

## Total and Differential Leucocytic Count (TLC and DLC)

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**ADVICE: Cut down on saturated fat**

- ✓ Eating too many foods that are high in saturated fat can raise the level of cholesterol in your blood. This increases your risk of heart disease.

# Objectives

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

## Reagents and apparatus

A microscope with an oil immersion objectives.

Mineral or cedar oil.

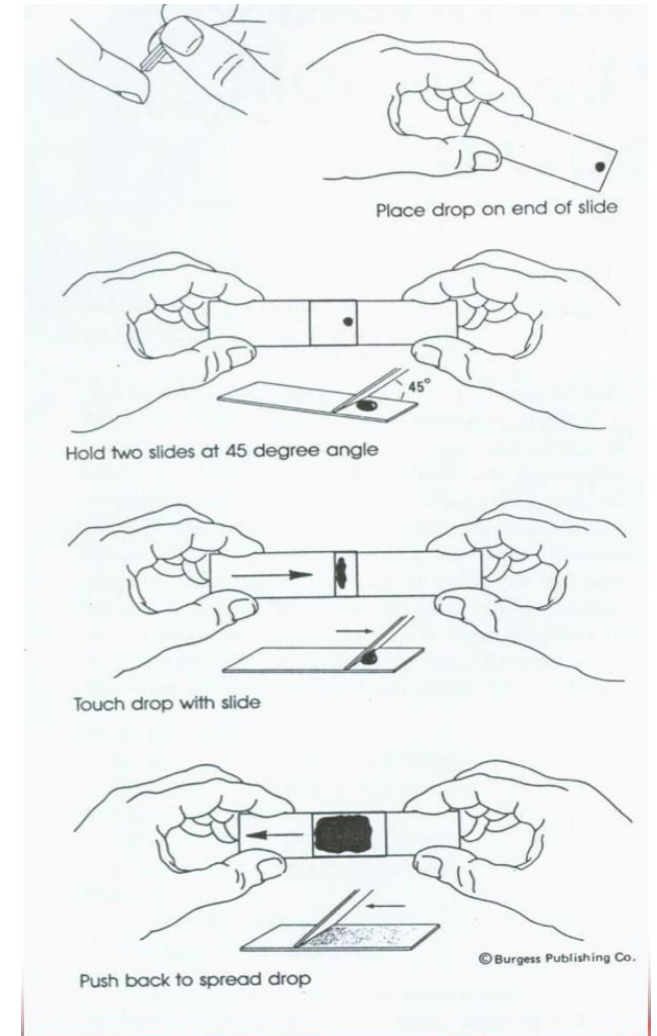
Various dyes for staining blood films (e.g., Wright's stain and Leishman's stain).

Microscope slides.

## Procedure

Prepare blood film and stain it with Wright's stain

Examine it under the oil immersion objective lens of the microscope and identify the different leucocytes (count about 100 cells)



# WBCs

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

The diagram is a hierarchical flowchart. At the top is a dark green box labeled 'WBCs'. Two lines descend from this box, each turning 90 degrees to point to a white box with a green border. The left box is labeled 'Granular' and the right box is labeled 'Agranular'. From the 'Granular' box, three lines descend to three separate light green boxes labeled 'Neutrophils', 'Eosinophils', and 'Basophils'. From the 'Agranular' box, two lines descend to two separate light green boxes labeled 'Lymphocytes' and 'Monocytes'.

## Granular

Neutrophils

Eosinophils

Basophils

## Agranular

Lymphocytes

Monocytes

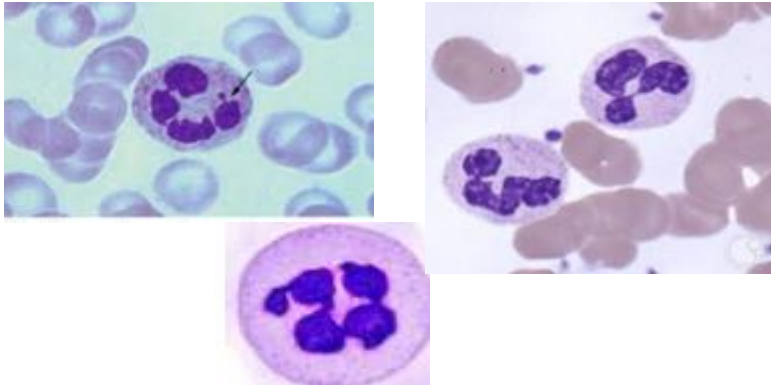
# Granular

Contain granules in their cytoplasm

## Neutrophils

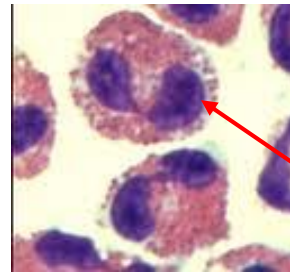
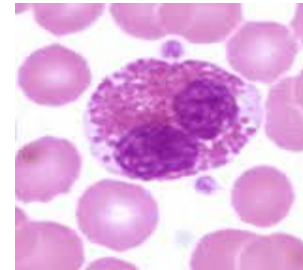
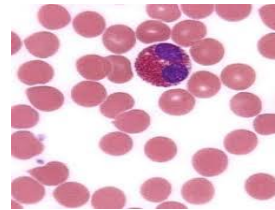
- **Most common type** of blood cells (50-70%)
- They have small cytoplasmic granules and a complex, **multilobed nucleus**.
- Their granules take a neutral (purple or pink) color with various stains such as Wright's stain.

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



## Eosinophils

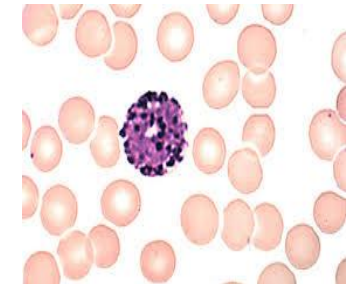
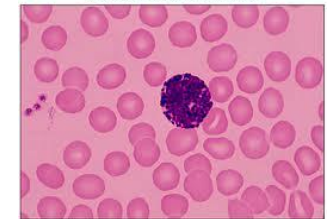
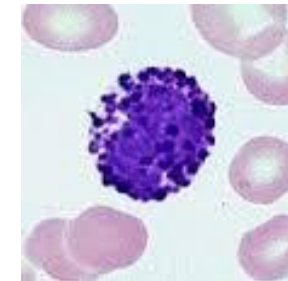
- **Less common** in the blood stream (1-3%)
- They are characterized by a dumbbell-shaped nucleus (bi-lobed) and large, prominent, **red (eosinophilic) granules**



كأنها سماعة

## 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.

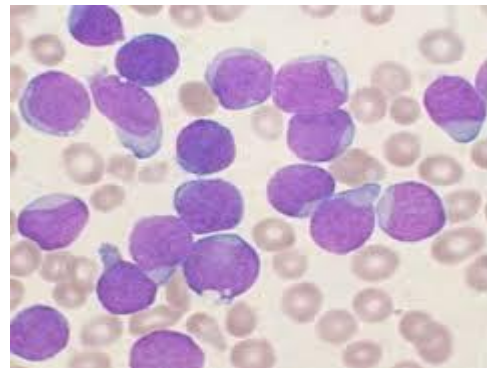
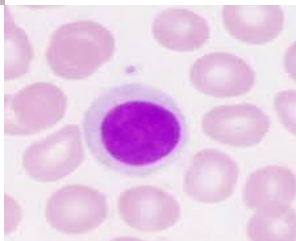


# A granular

Contain NO granules in their cytoplasm

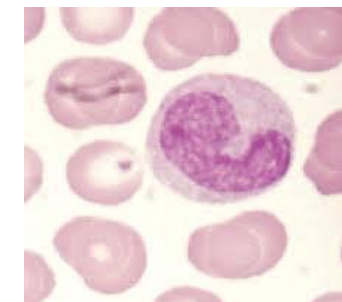
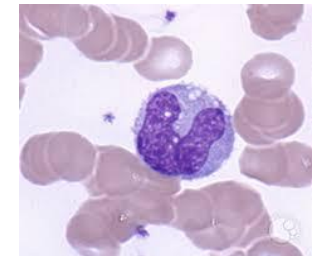
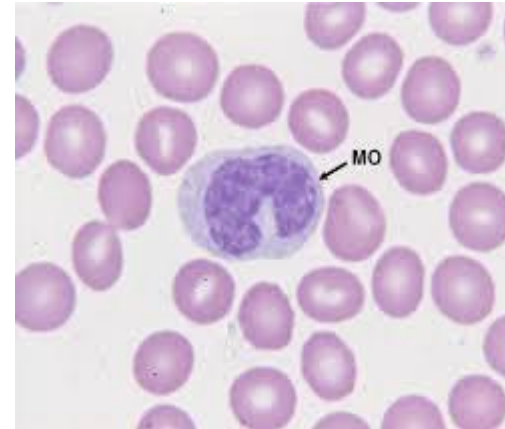
## Lymphocytes

- 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: macrophage

# Clinical Application

Differential count provides clues about certain illnesses:

→ **1- Neutrophils** : pyogenic illness( bacterial and fungal infection)

→ **2- Eosinophilia**: Allergy and parasitic infections

→ **4- Basophilia**: in allergy and malignancy----- Because they secrete histamine

→ **4- Lymphocytosis**: viral infections (infectious mononucleosis).

→ **4- Monocytosis** : chronic infections

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	bilobed purplish
Basophil	0-4-1	14-15	Large, basophilic granules	Bilobed bluish black

Extra information

When RBC = lymphocyte it's a condition called macrocytic anemia

When they're hyper segmented = macrocytic anemia





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**GOOD LUCK**

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