

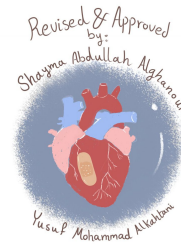


Practical Total and Differential Leukocyte Count (TLC and DLC)

Team Leaders:

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Red: Important
Black: In Male & Female slides
Blue: In male slides
Pink: In female slides
Green: Notes & extra information

Objectives

- To be able to identify the different types of leukocytes under the microscope
- To practice the procedure for differential leukocyte 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.

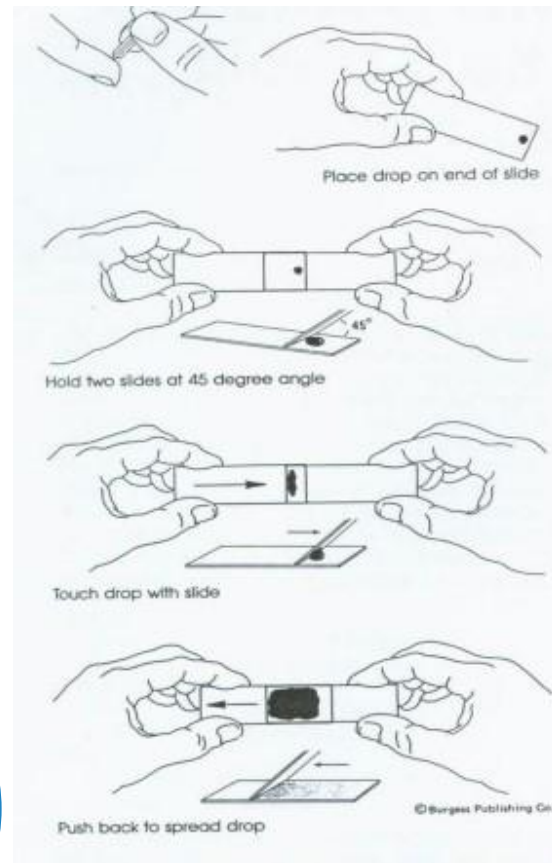
Reagents and apparatus

- A microscope with an oil immersion objectives.
- Mineral or cedar oil
- Various dyes for staining blood films (e.g., Wright's stain and Leishman's stain)
- Microscope slides.

Procedure

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

2- Examine it under the oil immersion objective lens of the microscope and identify the different leukocytes (count about 100 cells).



WBC

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graph TD; WBC[WBC] --> Granular[Granular]; WBC --> Agranular[Agranular]; Granular --> Basophils[Basophils]; Granular --> Eosinophils[Eosinophils]; Granular --> Neutrophils[Neutrophils]; Agranular --> Lymphocytes[Lymphocytes]; Agranular --> Monocytes[Monocytes];
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Granular

Agranular

Basophils

Eosinophils

Neutrophils

Lymphocytes

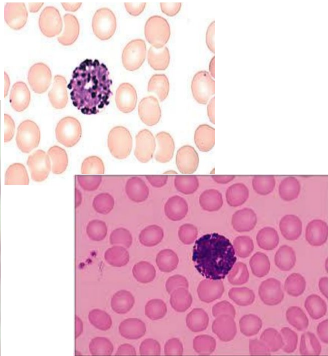
Monocytes

Granular

Contains granules in the cytoplasm

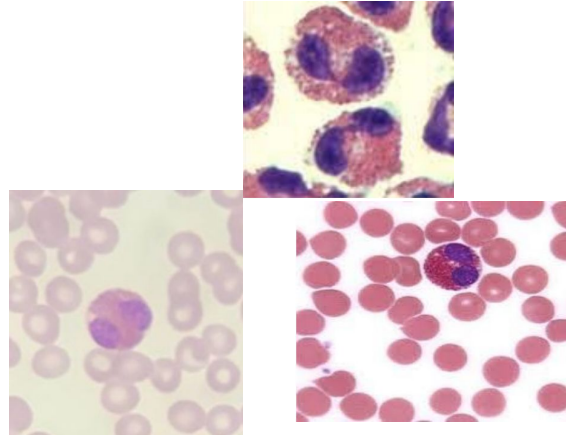
Basophils

- The rarest of all blood cells (0.4- 1%)
- It is a large cell filled with prominent **blue (basophilic) granules**. These large granules contain **heparin** and **histamine**. The nucleus is somewhat hidden behind these large granules.



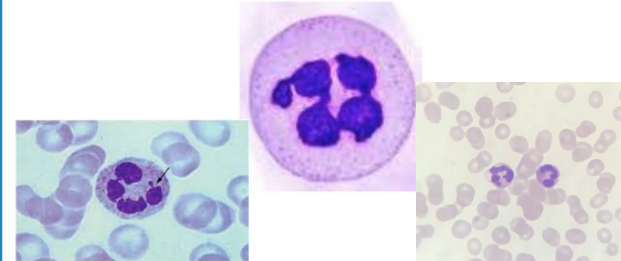
Eosinophils

- **Less common** in the blood stream (1-3%)
- They are characterized by a **dumbbell-shaped nucleus (bilobed)** and large, prominent, **red (eosinophilic) granules**.



Neutrophils

- **Most common type** of blood cells (50-70%)
- They have small cytoplasmic granules and a complex, **multilobed nucleus**.
- Their granules take a **neutral (purple or pink) color** with various stains such as Wright's stain.



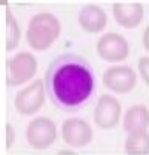
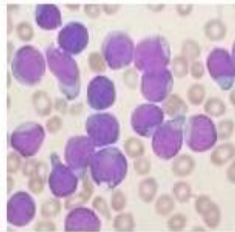
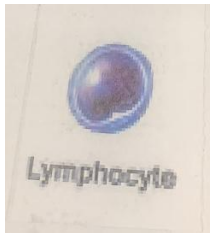
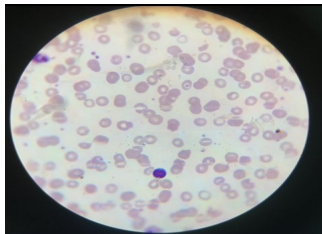
nucleus may be 2 separated segments (lobes) or more (2-5) or unseparated

Agranular

*Contain NO granules in their cytoplasm

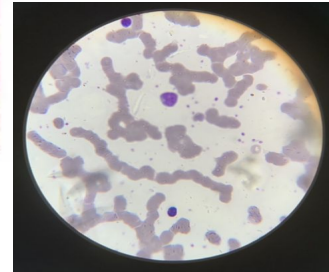
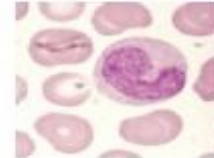
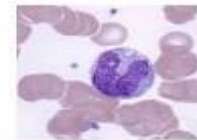
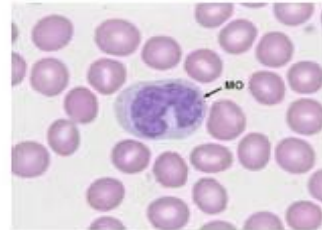
Lymphocytes

- About 25-35% of the blood cells.
- 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.



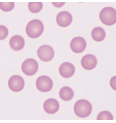
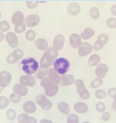
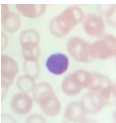
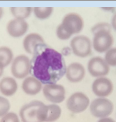
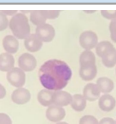
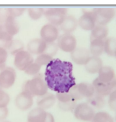
Monocytes

- About 4-6% of the blood cells.
- The largest of the blood cells, the cytoplasm has **no granules**.
The nucleus is large and **kidney-shaped**.



In the blood: monocyte
In the tissue: macrophages



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 Lobes
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	Bilobed purplish
Basophil		0.4 - 1	14- 15	Large, basophilic granules	Bilobed Bluish black

Clinical Application

Differential count provides clues about certain illnesses:

Neutrophilia: pyogenic illness (bacterial and fungal infection).

Eosinophilia: Allergy and parasitic infections.

Basophilia: in allergy and malignancy.
*Because they secrete histamine

Lymphocytosis: viral infections (infectious mononucleosis).

Monocytosis : chronic infections.

QUIZ!

MCQs

Q1: Which of the following is the biggest blood element

A) Lymphocyte

B) Monocytes

C) Basophil

D) Eosinophil

Q2: which of the following is the rarest leukocyte

A) Neutrophil

B) Lymphocyte

C) Basophil

D) Erythrocyte

Q3: The most common agranular cell is

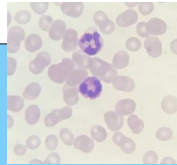
A) Neutrophils

B) Monocytes

C) Macrophages

D) Lymphocytes

Q4 : Identify the following cell



A) Monocytes

B) Lymphocytes

C) Basophils

D) Neutrophils

SAQ

Q1:

Give me two characteristics of lymphocyte

Q2:

Basophils contain And

MCQs key answer :
1) B
2) C
3) D
4) D

SAQ answer key :
1) -round nucleus
-The cytoplasm does not contain any granules.
2) Heparin & histamine

Thank You

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- ▶ يارا الزهراني
- ▶ لمى الأحمدى
- ▶ آلاء السلمي
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