

# **BLOOD& B.M**

## **(Lab)**

► **DR. Heba Hassan**

# Complete blood count (CBC)

سلايد زجاجية بنحط عليها قطرة دم بصير لها spread



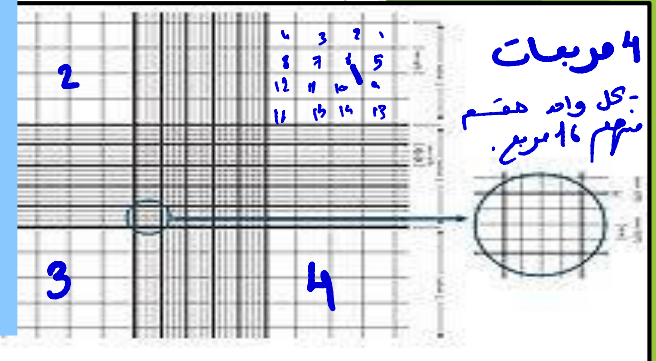
1- **Total count**: It is the total number of blood elements (RBCs, WBCs, or Platelets) per cubic millimeter Measured by

How to count WBC using hemocytometer?  
I will count the WBC only from the eccentric squares

المربعات الطرفية فقط

RBCs will be counted from the central square > have 25 small squares (5x5), RBC is rounded biconcave disc in shape.

Platelet cytoplasmic fragment in shape.  
WBC have nuclei.



□ Hemocytometer Slide

□ Or Automatic counter

2- **Differential leukocytic count**: The percentage of each type of leucocytes to the total count

The blood sample from veins  
عينة دم وريدية  
EDTA to تمنع على مادة اسمها  
prevent the coagulation

Can measure  
MCV  
Hct  
Hb content

The counter problem is that it won't observe the shape that's why we should use hemocytometer in cases of sickle shape anemia and sometimes we might use the blood film to diagnose the anemia

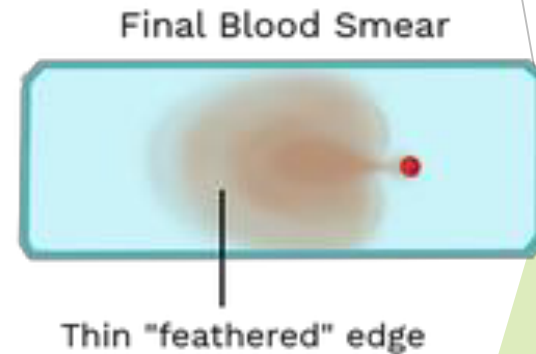
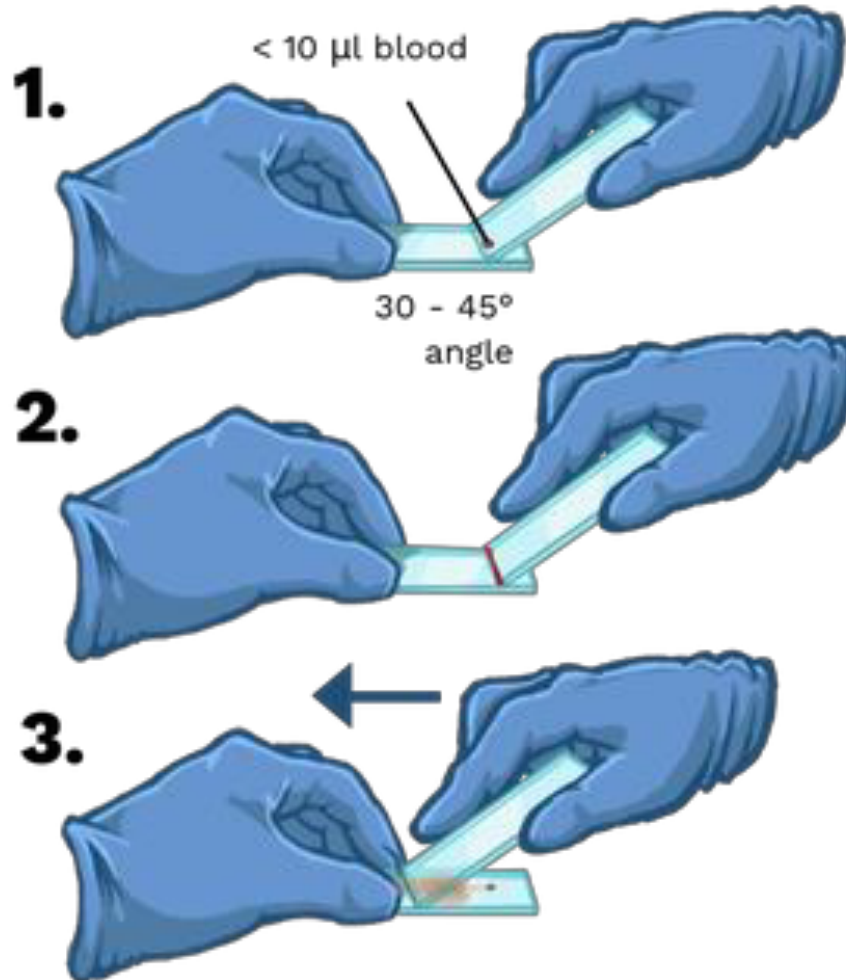
Hemocytometer can be used for counting sperms  
مثل الخلايا الجنسية



# Blood smear (Leishman stain)

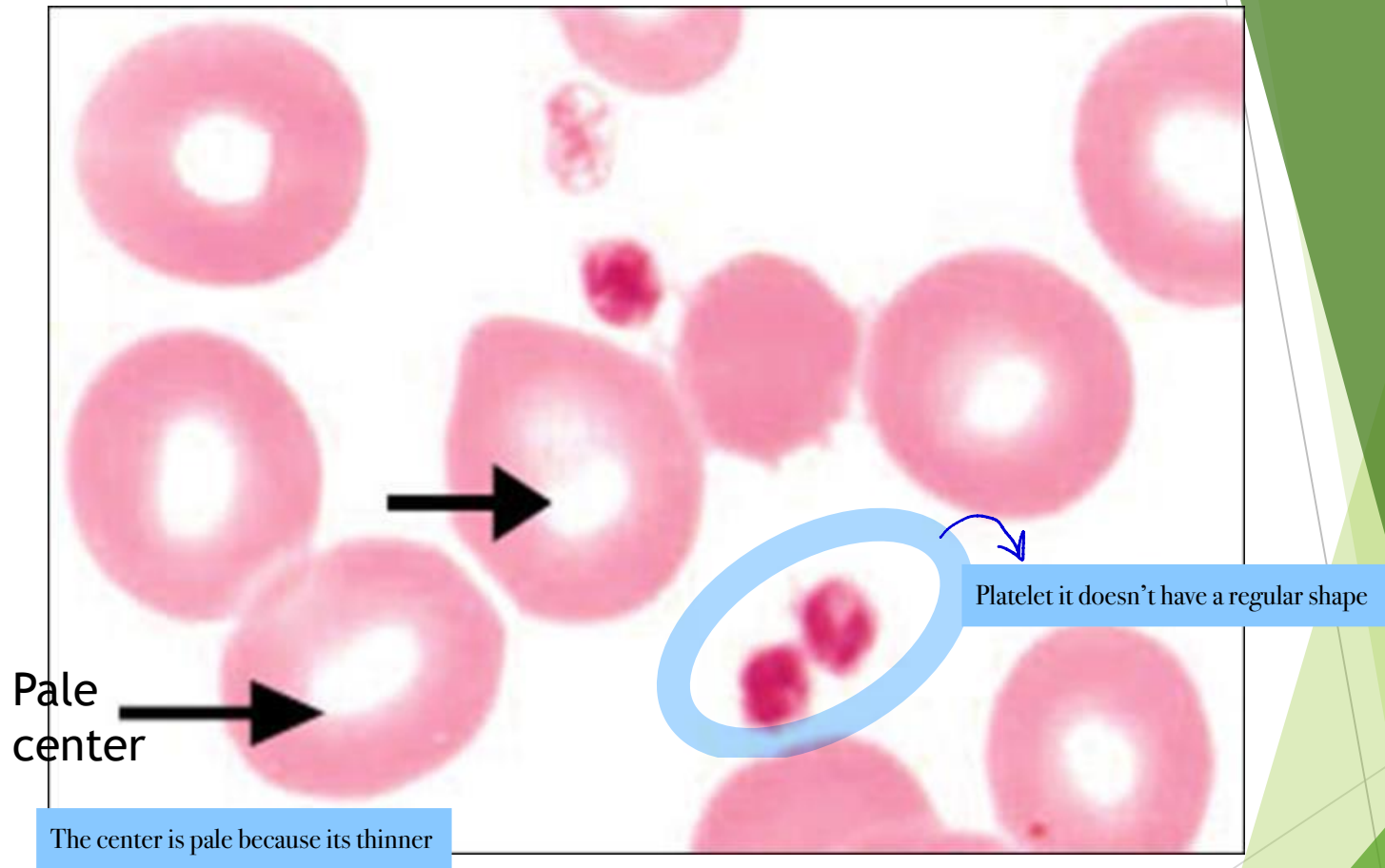
Or gemsa stain

بكون للصبغة جزء basic and the other acidic



We wait until its firm and dry and then i can stain it with leshiman stain

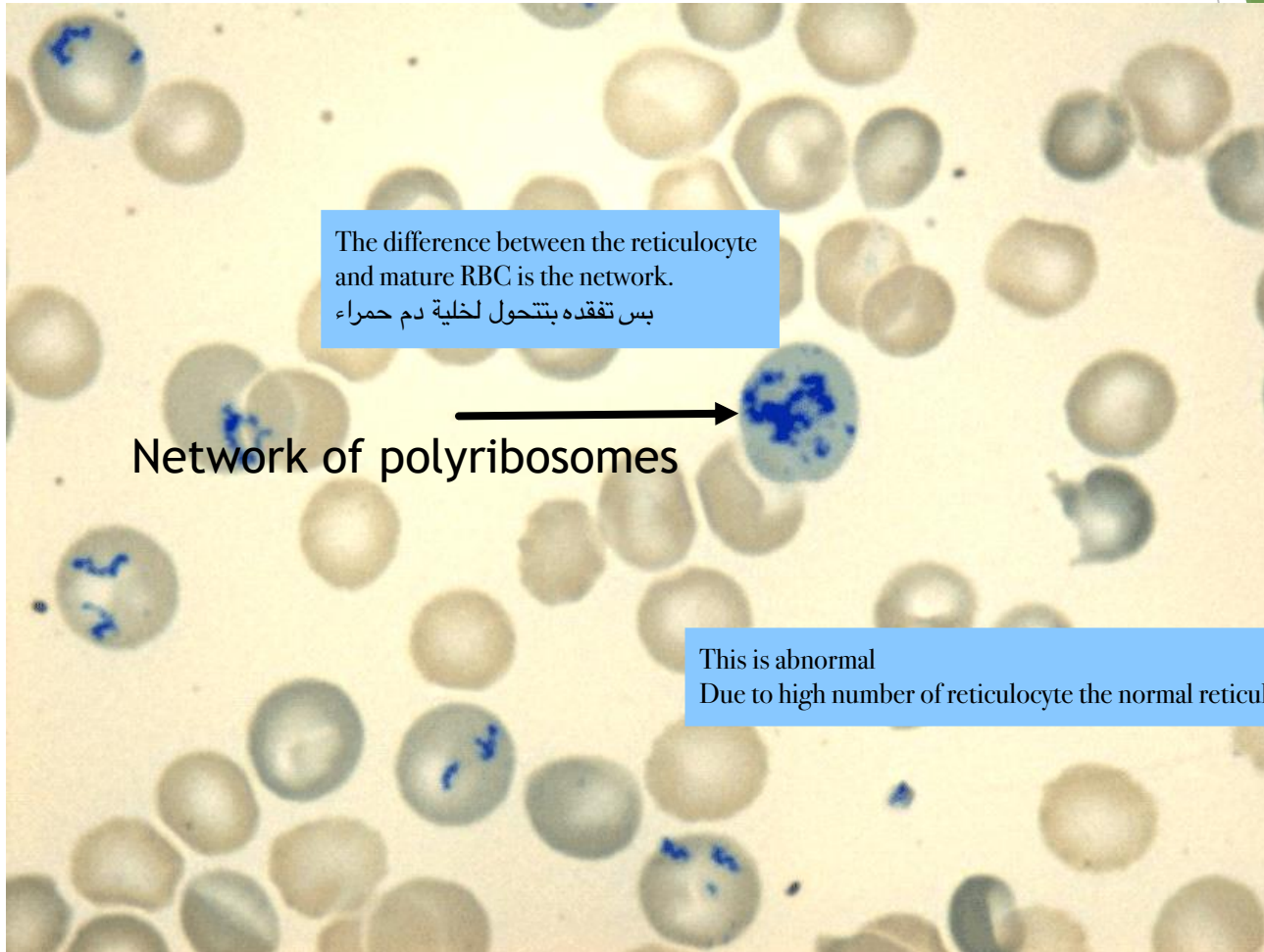
# Red Blood Cells (RBCs)



- ▶ ***RBCs that display rounded biconcave discs.***

# Reticulocyte (brilliant cresyl blue)

الصبغة هاي بتتحد مع ال ribosome that are in reticulocyte



The difference between the reticulocyte and mature RBC is the network.  
بس تفقده بتتحول لخلية دم حمراء

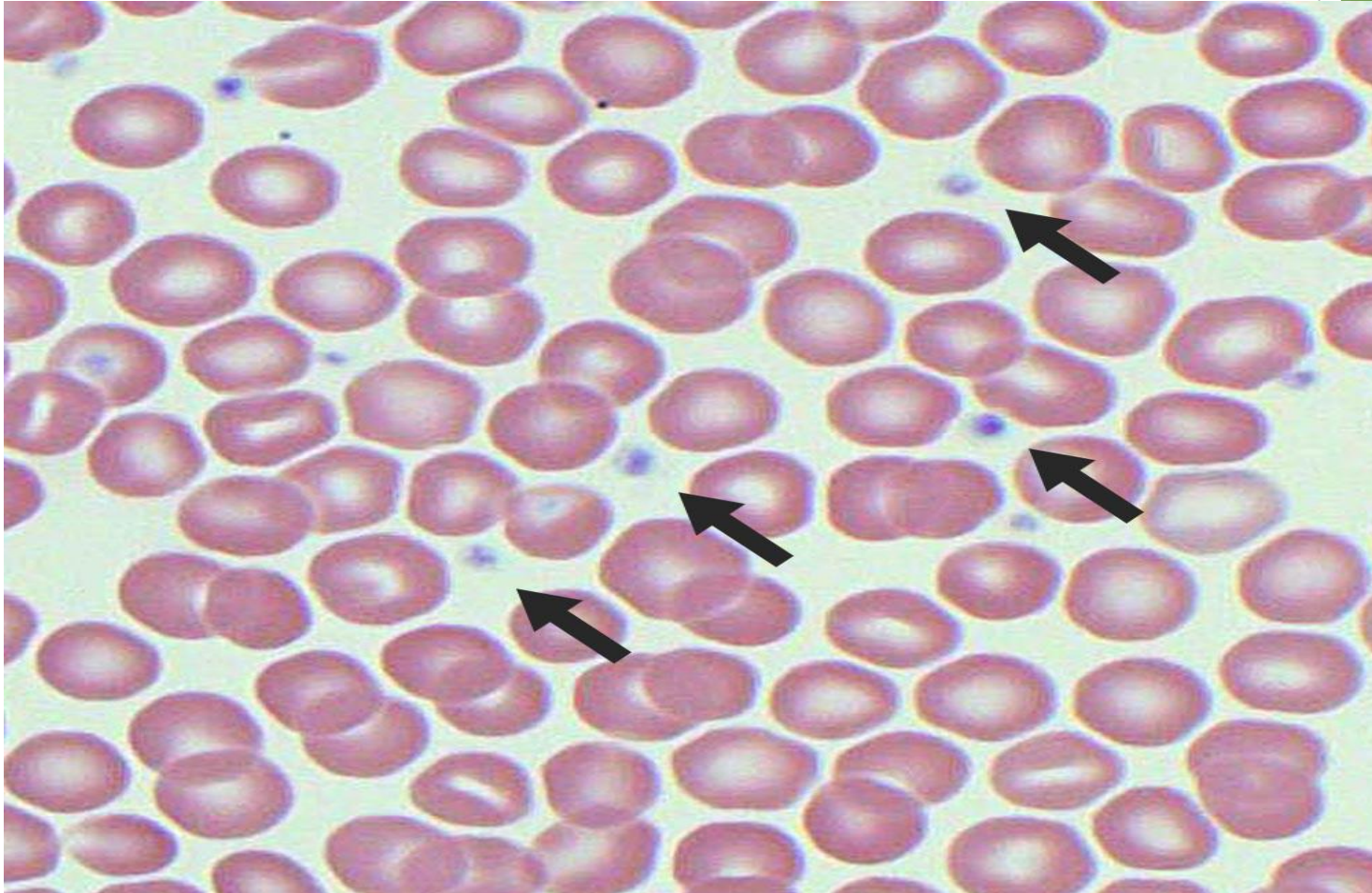
Network of polyribosomes

This is abnormal  
Due to high number of reticulocyte the normal reticulocyte percentage is 1%



# *Platelets*

Cytoplasmic fragments  
Irregular  
No specific shape  
Between the other blood cells



# EM of Platelets

دکڑوا علی glycogen

Outer pale part > hyalomere  
Inner is granular

Hyalomere  
الجزء الباهي

4  
Endoplasmic reticulum

ER

Commonest is alpha granules

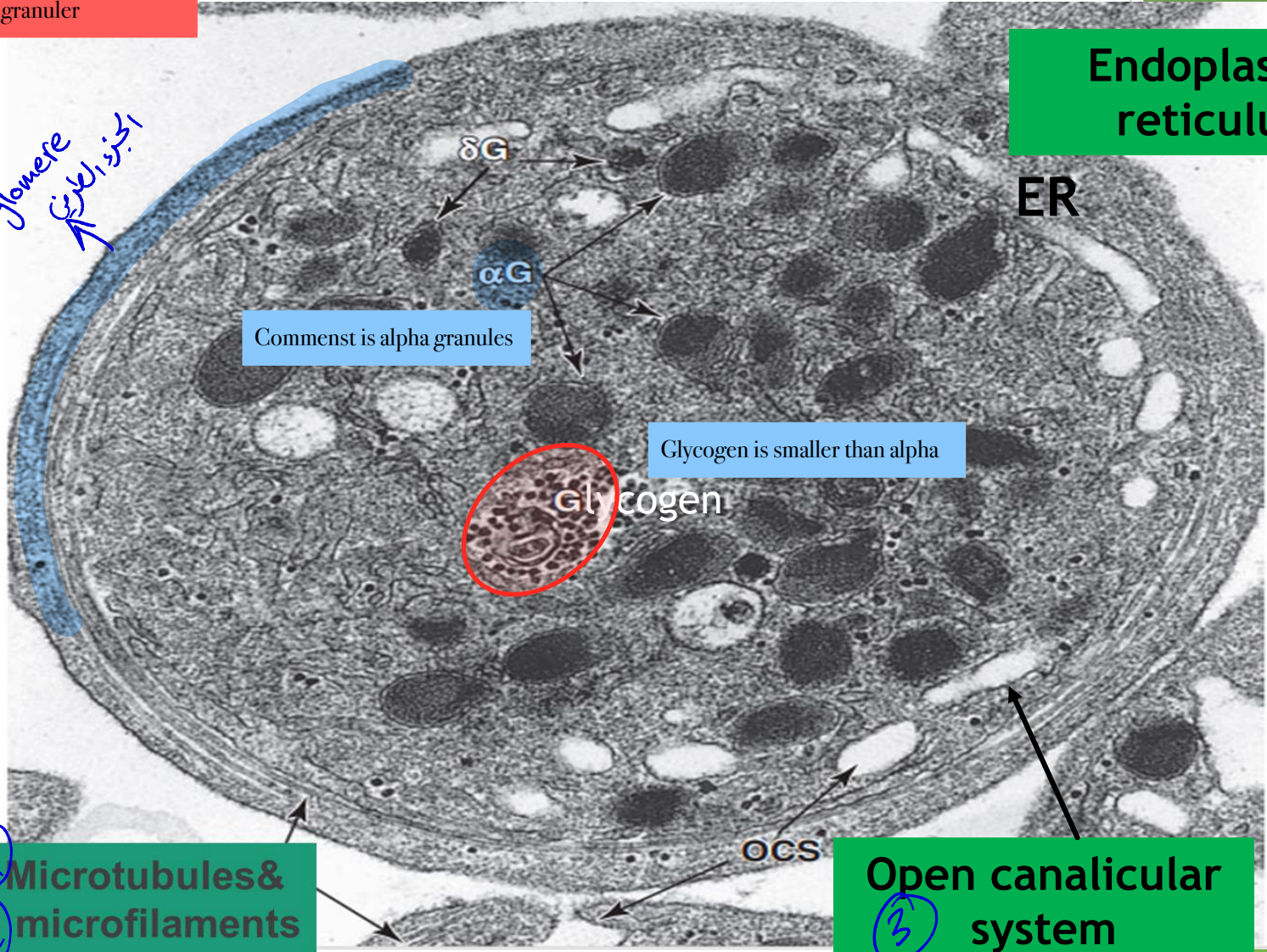
Glycogen is smaller than alpha

glycogen

OCS

3  
Open canalicular system

2  
1  
Microtubules & microfilaments





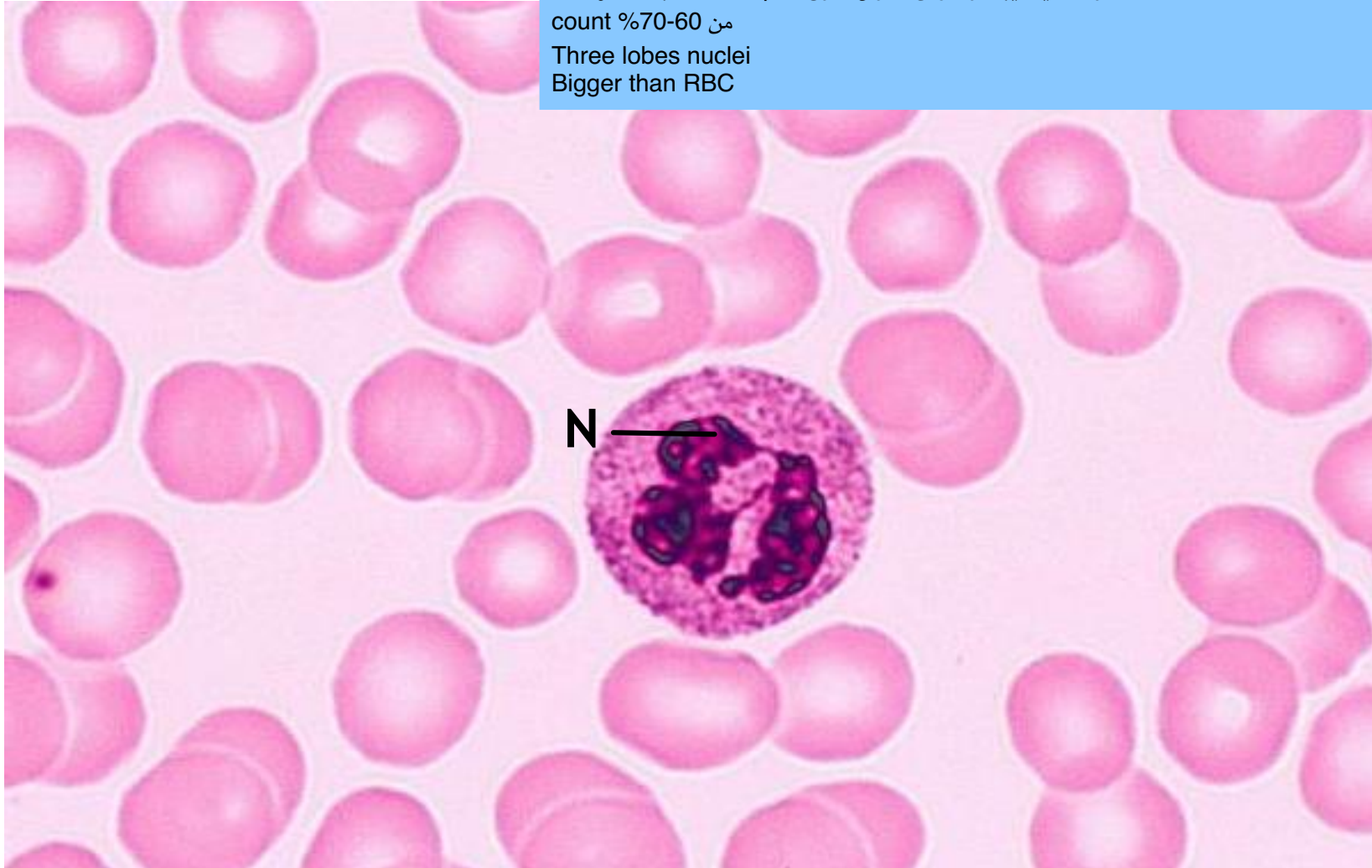
# 1- **Neutrophils** with segmented nucleus (N) and neutrophilic granules.

بس تشوف عينة دم تحت المايكروسكوب مش شرط تلاقى leukocytes فحتصير تحرك لسلايد لحد ما نشوف خلية فيها نواة ومن المتوقع تكون neutrophil لانها الأثر عددًا

من 60-70% count

Three lobes nuclei

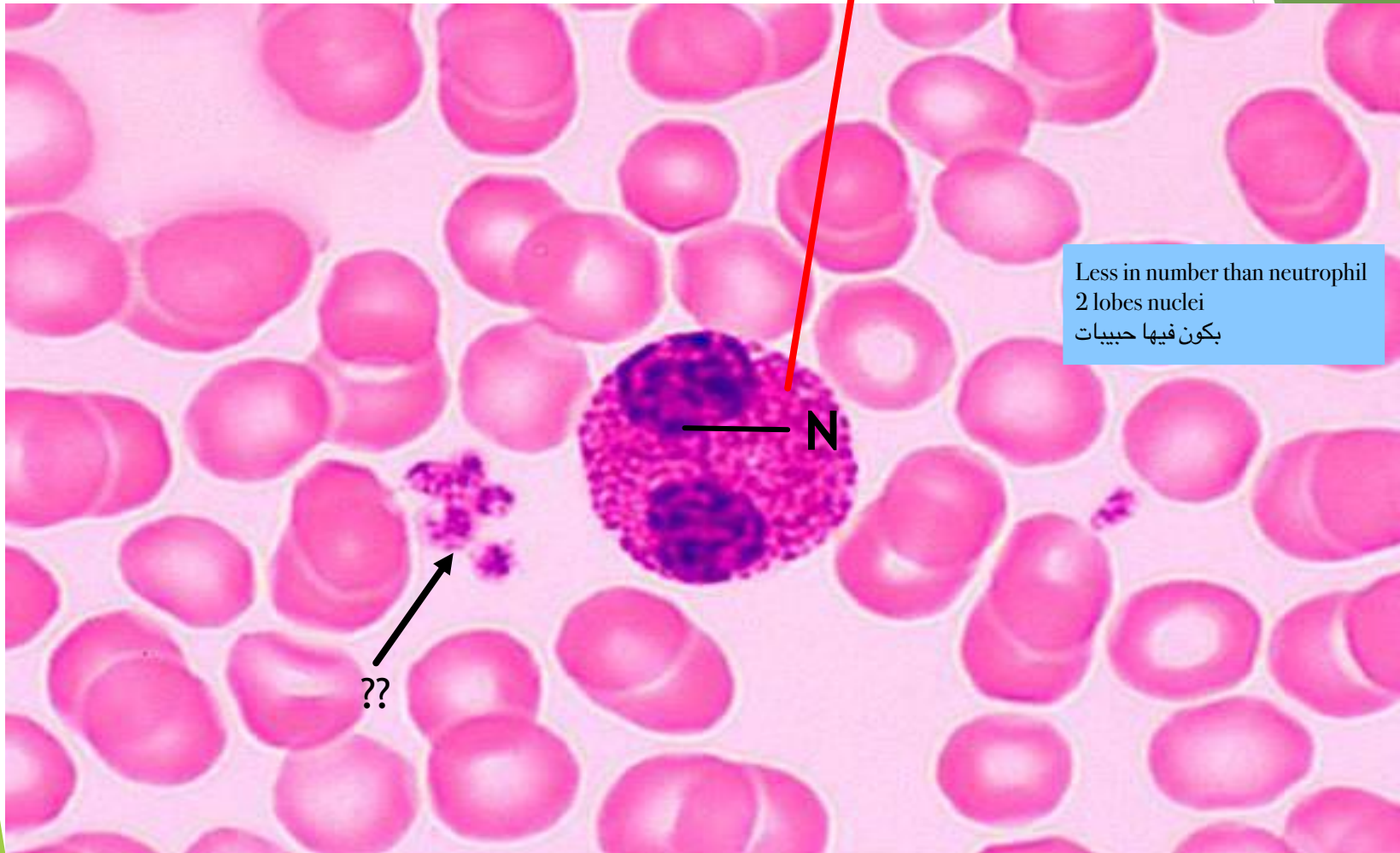
Bigger than RBC





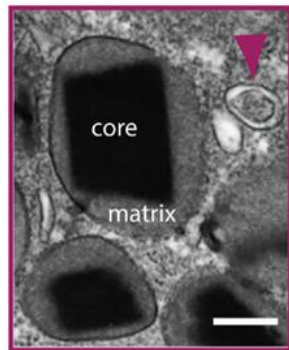
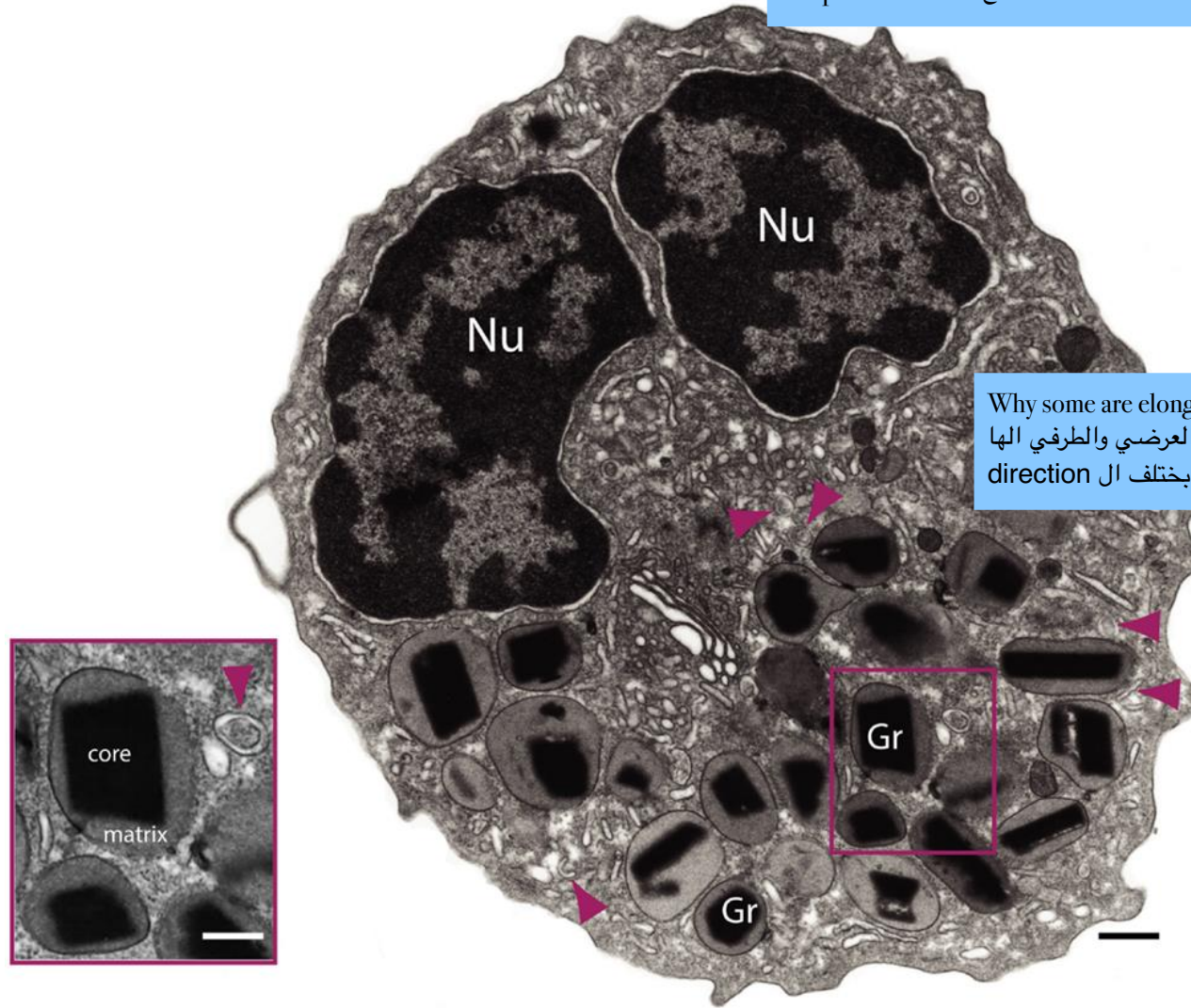
## 2- **Eosinophils** with horse-shoe shaped nucleus (N) and eosinophilic granules.

Purple in colour is the granules basophilic

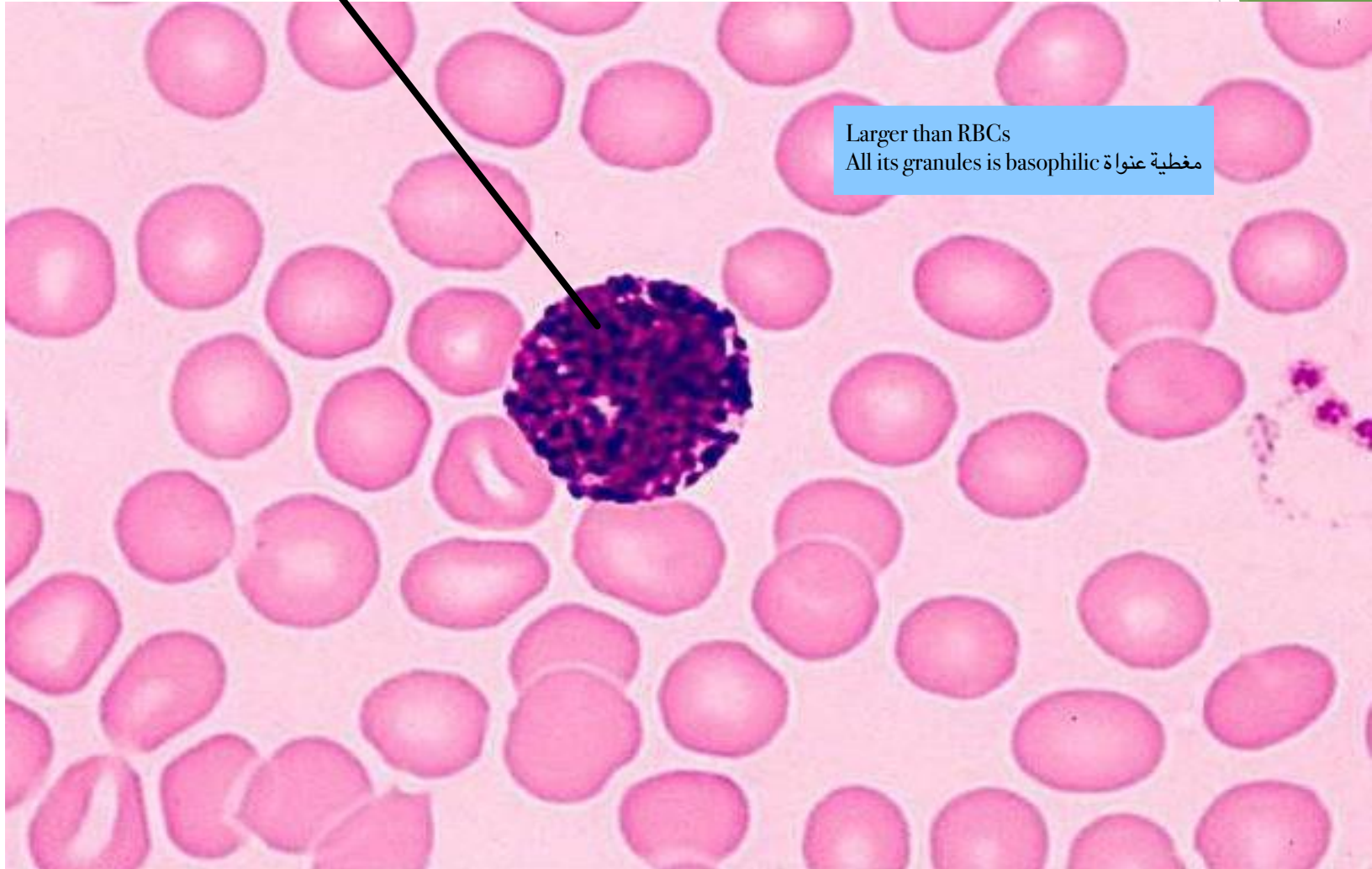


# EM of Eosinophils

The specific granules is elongated “oval”  
Core > electron dense  
Peripheral > matrix فاتح



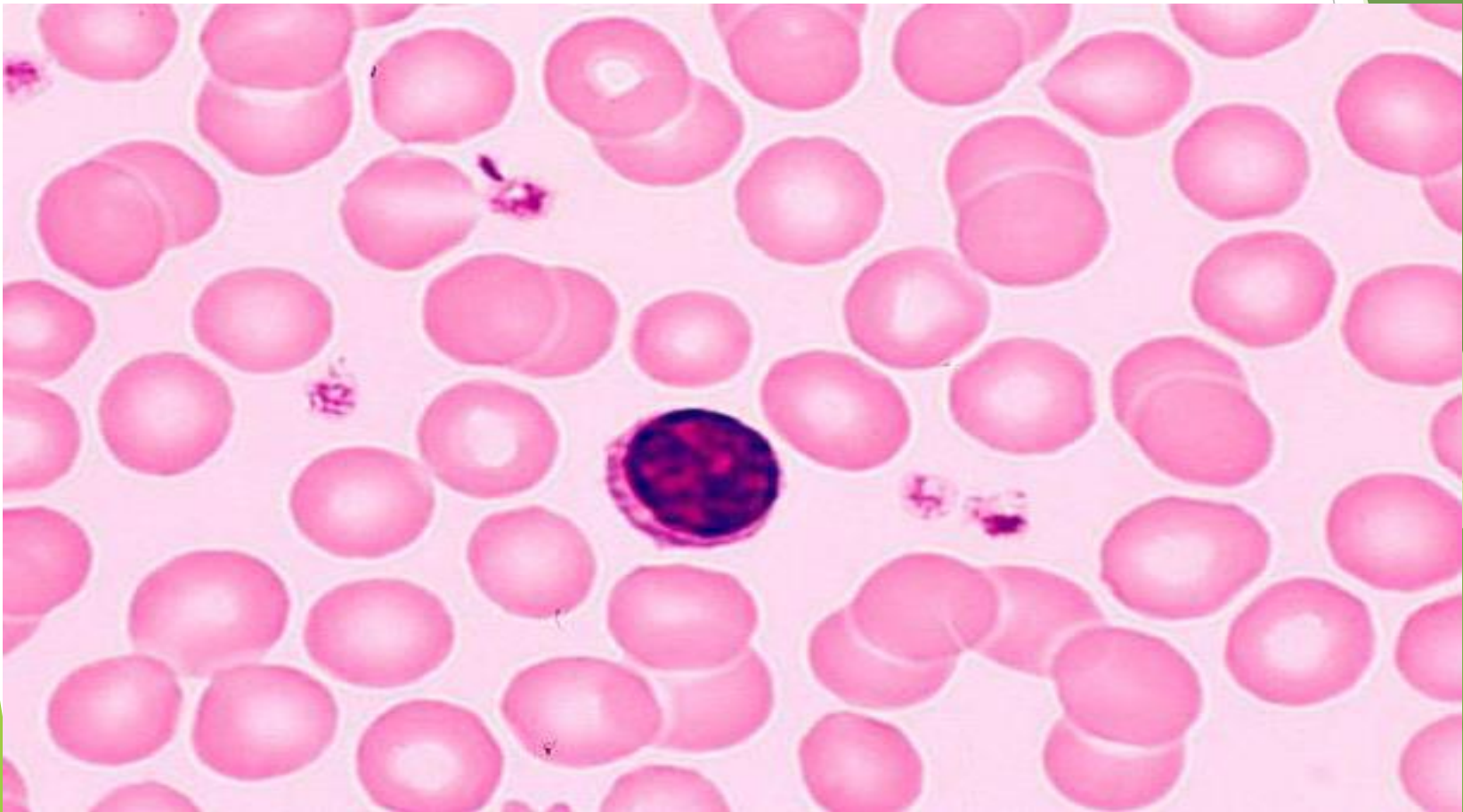
### 3- **Basophils** with basophilic granules.





# Agranulocytes

1- **Lymphocytes:** with large nucleus and basophilic thin rim of cytoplasm.

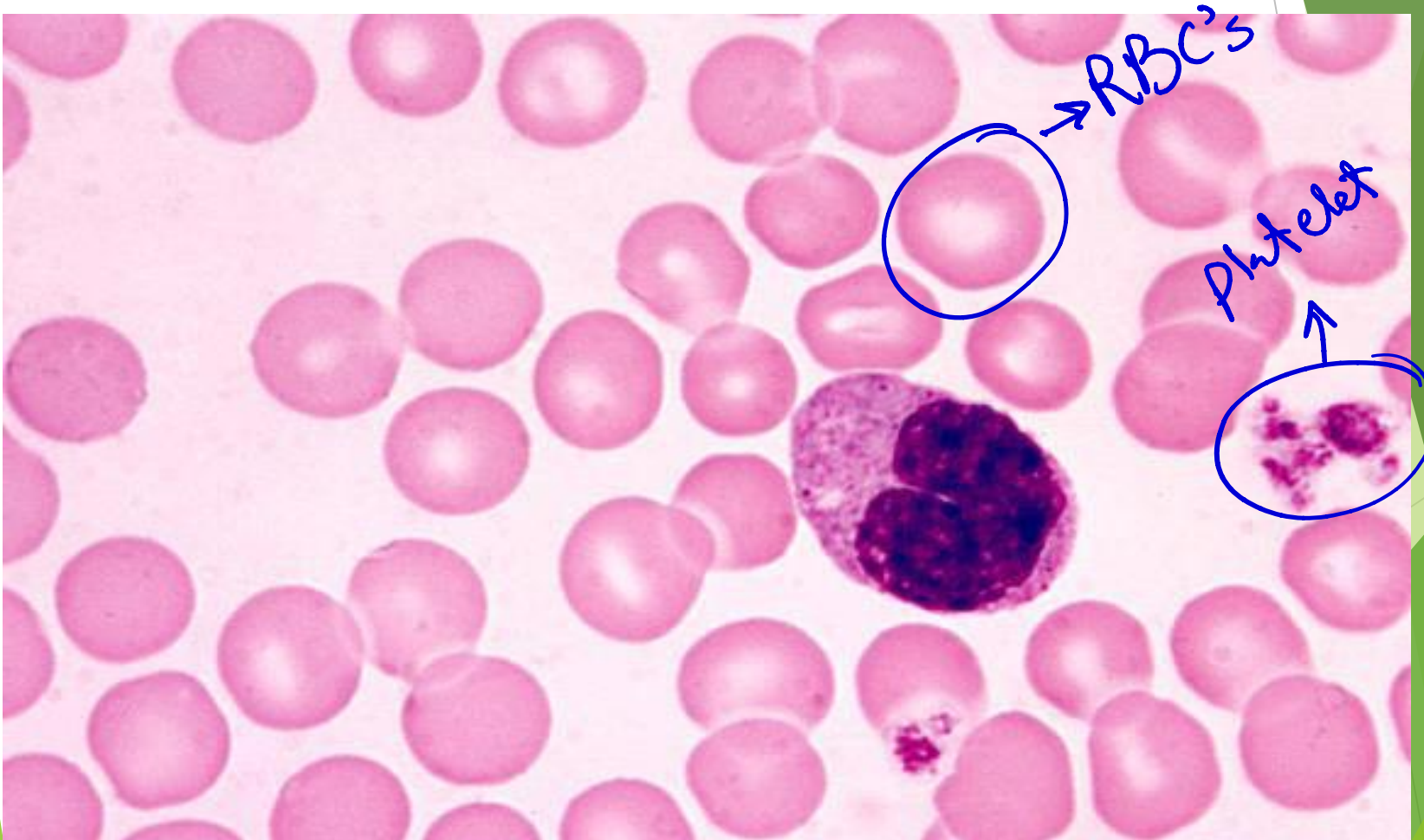




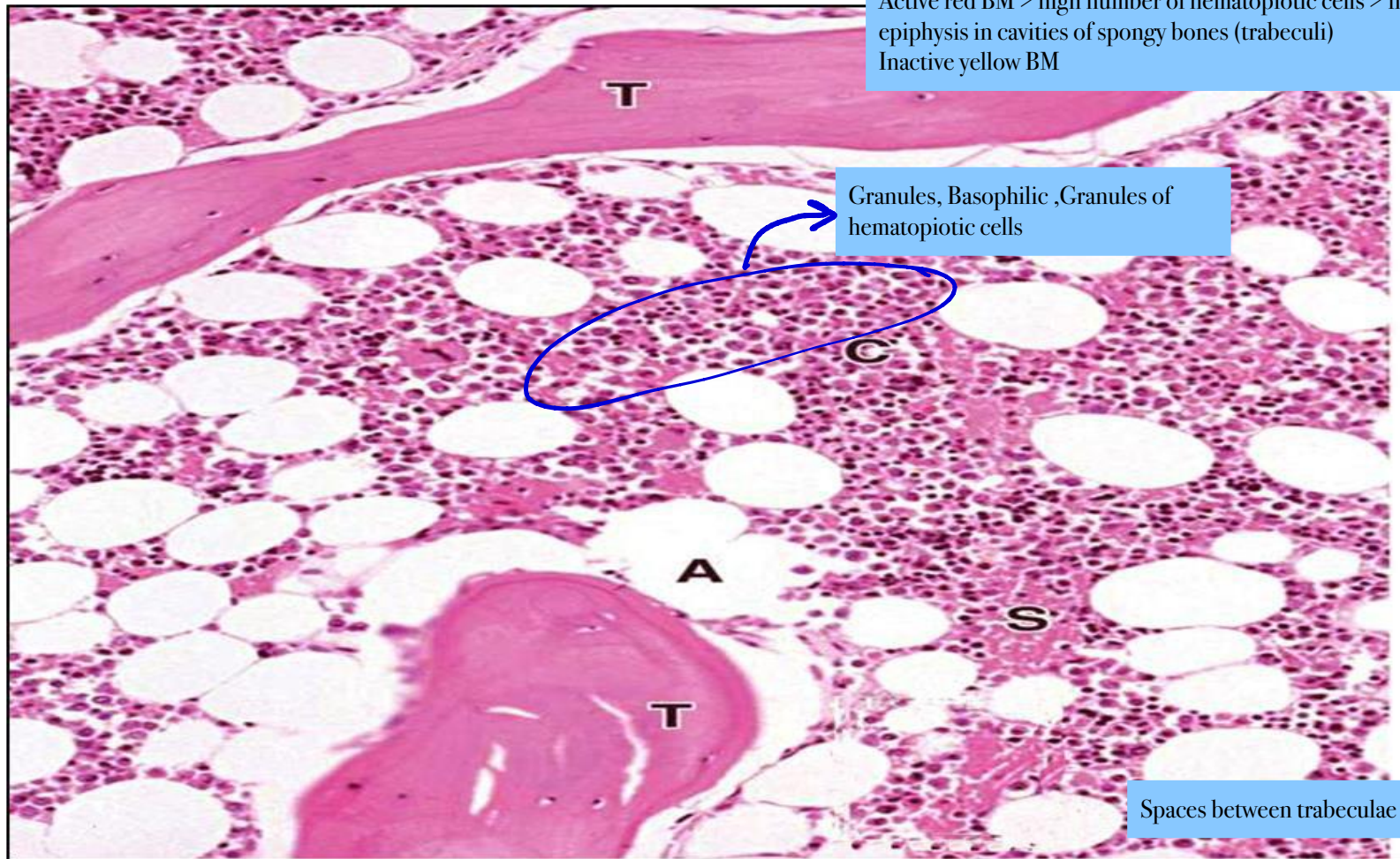
# Agranulocytes

2- **Monocytes:** with kidney-shaped eccentric nucleus and pale basophilic cytoplasm.

The most largest cell  
Very large nucleus  
Kidney shape



# LM picture of red bone marrow



Two types of  
Active red BM > high number of hematopoietic cells > in  
epiphysis in cavities of spongy bones (trabeculi)  
Inactive yellow BM

Granules, Basophilic, Granules of  
hematopoietic cells

Spaces between trabeculae is the BM

**Hematopoietic cells (C) bony trabeculae (T).  
Sinusoidal capillaries (S) and Adipocytes (A)**

High number of sinusoids  
circulation عشان يمر من خلالها خلايا الدم

Why adipocyte cytoplasm is white?

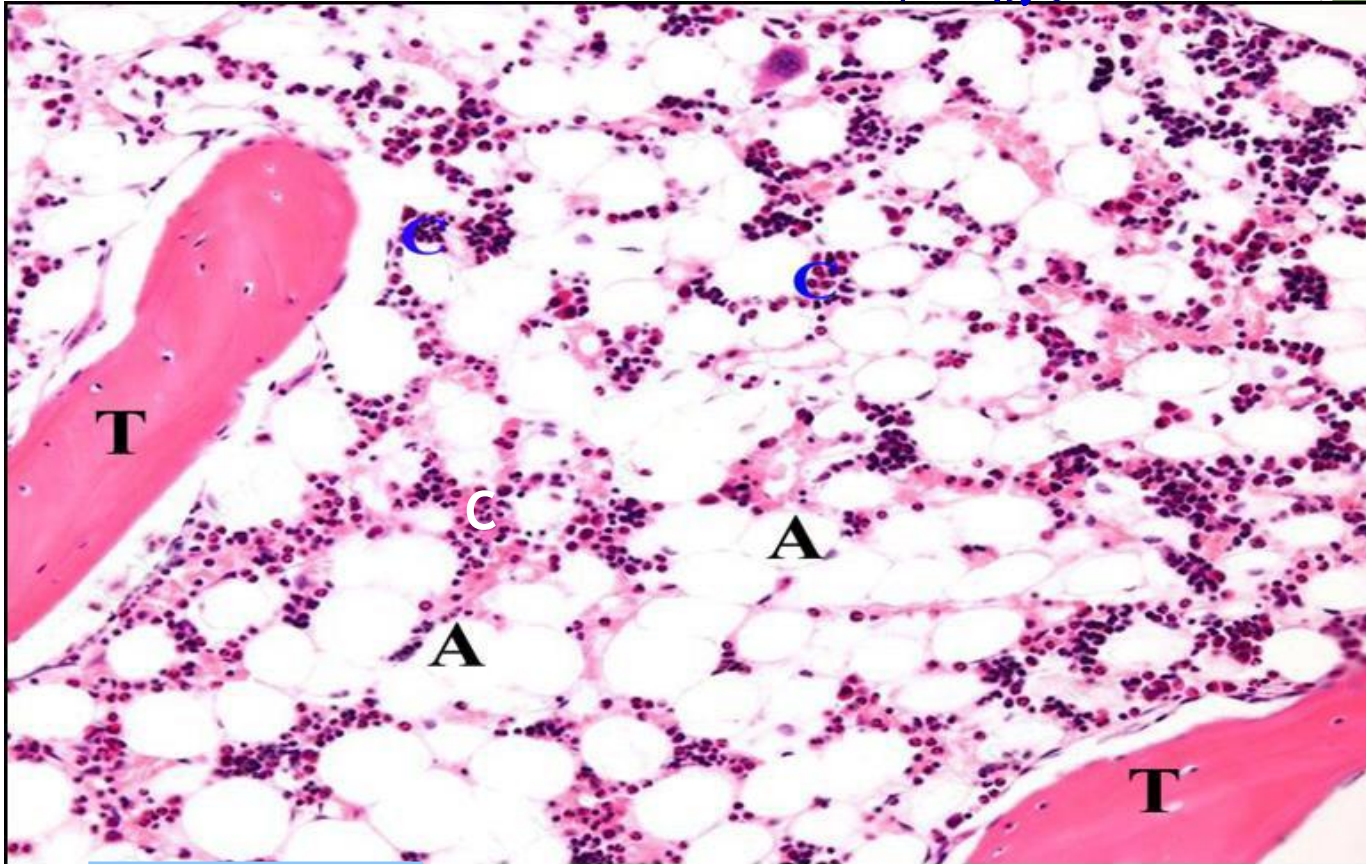
H&E stain dissolved the fats

ذابت الدهون في تحضير الشريحة بسبب الكحول والصبغات



# LM picture of yellow bone marrow

*Inactive marrow.*



Upper hand is for adipocyte

Adipocytes (A) occupy the bone marrow spaces and there is decrease in the ratio of hematopoietic cells (C).

# TEM of a megakaryocyte

Precursor of platelets and its very large



polyploidy

lobulated nucleus (N),  
numerous cytoplasmic granules (G),  
demarcation lines (D)

عشان حيعطيهم بعدين للصفائح

بتحدد الاجزاء لحتتكسر من الخلية عشان  
تروح على circulation وتسوي الصفائح

بتمد أذرع

Proplatelet between the endothelial  
so the demarcation lines will be  
destroyed and release platelets