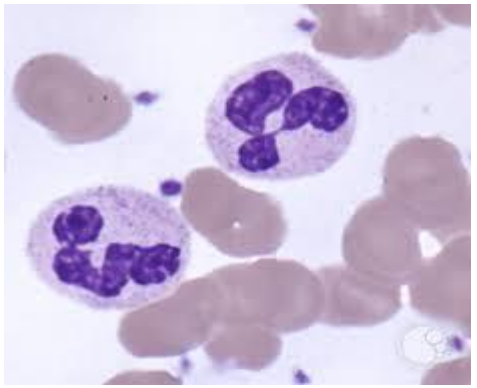
1- Neutrophils

- Most common type of white blood cells (50-70%), the normal percentage value will increase in **acute bacterial or fungal infections** (pyogenic illness).
  Pyogenic= involving the production of pus.
- They have small cytoplasmic granules and a complex, multi-lobed nucleus (from 2 to 5 lobes).
- Their granules take a neutral (purple or pink) color with various stains such as Wright's stain.



Erythrocytes and a neutrophil.
Wright's (Oil)



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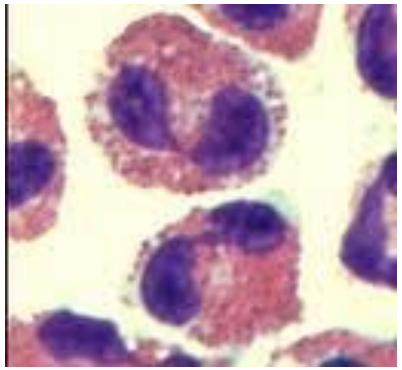
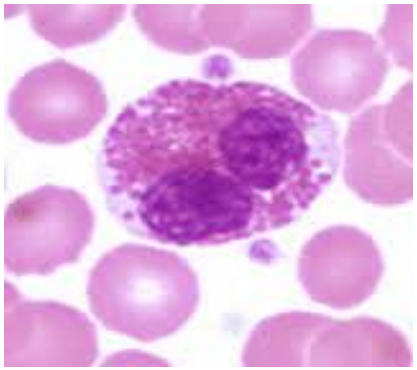
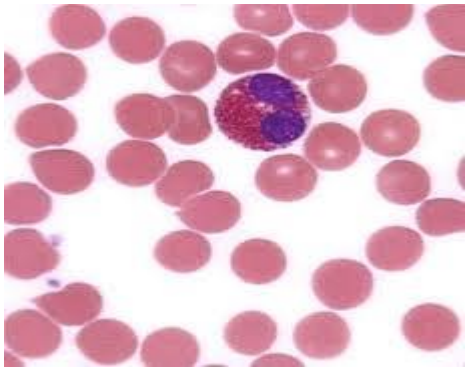
2- Eosinophils

- Less common in the blood stream (1-3%), the normal percentage will increase in **parasitic infections** and **allergies**.
- They are characterized by a dumbbell-shaped nucleus (bi-lobed) and large, prominent, red (eosinophilic) granules .







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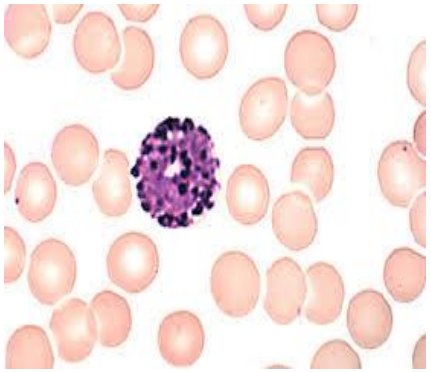
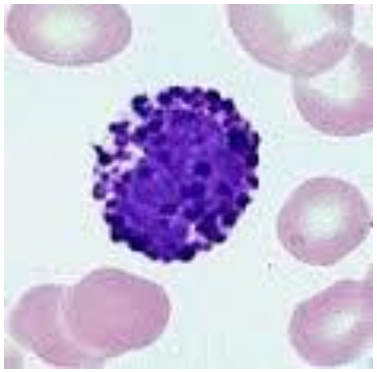
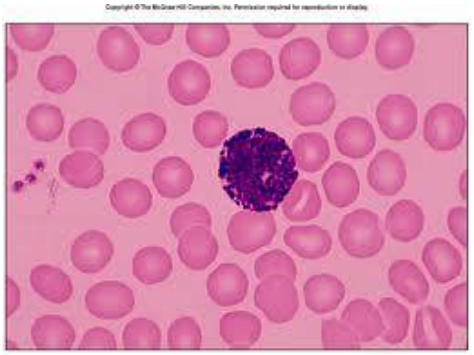
3- Basophils

- The rarest of all white blood cells (0.4-1%), the normal percentage will increase in **allergies and malignancies**.
- It is a large cell filled with prominent blue (basophilic) granules. These large granules contain **heparin** , an anticoagulant , and **histamine** which increases the permeability of capillary walls.
- The nucleus is somewhat hidden behind these large granules.







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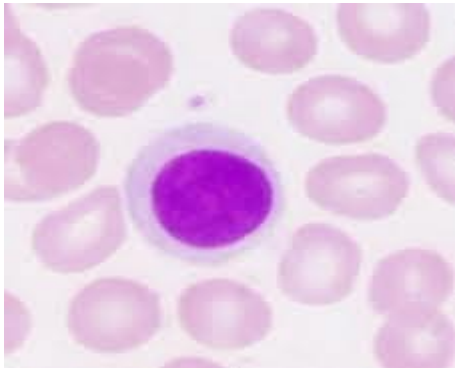
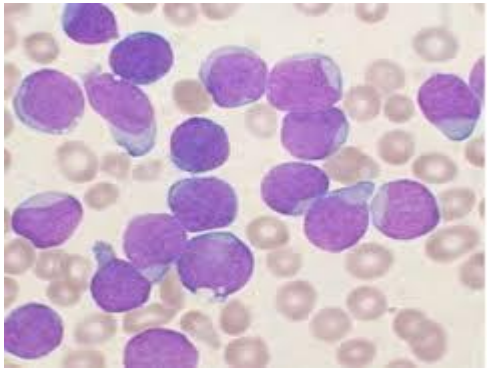
4- Lymphocytes

- About 25-35% of the white blood cells, the normal percentage will increase in **acute viral infections** (infectious mononucleosis) and **malignancies** .
- Small, spherical cells with large, round nucleus
- The cytoplasm does not contain any granules.
- The nucleus occupies most of the volume of the cell, leaving only a thin rim of the cytoplasm around it .

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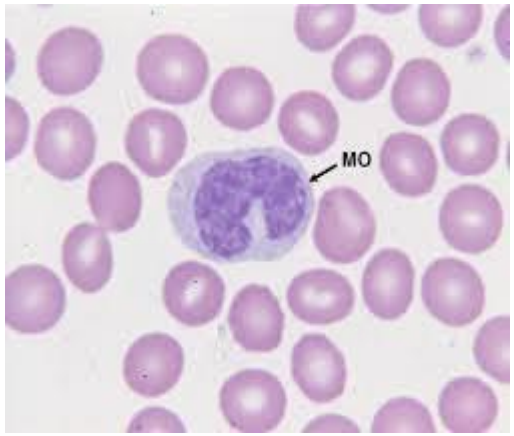
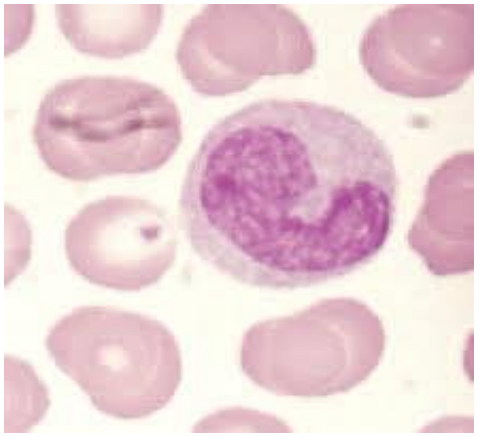
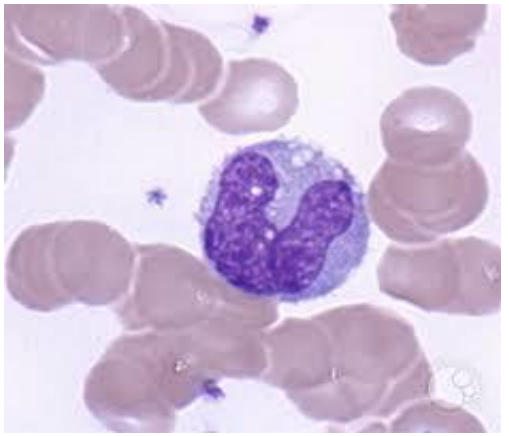
5- Monocytes

- About 4-6% of the white blood cells, the normal percentage will increase in **chronic infections**.
- The largest of the blood cells, the cytoplasm has no granules
- The nucleus is large and horseshoe-shaped (kidney-like shaped) .







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Mind map

WBCs

Clinical Application

NEUTROPHILS ➔ will increase in acute bacterial or fungal infections(pyogenic illness).

EOSINOPHILS ➔ will increases in parasitic infections and allergies.

LYMPHOCYTE ➔will increase in acute viral infections (infectious mononucleosis) and malignancies ..

BASOPHILS ➔ will increase in allergies and malignancies.

MONOCYTES ➔will increase in chronic infections.

stains are used in the preparation of blood films.

Wright's stain

Leishman's stain

Types

1- Granular

1-neutrophils:
- The most common type.
- Small cytoplasmic granules.
- Complex multilobed nucleus

2-eosinophils.
- Less common type
- Bi-lobed nucleus..

3- basophils.
- the rarest of all types.
- Large cell
- granules filled with heparin (anticoagulant) and histamine.
- Hidden nucleus.

2-Agranular

1-Lymphocytes:
- round nucleus.
- 25%-35% of blood.
- Nucleus occupies most of the cell volume.

2-Monocytes:
- Largest cell of blood cells
- Kidney shape of nucleus.

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Blood element	% of leukocytes	Size µ	Cytoplasmic staining	Nucleus morphology
Erythrocyte	-	7-8	pink, no granules	none
Neutrophil	50-70	10-12	salmon-colored small granules	Segmented, 2-5 lobed
Lymphocyte	25-35	7-8	Light blue, scant amount, no granules	Single large Oval purple
Monocyte	4-6	16-18	Basophilic, no granules	Large, kidney shaped
Eosinophil	1-3	13-14	Bright red coarse granules	Bi-lobed purplish
Basophil	0.4-1	14-15	Large, basophilic granules	Bi-lobed bluish black

*** Regarding size:** just know that monocyte is the biggest and lymphocyte is the smallest
*** Regarding number:** WBCs from highest to lowest percentage"Never let the monkey eat bananas"

Physiology practical team

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Quiz

YouTube

WBC Types and Functions

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