



HEMATOPOIETIC & LYMPHATIC SYSTEM

SUBJECT : _____

LEC NO. : Lap 2

DONE BY Tabark Aldaboubi , Raneem Azzam



وَقُلْ رَبِّ زِدْنِي عِلْمًا

“Hematopoietic And Lymphoid System”
Pathology Lab “2”

Dr. Ola Abu Al Karsaneh

Acute Leukemia



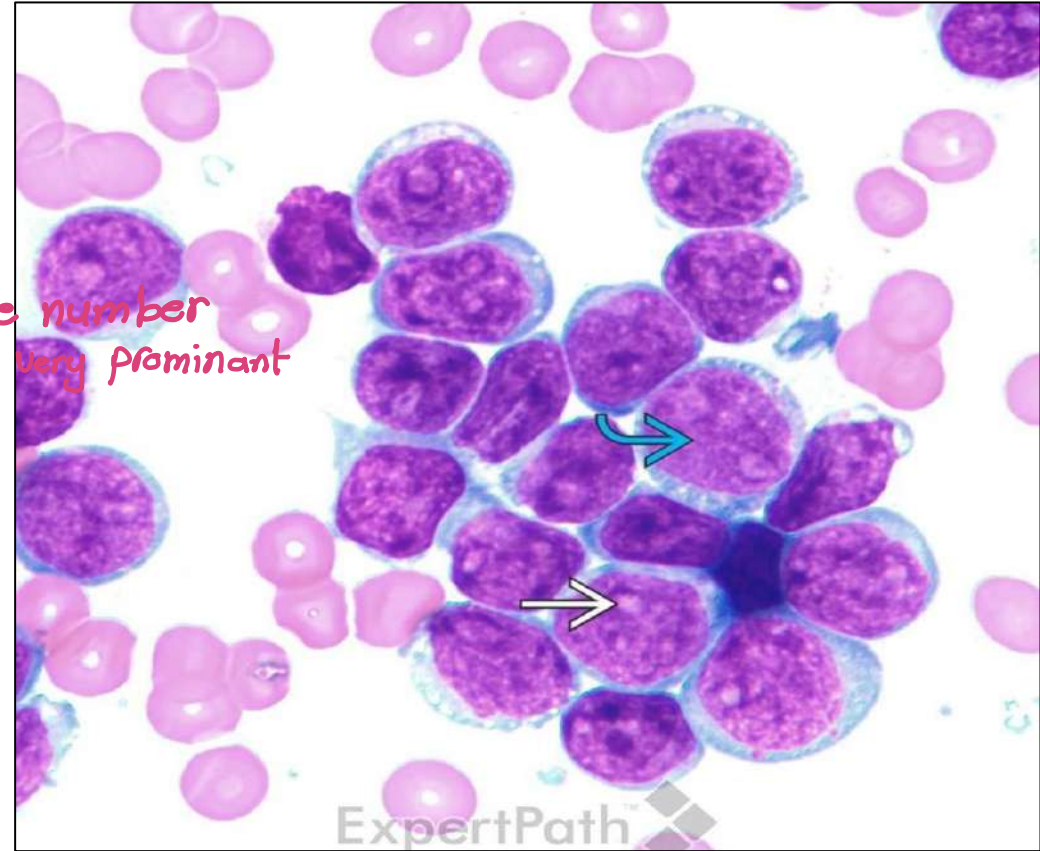
Acute Lymphoblastic Leukemia/Lymphoma (ALL)

a granule

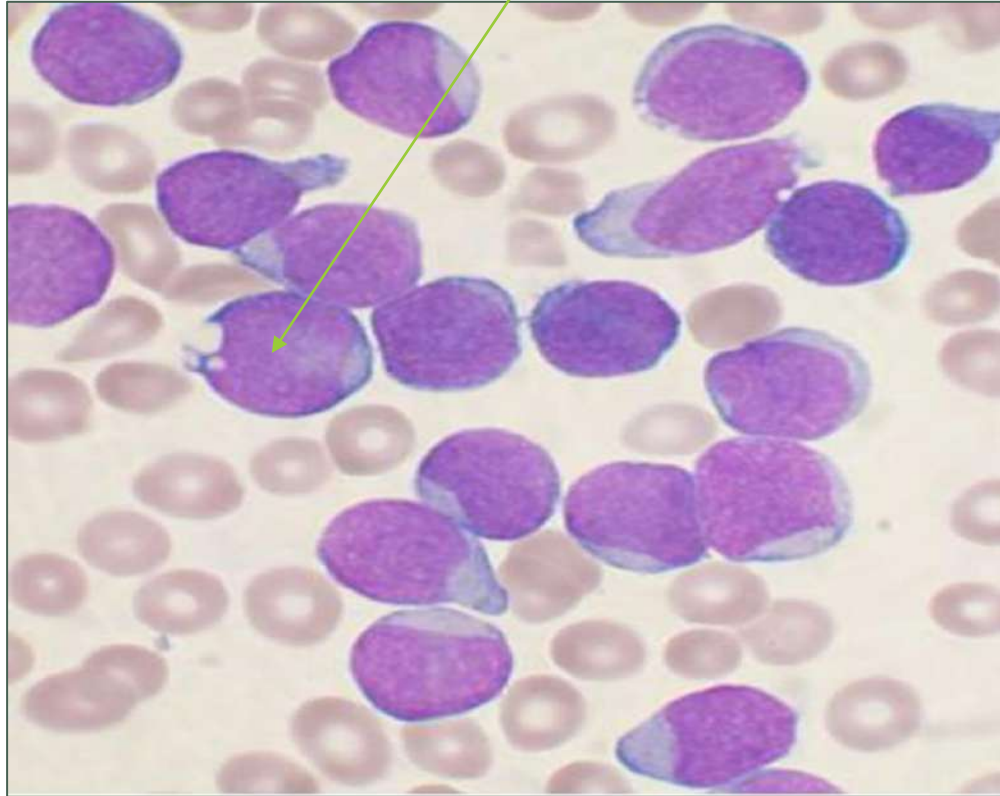
Bone marrow aspirate: B-ALL shows

lymphoblasts with a high N/C ratio, fine chromatin (curved arrow), small nucleoli (solid white arrow), and basophilic cytoplasm.

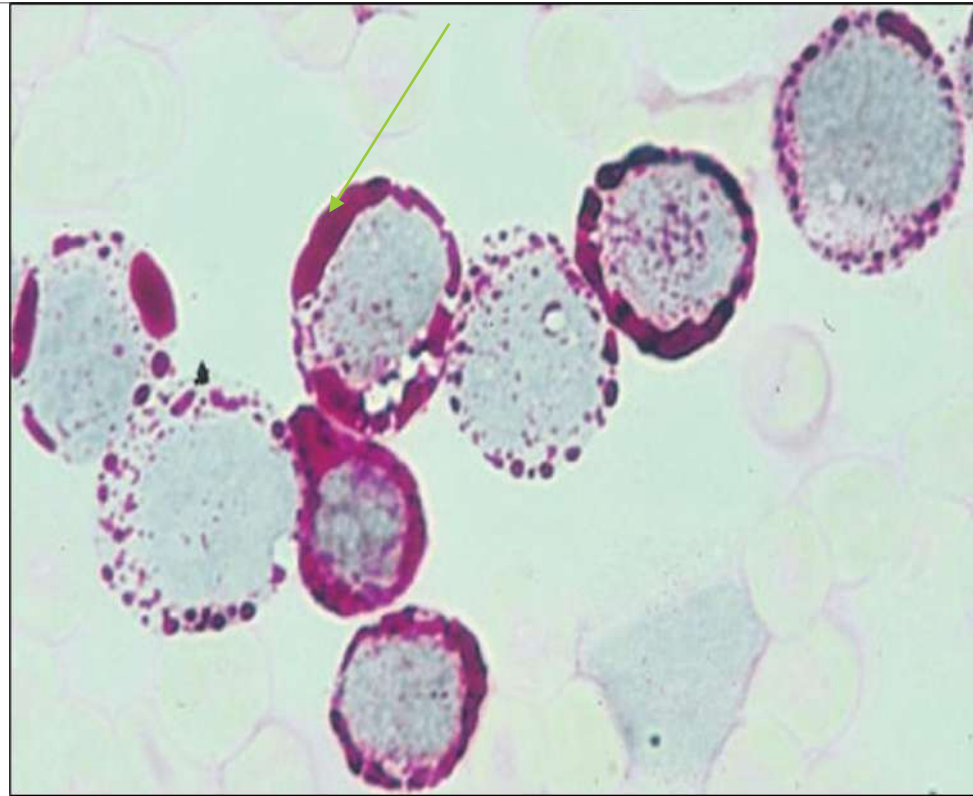
*not large number
not very prominent*



ALL (lymphoblasts)



Lymphoblasts: Positive PAS cytoplasmic stain



AML (Acute Myeloid Leukemia)

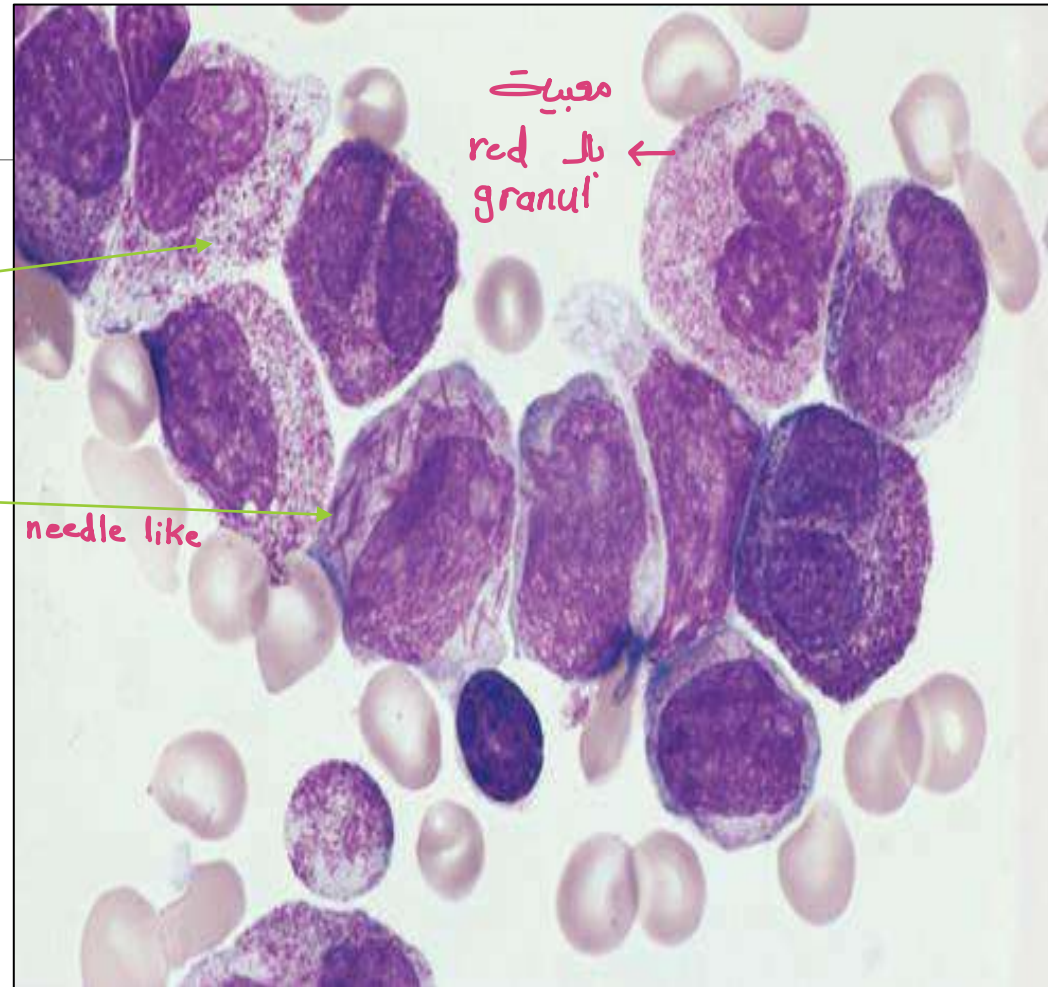
Myeloblasts with delicate nuclear chromatin, prominent nucleoli, and fine azurophilic cytoplasmic granules.

اكثف من نوياتها وعاضدات



AML-Acute promyelocytic leukemia—bone marrow aspirate

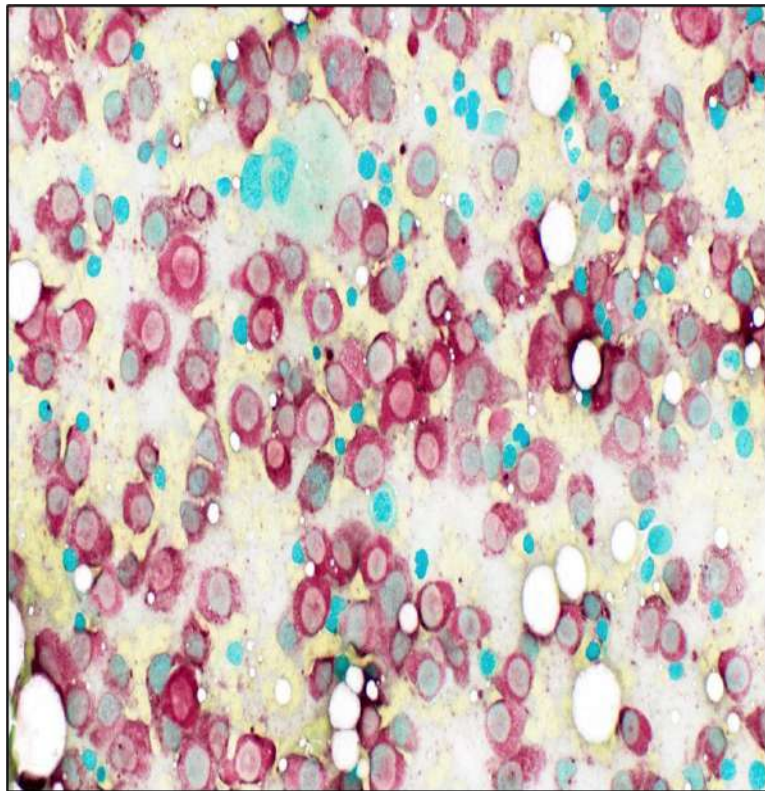
- The neoplastic promyelocytes have abnormally coarse and numerous azurophilic granules.
- Other characteristic findings include a cell in the center of the field with multiple needlelike **Auer rods**.



Non specific esterase

NSE highlights blasts of monocytic origin

Positive

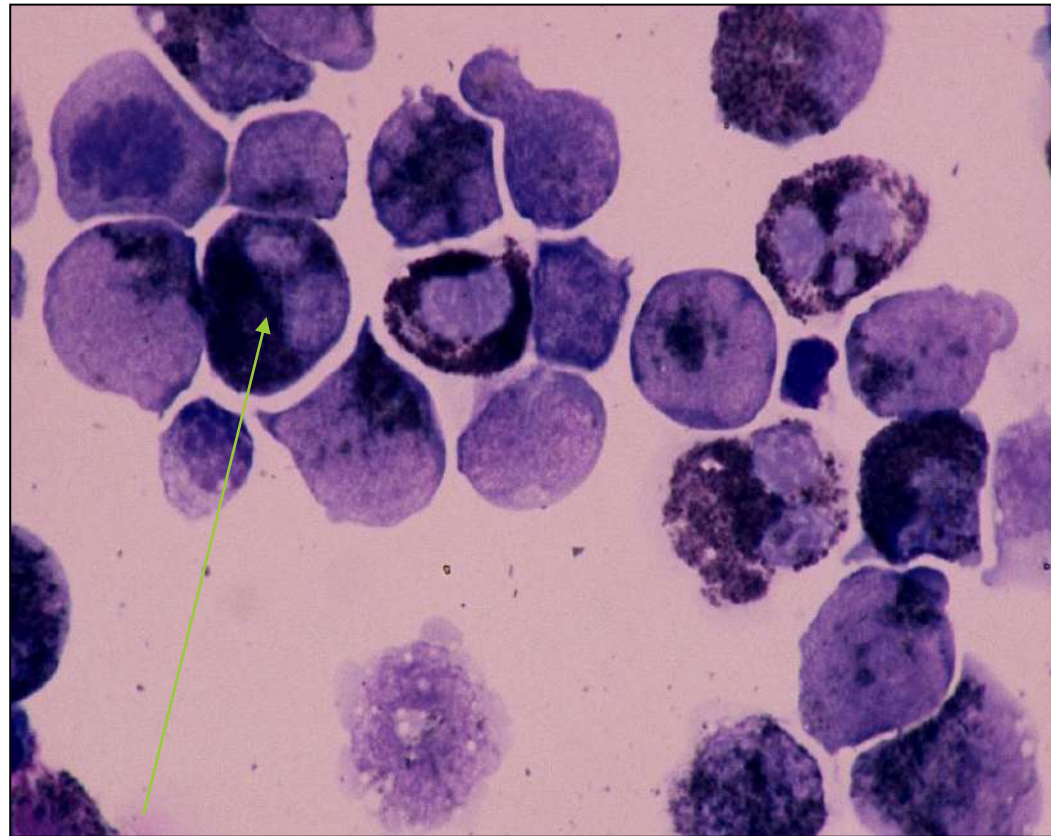


granule ← بنميرها انه فيها Lymphoplast

granule ← فيها Myeloplast

Positive

AML, MPO
Myeloperoxidase



MPO

* التزييات مش كثير مهمة (الي بهم الدكتور الاختلافات بال (morphology)

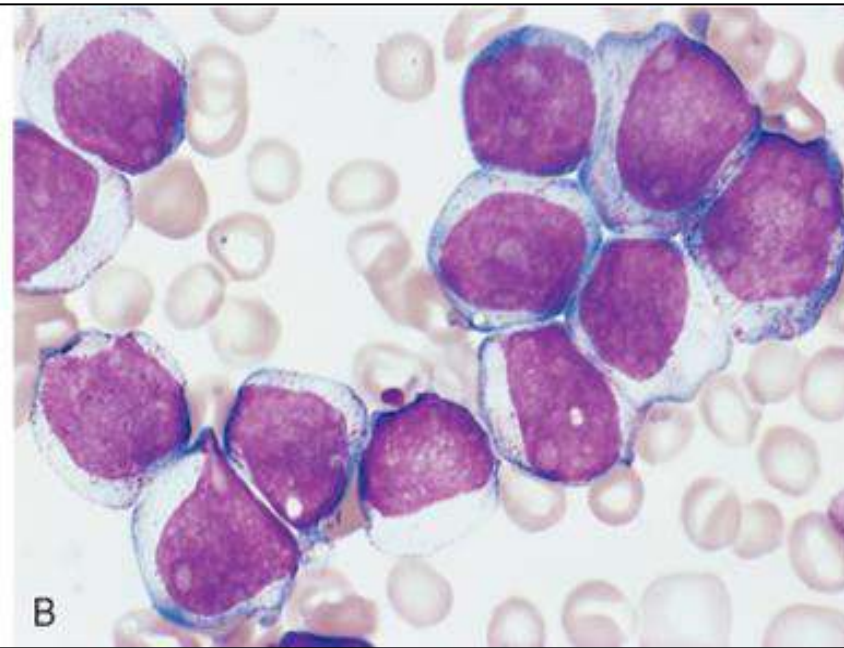
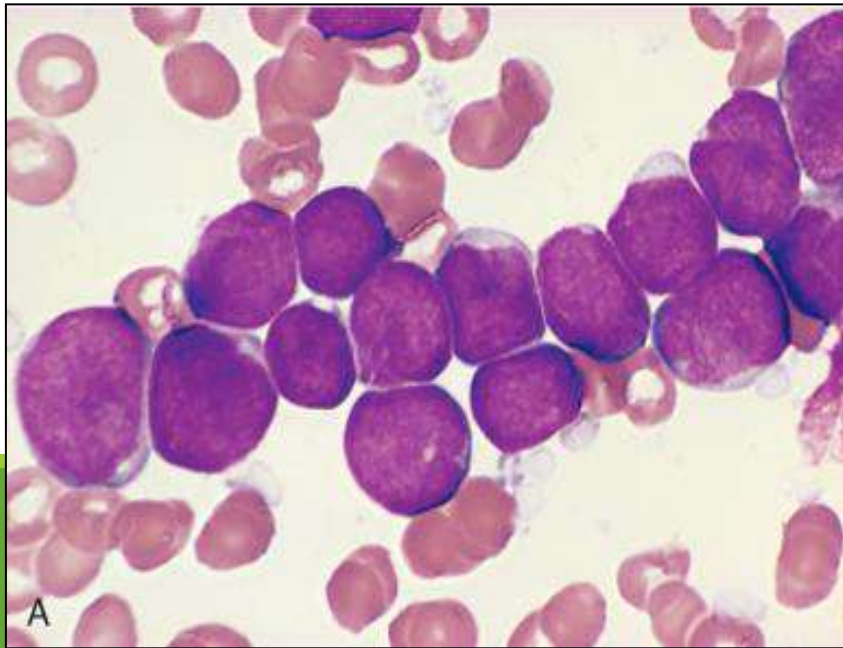
* ممكن يكون فيه بالسؤال Hint يساعدنا بعرفه الاجابة

Morphologic comparison of lymphoblasts and myeloblasts.

A. ALL: Lymphoblasts have fewer nucleoli than do myeloblasts, and the nuclear chromatin is more condensed. Cytoplasmic granules are absent.

B. AML: Myeloblasts have delicate nuclear chromatin, prominent nucleoli, and fine azurophilic granules in the cytoplasm

lymphoplast
لا تملكها
granule



MPN+MDS



Myeloproliferative
Neoplasm

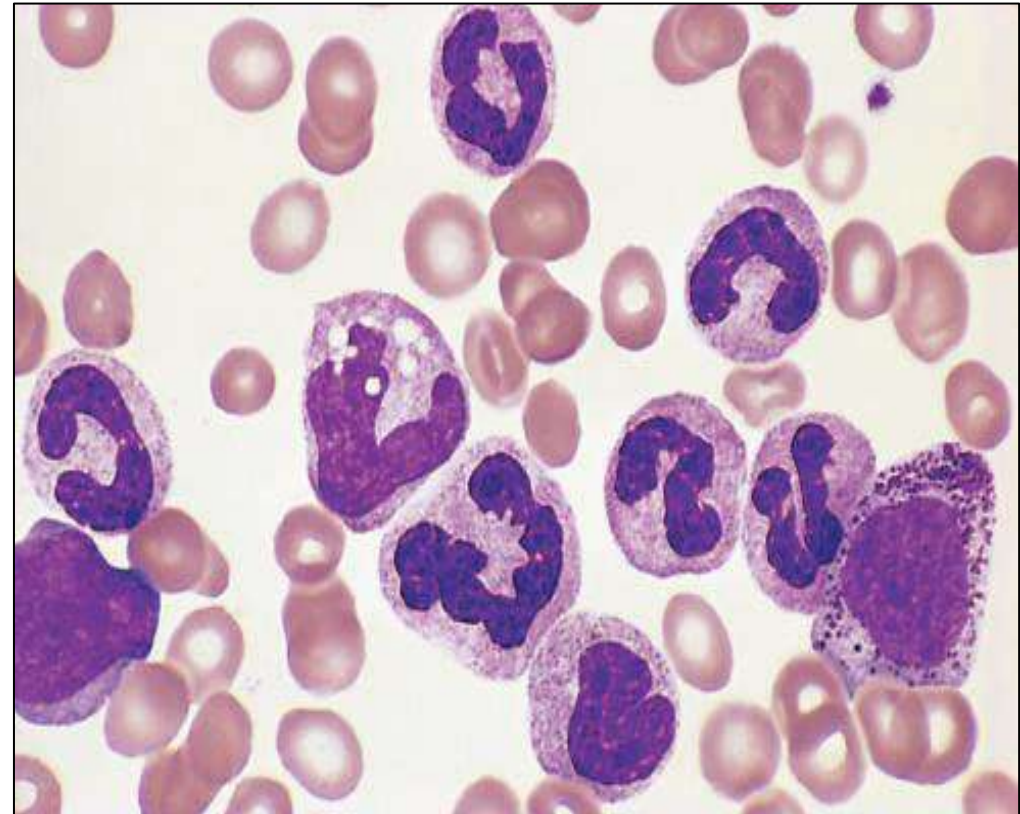
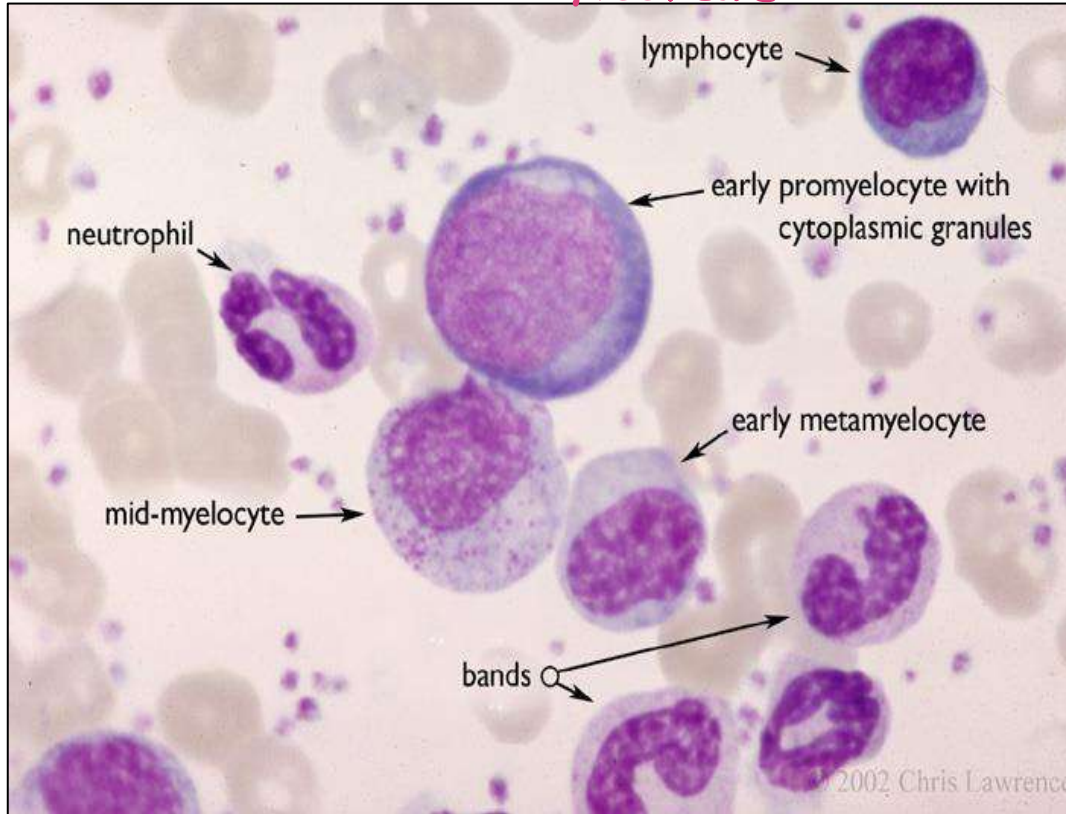


Myelodysplastic Syndrome

CML (Chronic Myeloid Leukemia)

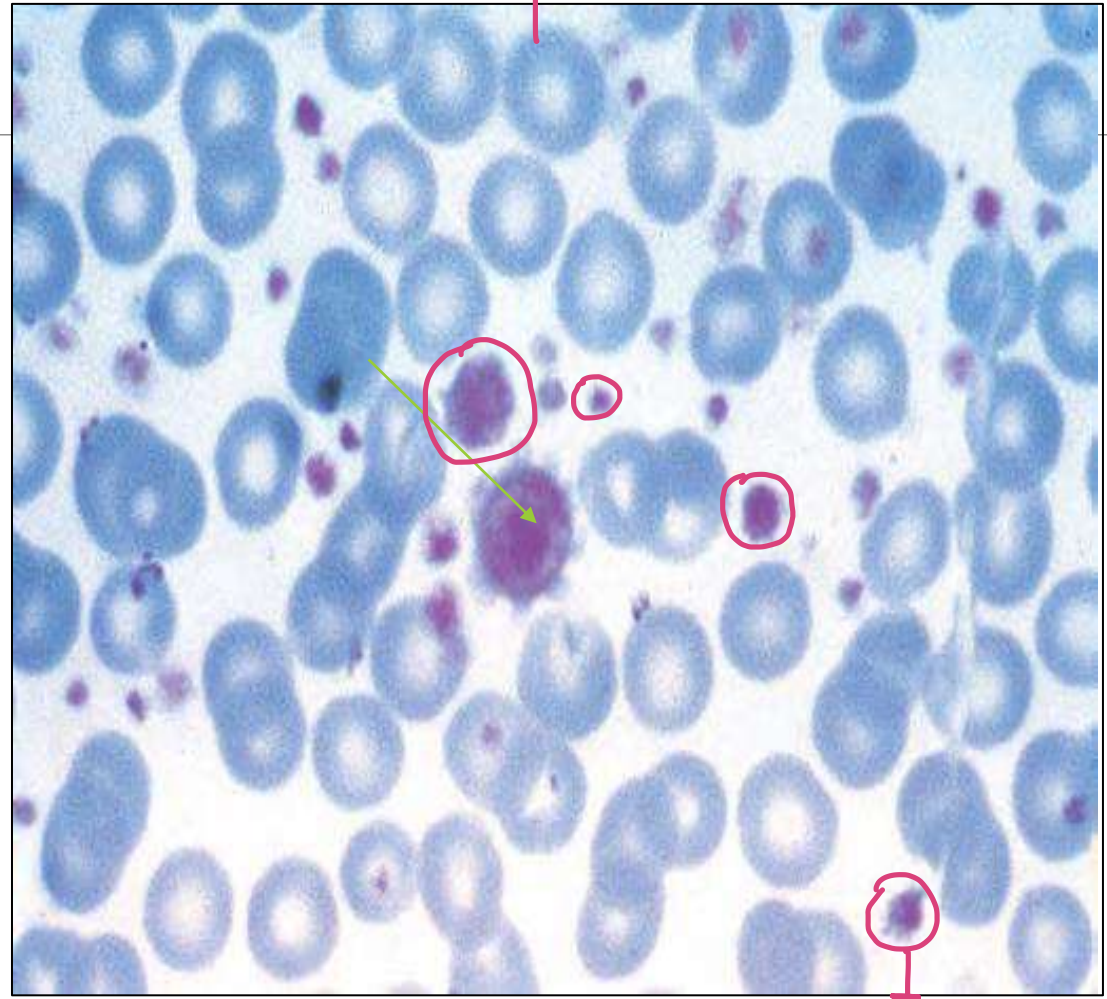
Peripheral blood smear: Granulocytic forms at various stages of differentiation are present

مگاکاریوسایته و Peripheral blood بال زیاد ال granulocyte precursors present



Essential Thrombocythemia (ET)

- Peripheral blood smear shows marked thrombocytosis, including **giant platelets** approximating the size of surrounding red cells.

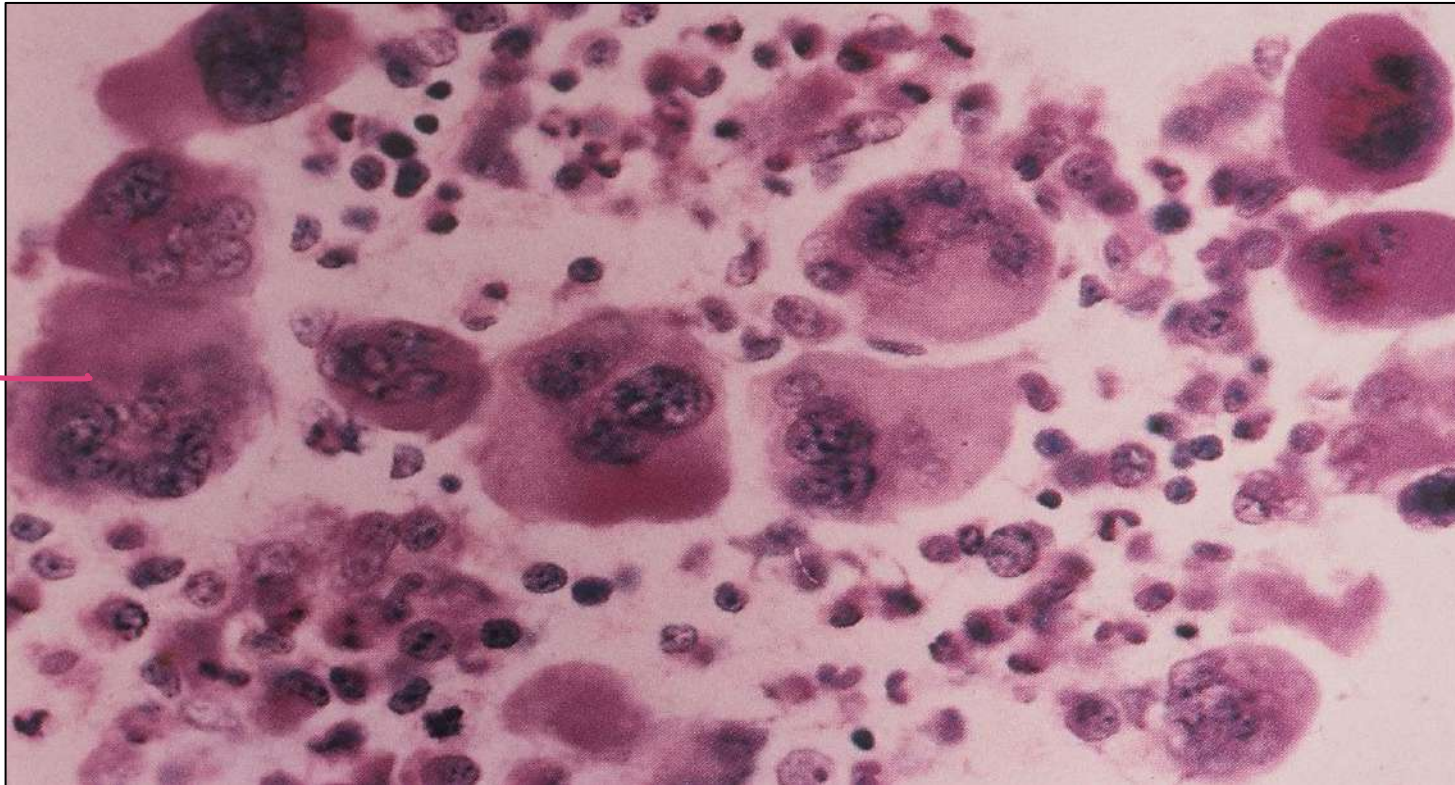


* زيادة بال Megakaryocyte بالتالي بنعكس على ال Peripheral blood
زيادة بال Platelet .

← Platelet حجمها كبير وموجودة بكثرة بالتالي يعرف انها ET
قريب من حجم ال RBC .

Essential Thrombocythemia (ET)

Bone marrow



multinucleated
↑ megakaryocyte

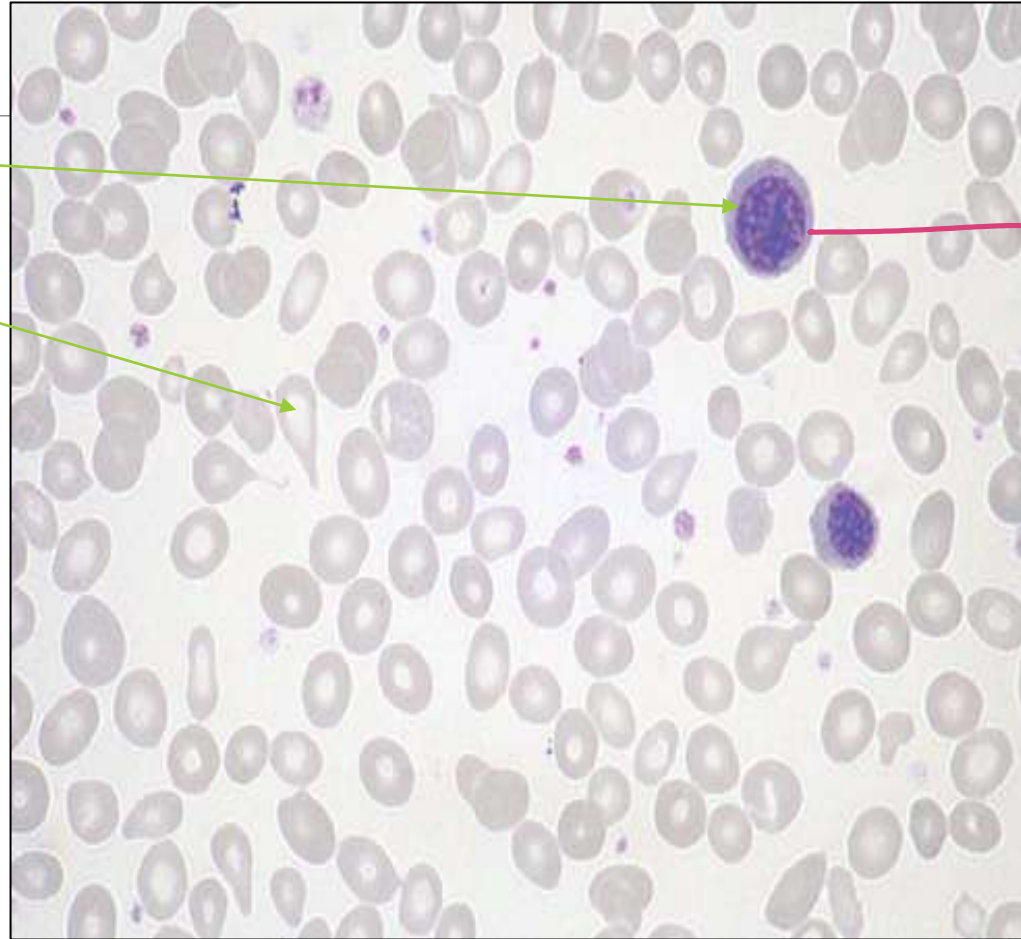


ET labia

Leukoerythroblastosis سببها Peripheral blood بال تفسیرات bone marrow بال densFibrosis لما يهيم في-
↓
Affected to erythroid precursor جزعنا التفسیرات بعلم

Primary myelofibrosis— peripheral blood smear.

-Two nucleated erythroid precursors and several teardrop-shaped red cells are evident (Leukoerythroblastosis)

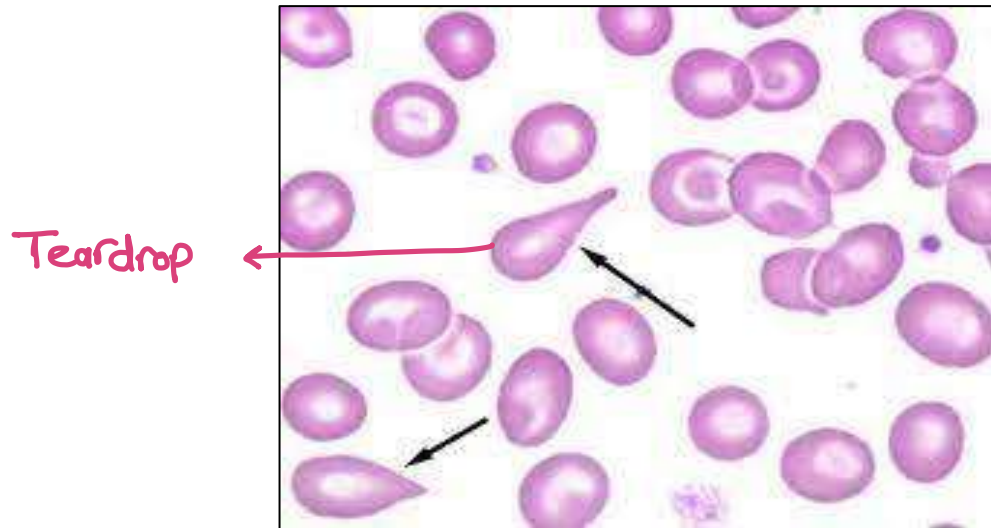


بنشوف ال
erythroid
precursor
(نليد الدم nucleus)

طالعين على ال
Peripheral blood
+
RBC تفسیر بشکل
(Teardrop)



جزعنا انها
Primary myelofibrosis



Teardrop

تغييرات
بأشكال
granulocyte
+ Megakaryocyte

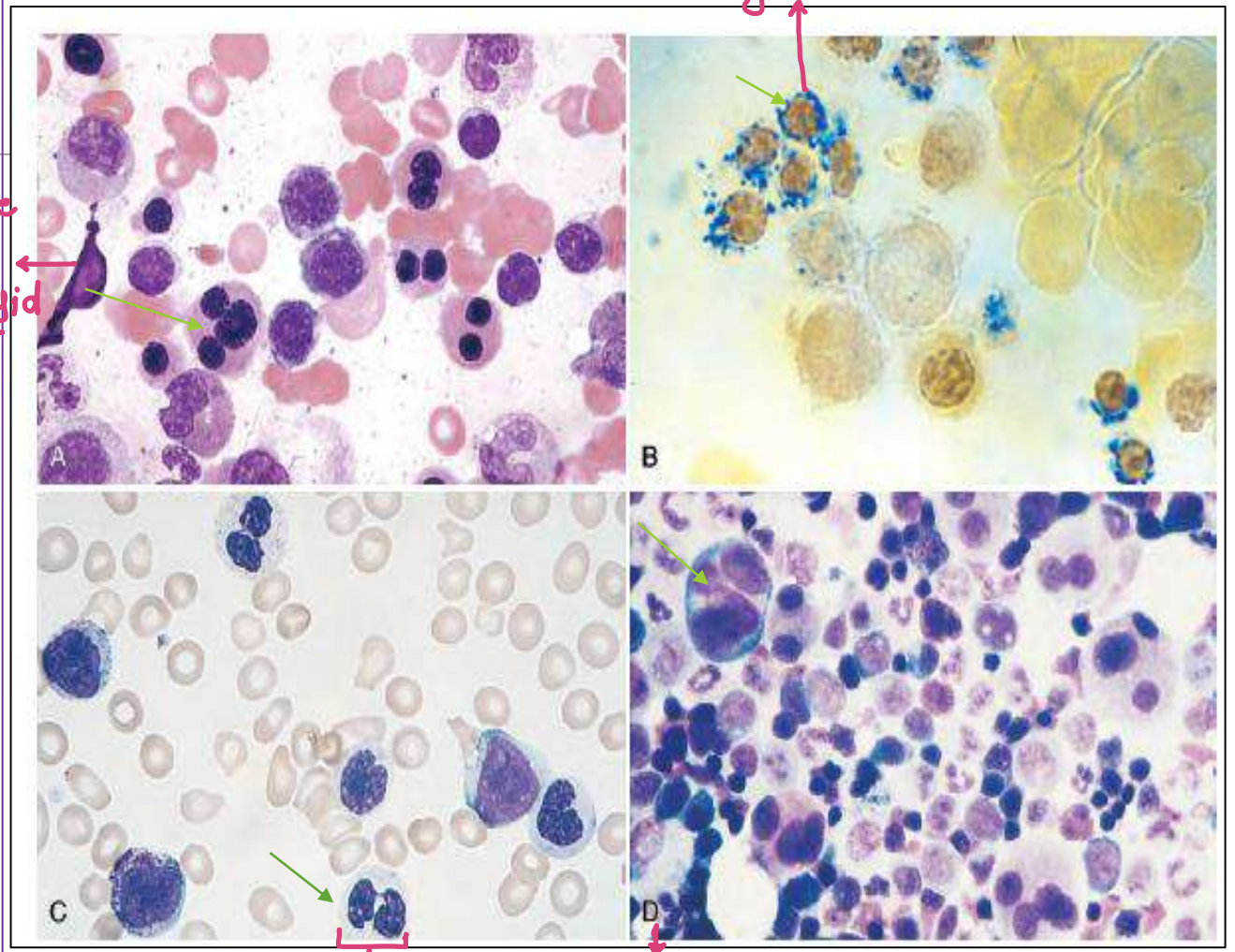
Myelodysplasia (MDS): Characteristic forms of dysplasia are shown (A, B, D, Marrow aspirates; C, peripheral blood smear.)

- A**, Nucleated red cell progenitors with multilobated or multiple nuclei.
- B**, Ringed sideroblasts, erythroid progenitors with iron-laden mitochondria seen as blue perinuclear granules (Prussian blue stain).
- C**, Neutrophils with only two nuclear lobes instead of the normal three to four
- D**, Megakaryocytes with multiple nuclei instead of the normal single multilobated nucleus.

Multilobe
nuclei
erthyroid
↓
MDC

← صبوغ بصبغة الحديد

ring sideroblast → MDC



hypossegmented

غير مطلوبة

Normal Lymph Node Morphology Reactive benign conditions

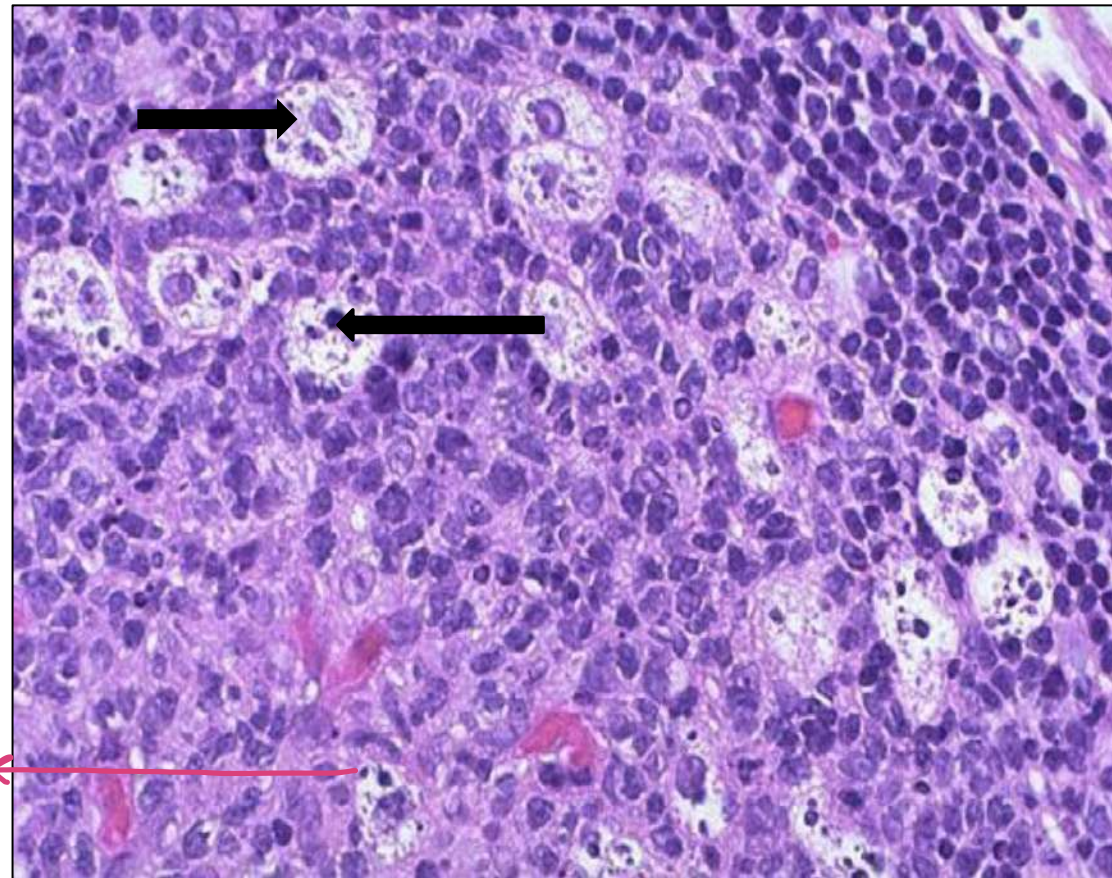
* الدكتورۃ فاح نساءل بال *normal* بالامتحان بس بتحللهم عشان
نقدر نميز بين ال *normal* وال *malignant* .

Benign reactive lymph node in follicular hyperplasia

The germinal center in this reactive lymph node follicle has prominent macrophages with irregular cellular debris (so-called "tingible body macrophages" (arrows)).

بقايا الخلايا الميتة او البكتيريا

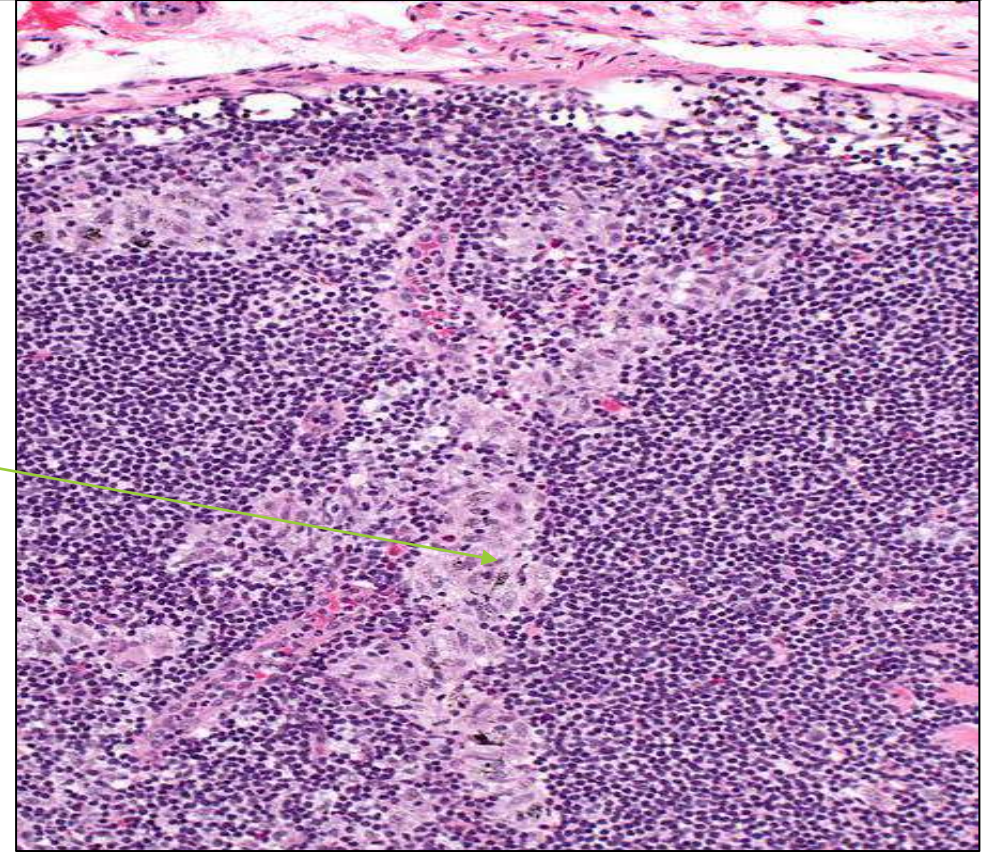
النقاط الالوانها غامقة (tingible body)
تفسيح
حميد [reactive follicular hyperplasia
or benign



Benign reactive lymph node, **Sinus Histiocytosis**

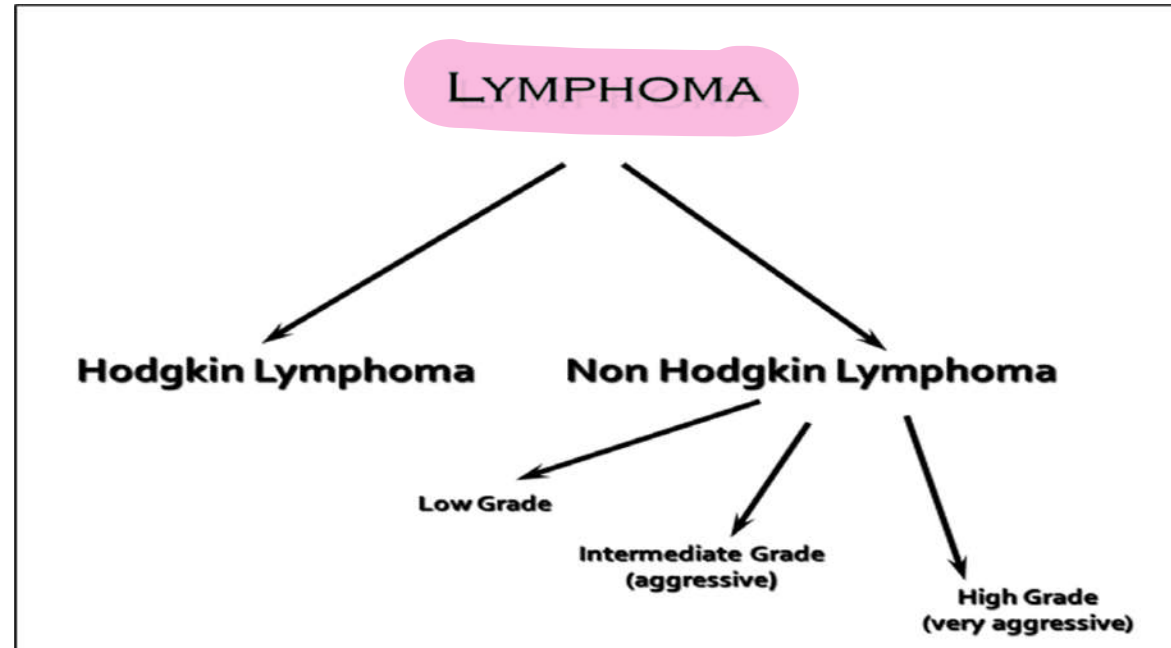
-Characterized by distention and prominence of the lymphatic sinusoids, owing to a marked **hypertrophy of lining endothelial cells** and an **infiltrate of macrophages (histiocytes)**.

Sinus وحبية بخلييا فانجرة اللون



NHL

Non hodgkin lymphoma

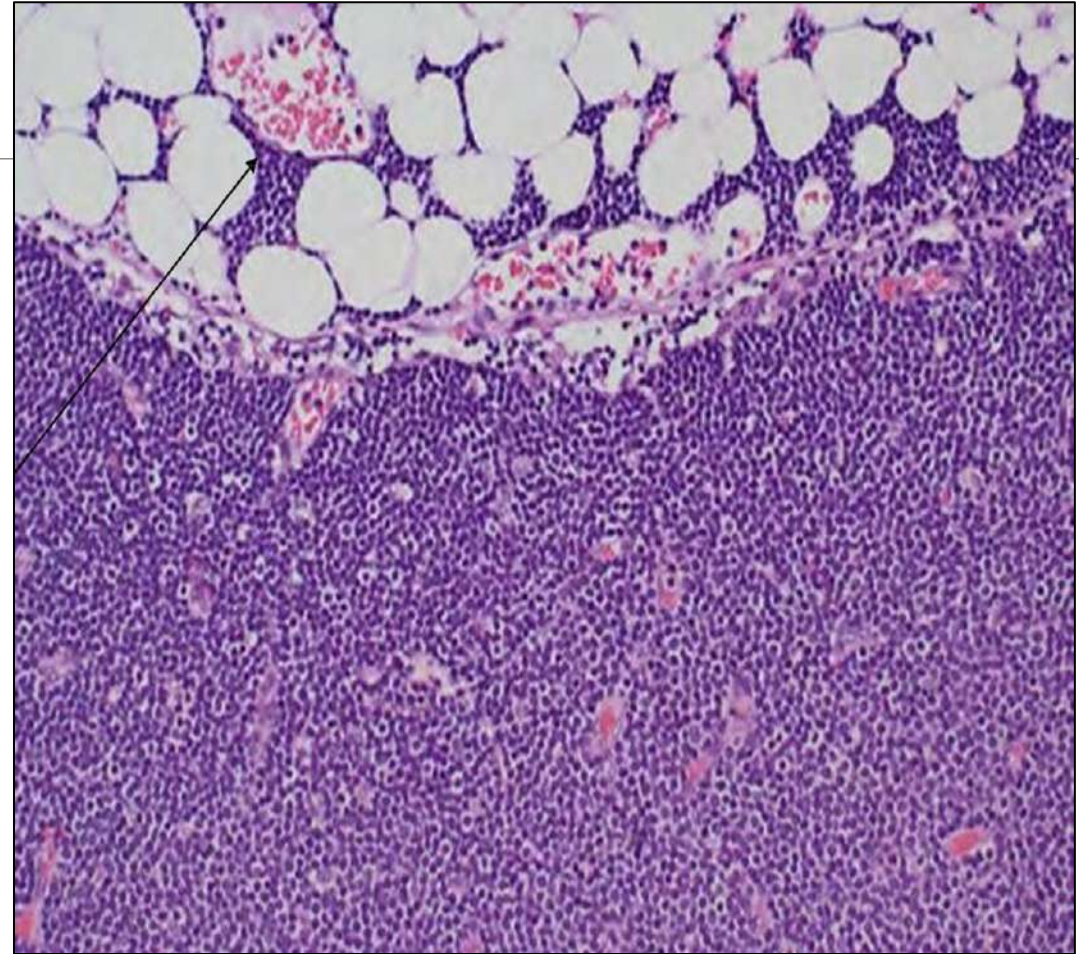


خلايا هافينين بشكل عشوائي وداخلين على ال Fat

low grad

Small Lymphocytic Lymphoma, SLL

- This lymph node's normal architecture is obliterated and replaced by an infiltrate of small (mature-appearing) neoplastic lymphocytes.
- The infiltrate extends through the capsule into the surrounding fat.



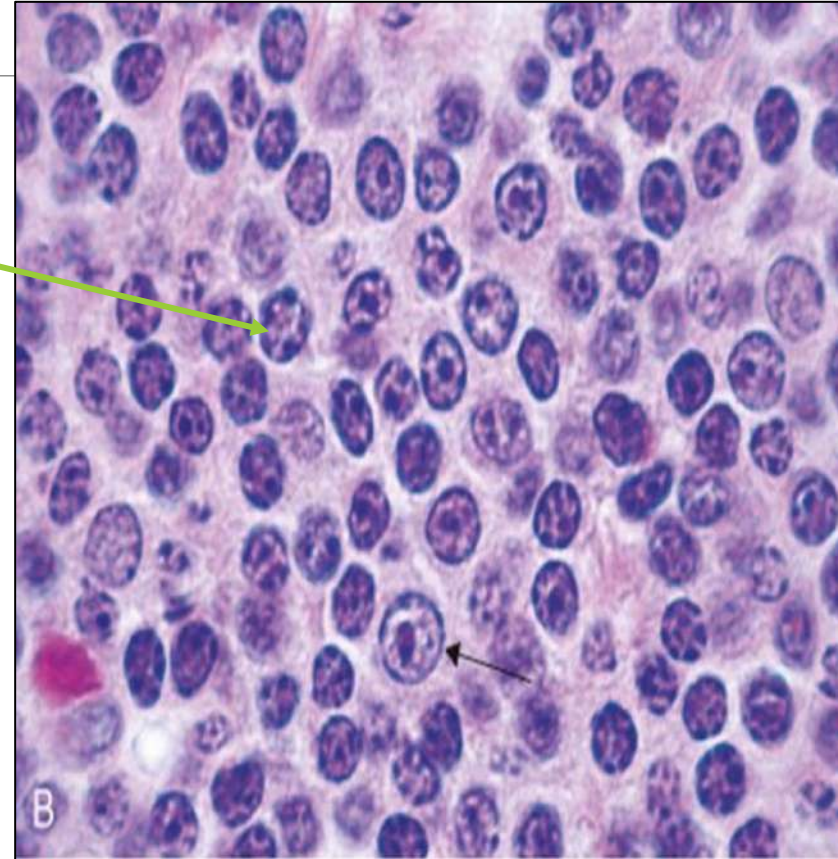
بيجبى السؤال مع هاي المبررة فيها صفات تبين النوع تاعها :

proliferation * smudge cell * small size *

Small lymphatic lymphoma

SLL

- At high power, most of the tumor cells have the appearance of small, round lymphocytes.
- A “prolymphocyte,” a larger cell with a centrally placed nucleolus also is present in this field (arrow).



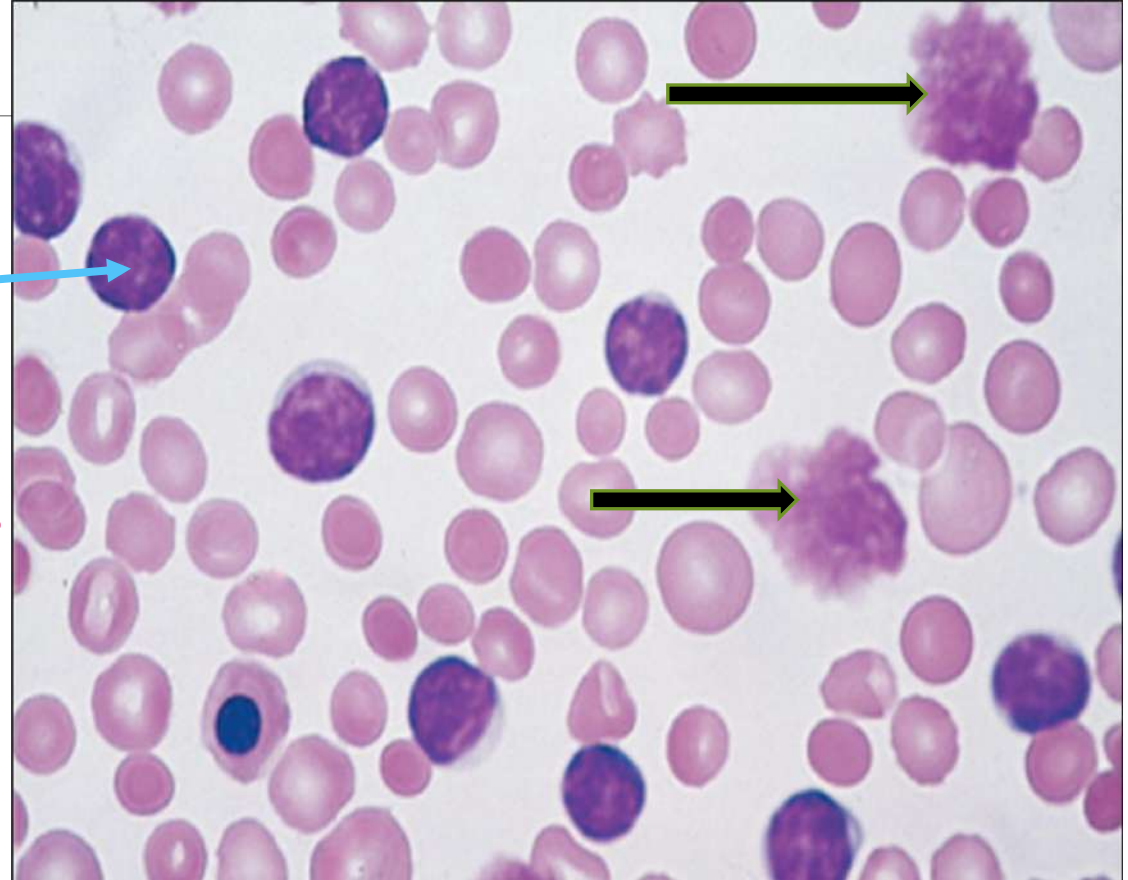
Smudge cell ← احد ال Hint الي بندق عاك SLL

SLL, Peripheral Smear

This peripheral blood smear is flooded with small lymphocytes with condensed chromatin and scant cytoplasm.

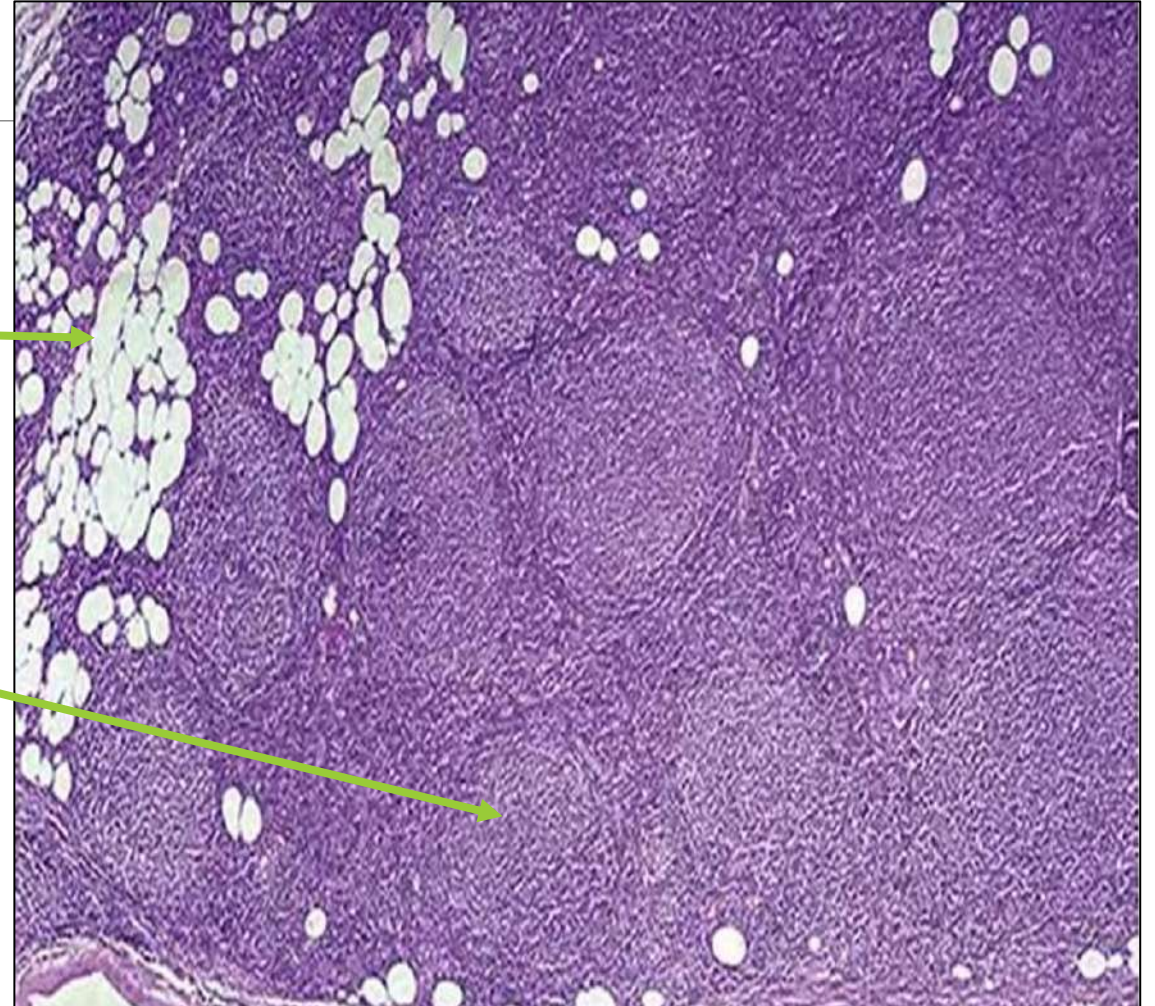
A characteristic finding is the presence of **Smudge cells**, two of which are present in this smear (black arrows).

بتكون لهشة
منعاق فلما
نرهم ال Smear
بيلشوا يتكسروا
بهميروا Smudge
ال cell



Follicular Lymphoma

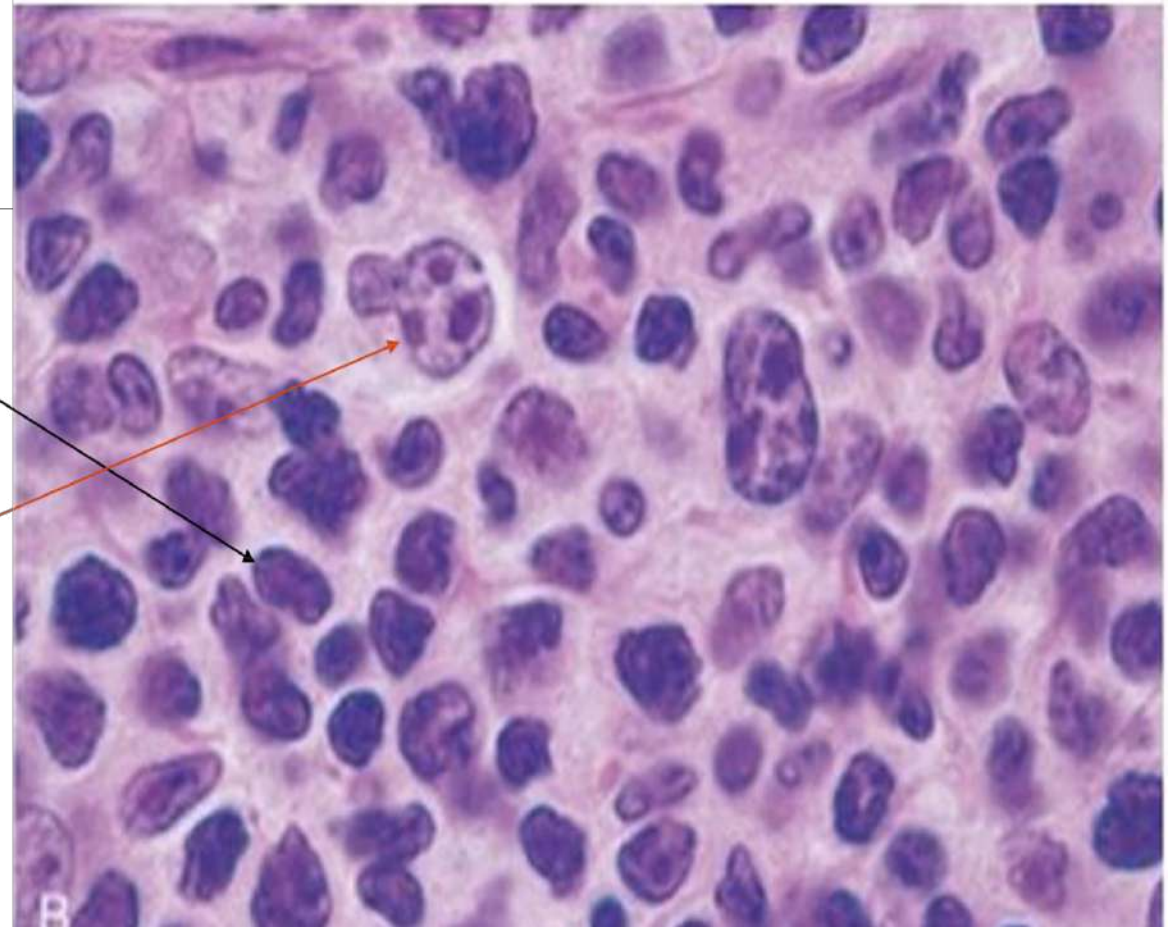
- The capsule of this lymph node has been invaded, and lymphoma cells extend into the surrounding fat.
- The follicles are numerous, irregularly shaped and present throughout giving the **nodular appearance**.



تجمعات عکلی شکلی nodule و عاقله Fat Tissue invasion

Follicular Lymphoma

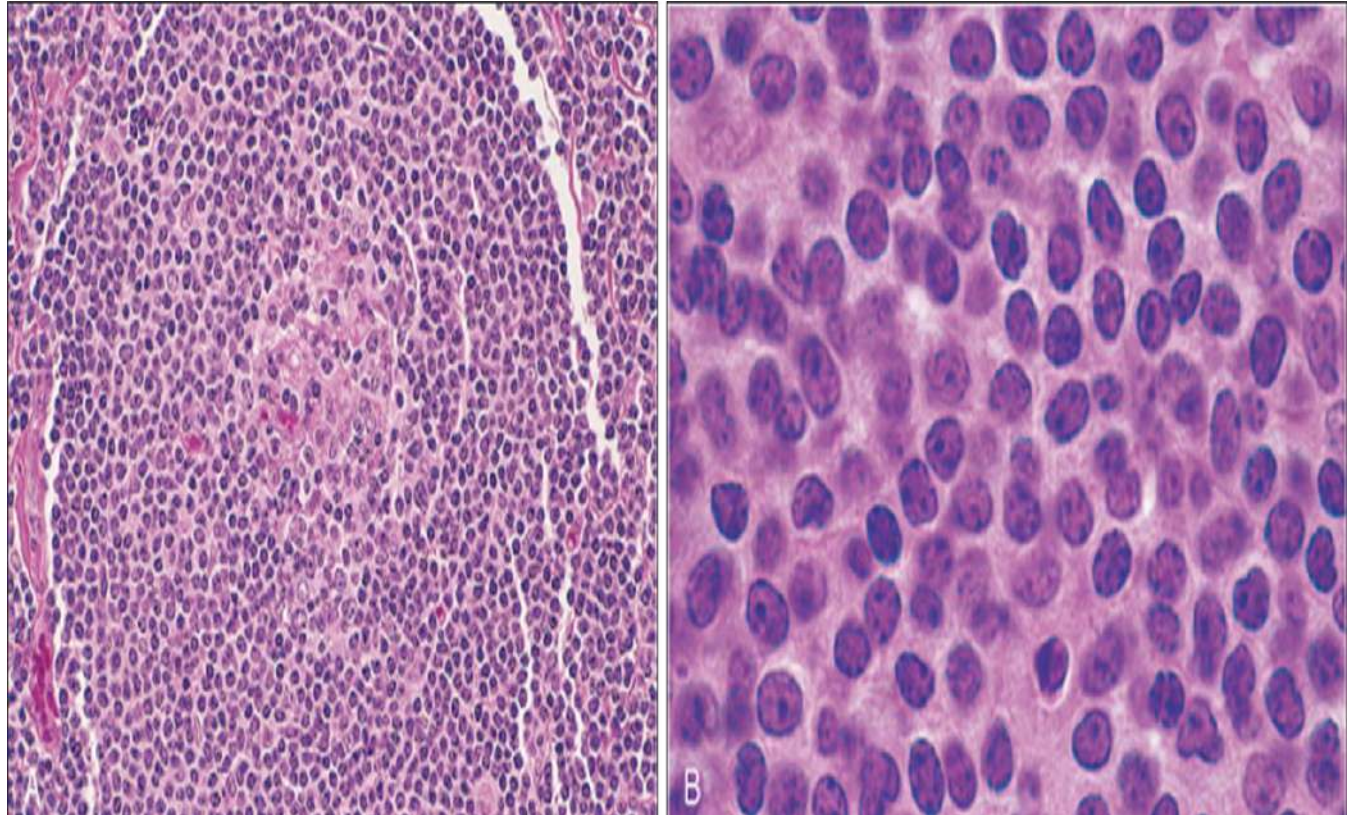
1. Centrocytes: Small and cleaved with dense chromatin.
2. Centroblasts: Large with fine chromatin and prominent nucleoli.



Mantle Cell Lymphoma

May involve lymph nodes in a **diffuse** or vaguely **nodular** pattern.

The tumor cells usually are slightly larger than normal lymphocytes and have an irregular nucleus(cleaved) inconspicuous nucleoli, and scant cytoplasm.



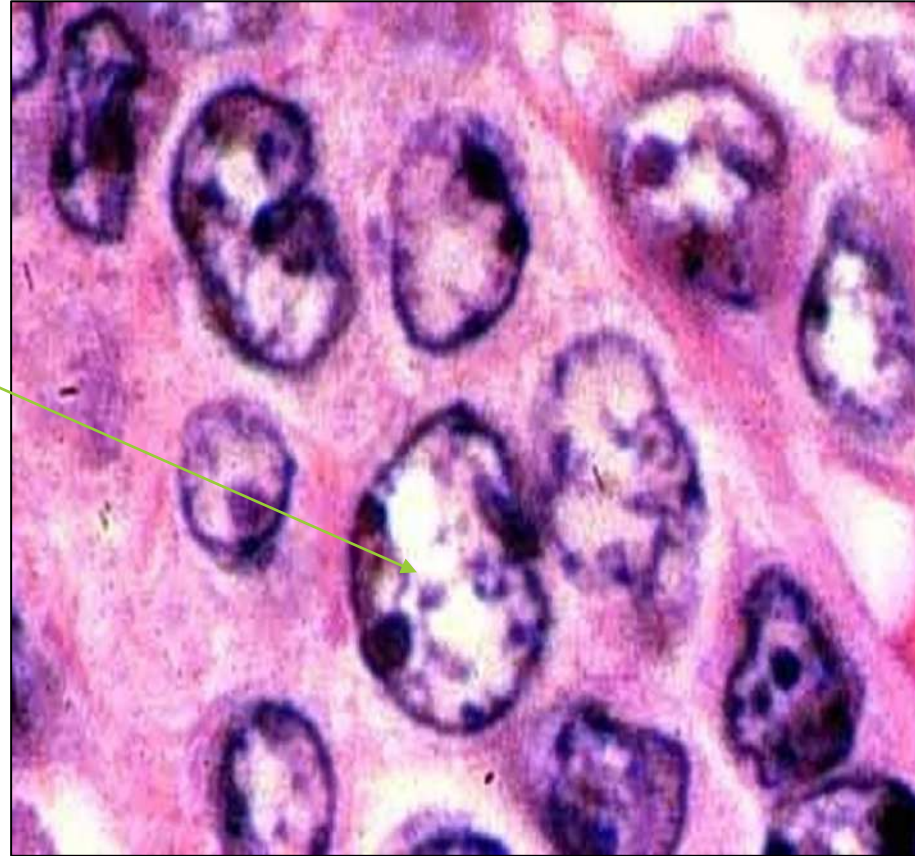
high grad

Diffuse Large B-cell Lymphoma

Lymph node biopsy:
showing large **centroblasts**
with multiple nucleoli

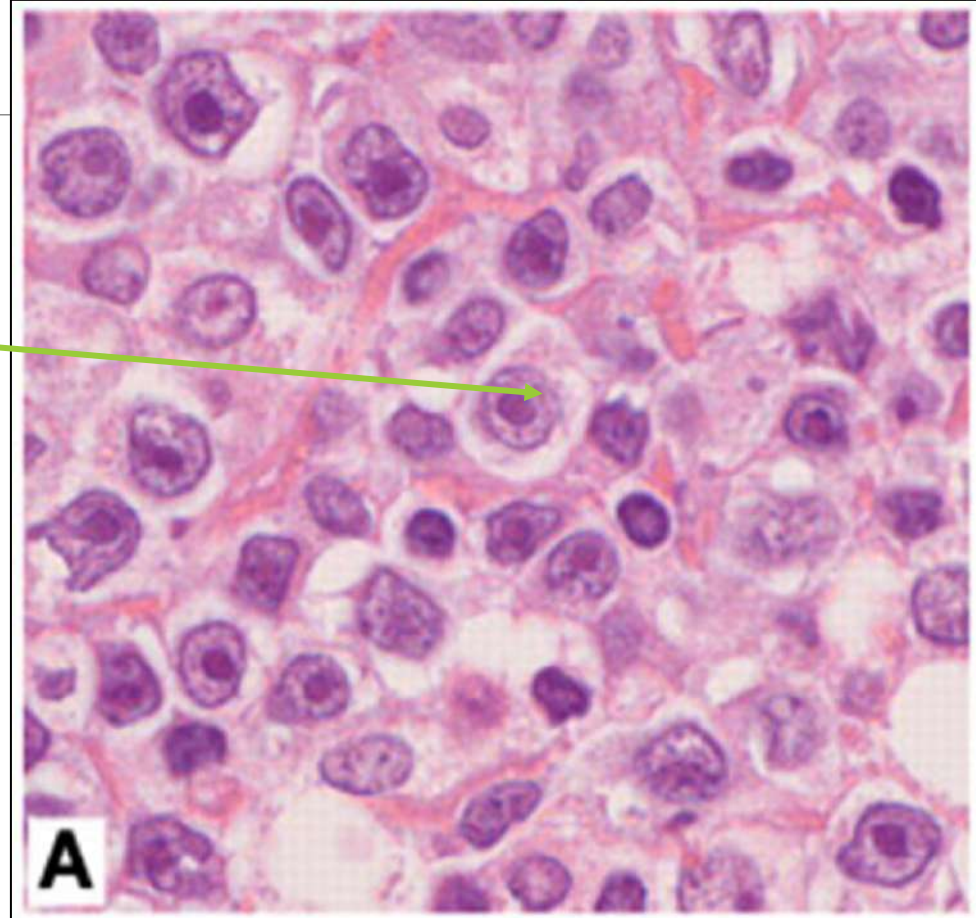
→ large cell

→ abundant and prominent nucleoli



Diffuse Large B-cell Lymphoma

DLBL with **immunoblasts** with one central nucleolus.

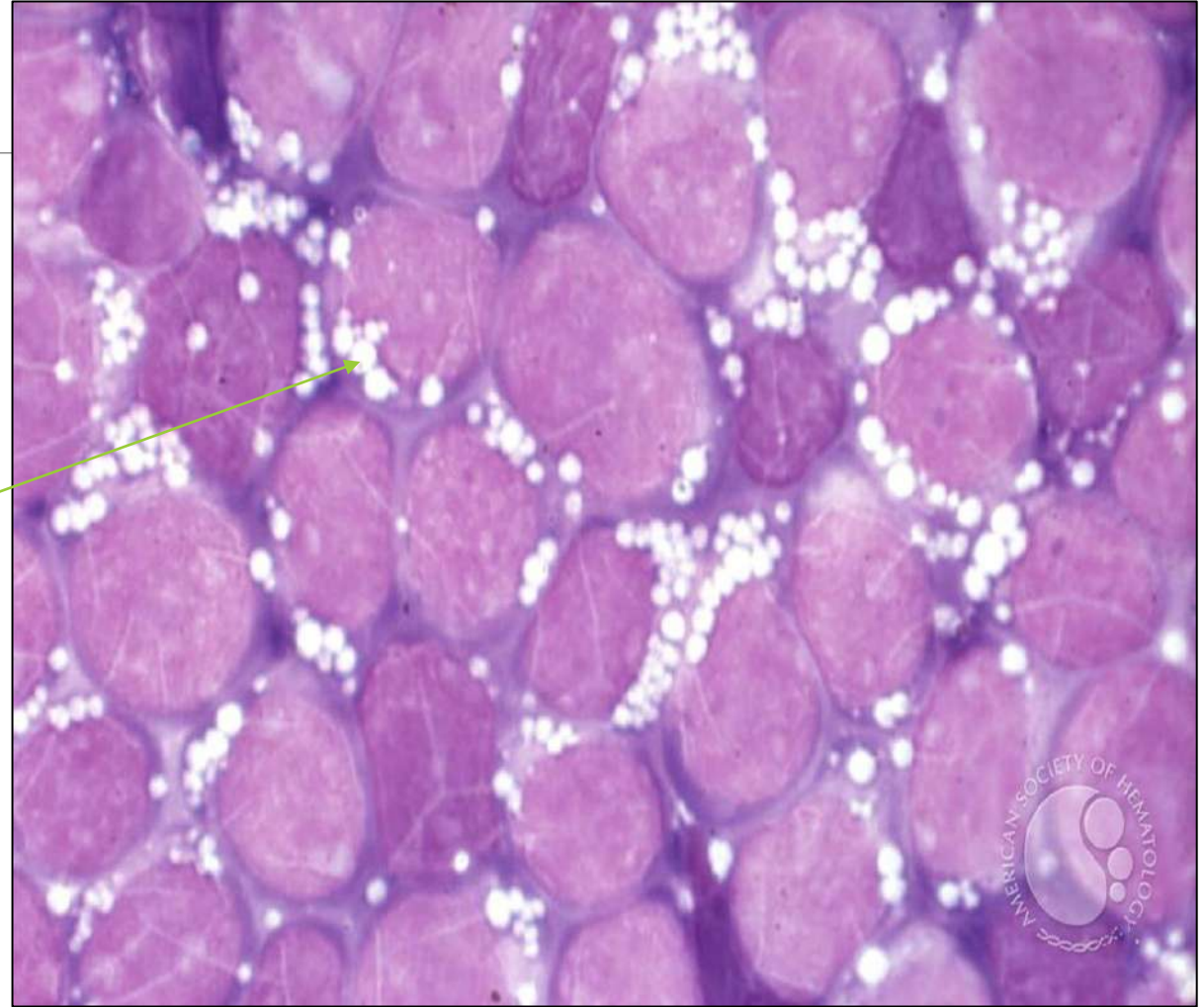


*مفروض لو جابت الدكتوراة **case** وفيها هاد السيمير على السريع نميزو ليه؟ عشان
بتميز السيتوبلازم بوجود **lipid filled vacuoles** (1)
(2) - **Starry sky appearance** (سلاية زعنفة)

وحدة فن الTumor الي دايركت ممكن نميزها

Burkitt Lymphoma, Smear

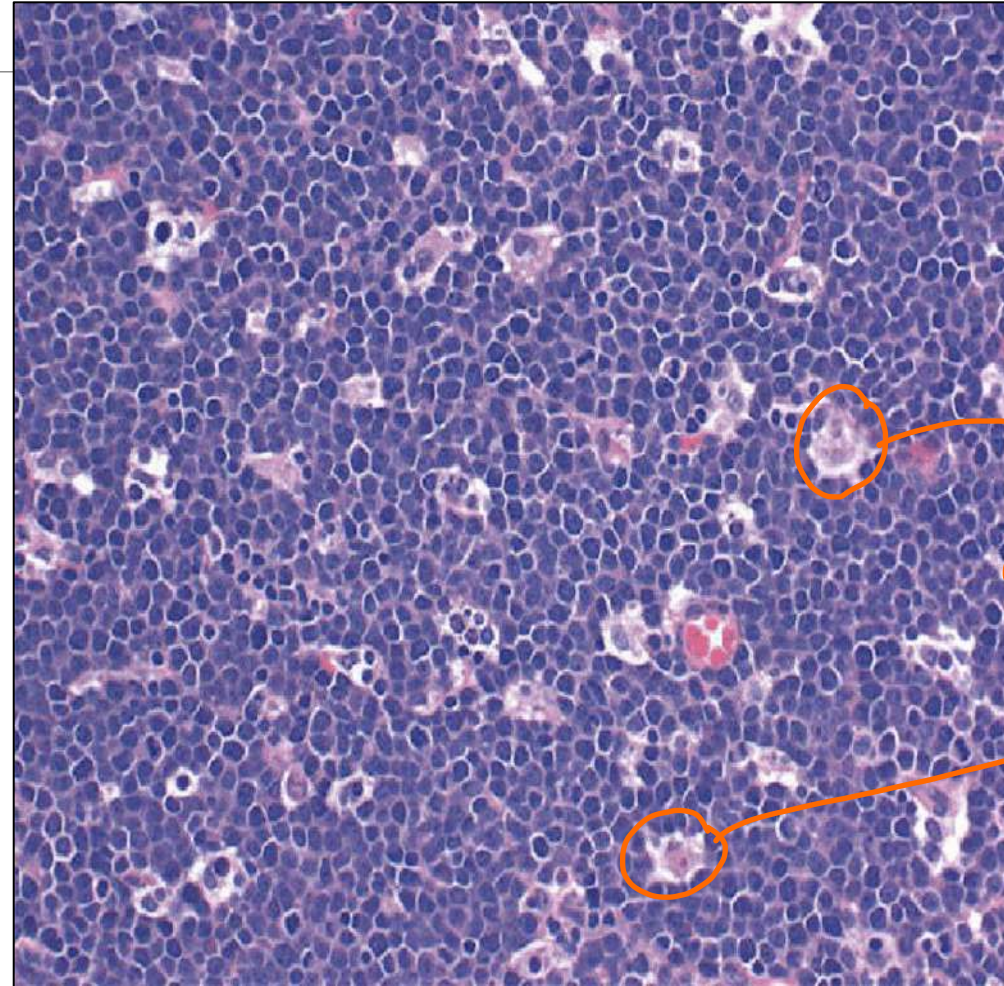
- The tumor cells are uniform and intermediate in size and typically have round or oval nuclei with 2-5 distinct nucleoli.
- There is a moderate amount of basophilic or amphophilic cytoplasm that often contains small, **lipid-filled vacuoles** (a feature appreciated on smears).



* شبيهة بالاطفال

Burkitt Lymphoma

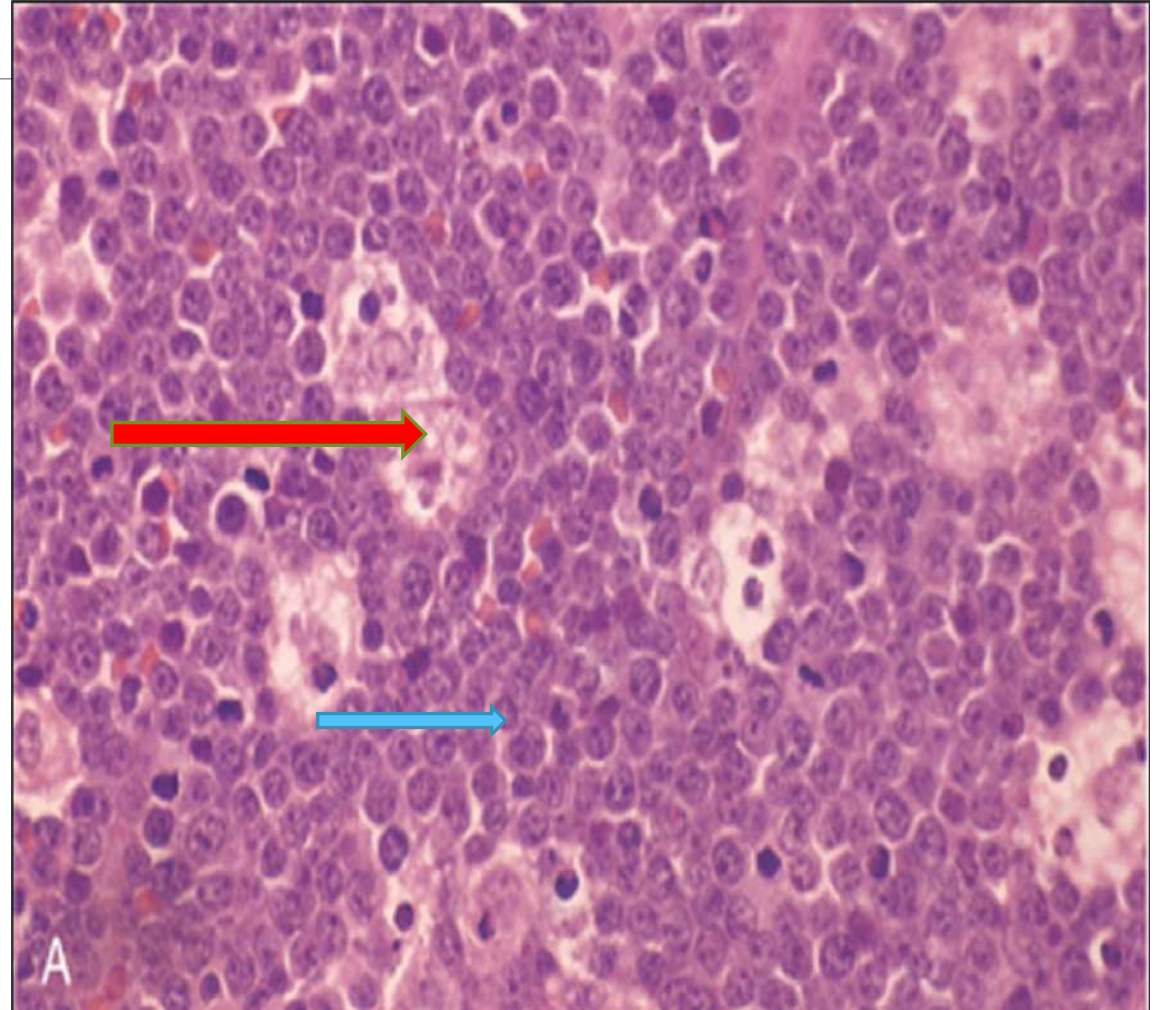
- Starry sky appearance



شكل ال
macrophages
زي الستار بالسماا

Burkitt Lymphoma

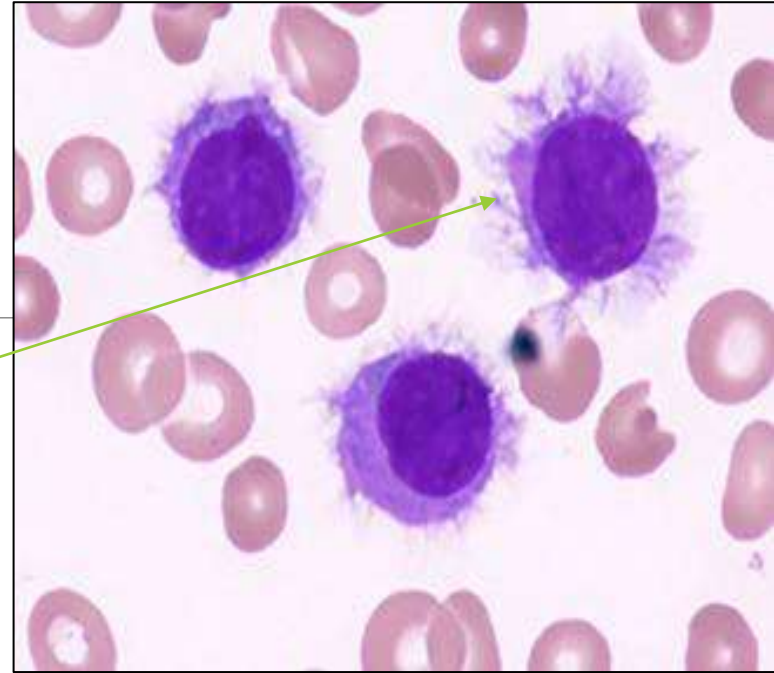
Diffuse sheets of medium-sized neoplastic **Lymphocytes** with **abundant mitosis** and apoptotic bodies beside **tingible body macrophages**.



Hairy Cell Leukemia

- peripheral bloodsmears shows abnormal lymphocytes with indistinct cytoplasmic borders and surface projections, giving the cells a “hairy” appearance.

في السؤال
hint



- The **red** cytoplasmic staining seen at the lower right is tartrate-resistant acid phosphatase (**TRAP**) positivity



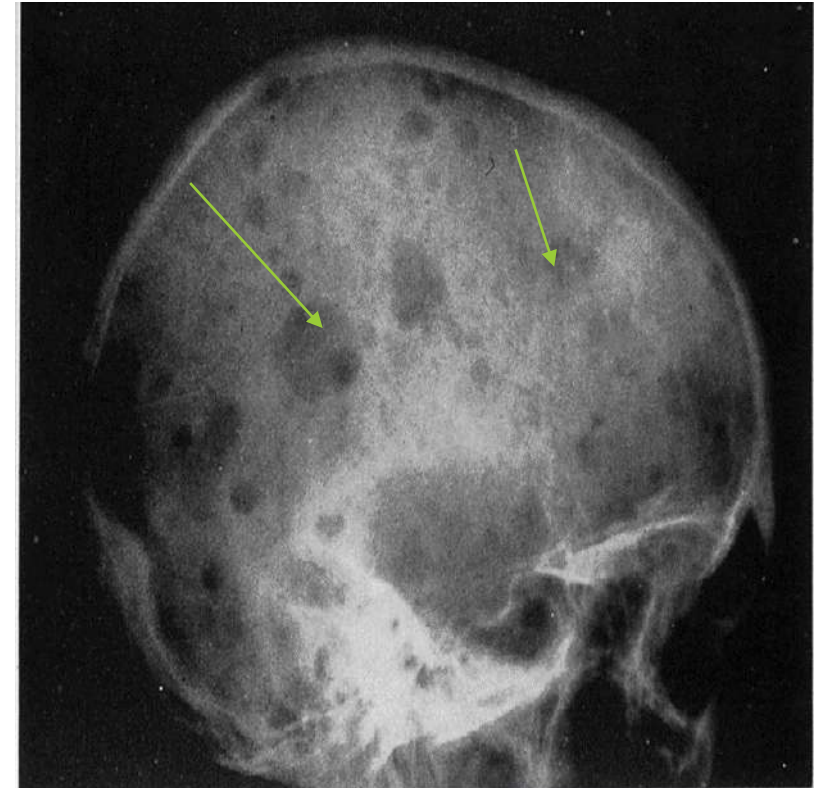
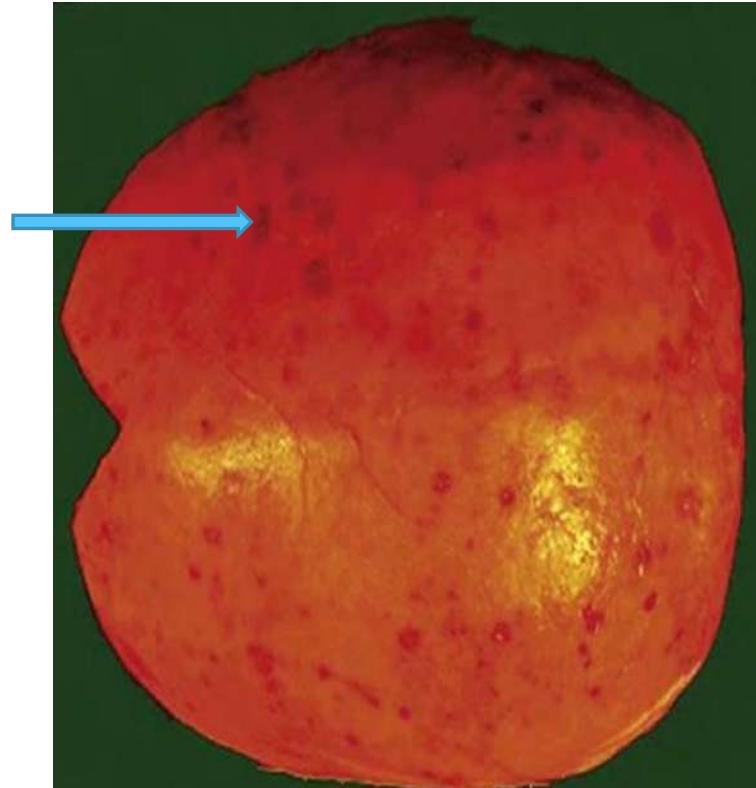
*من اسهل الاشياء الي ممكن نشوفها ب ال cases سواء حطلك صورة سيمير او لا، كيف؟
مريض عمرو ٥٠،٦٠ سنة وكان فيه عندو tumor في BM (بالتالي عم نحكي عن لوكيميا) وكان شكل الخلايا زي الي بالصورة

Plasma cell neoplasm

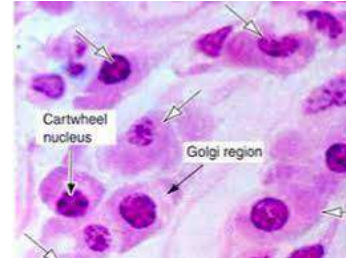
Multiple myeloma

Skull X-ray showing multiple “punched out” osteolytic lesions

- This skull shows the characteristic rounded “punched-out” defects.
كأثو حدا حافر بالعظم ↗
- The focal areas of plasma cell proliferation result in bone lysis to produce these multiple lytic lesions.
ببتميز ب:

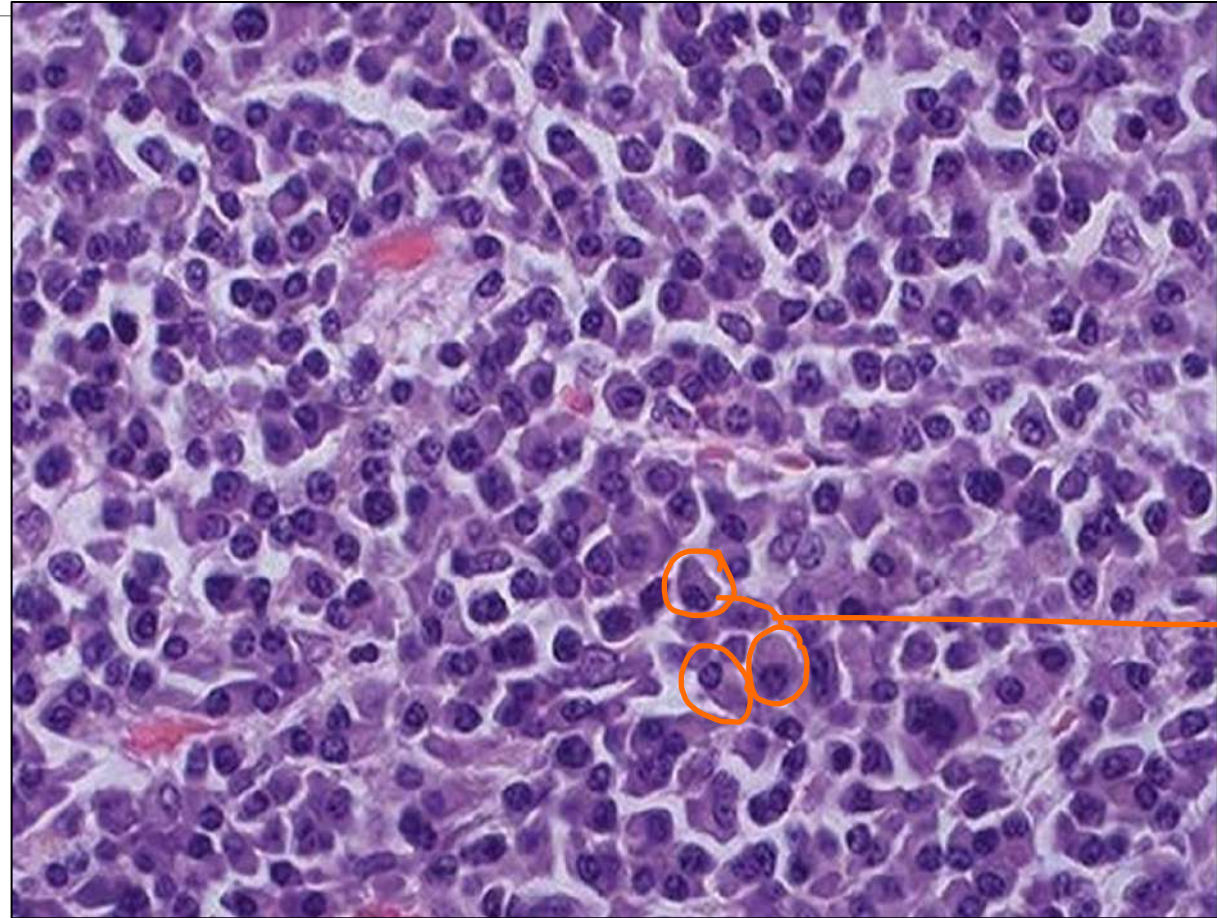


Multiple myeloma



In bone marrow biopsy section: there are sheets of plasma cells that are very similar to normal plasma cells, with eccentric nuclei and abundant pale purple cytoplasm resembling bike wheel.

* أهم ميزة فيها

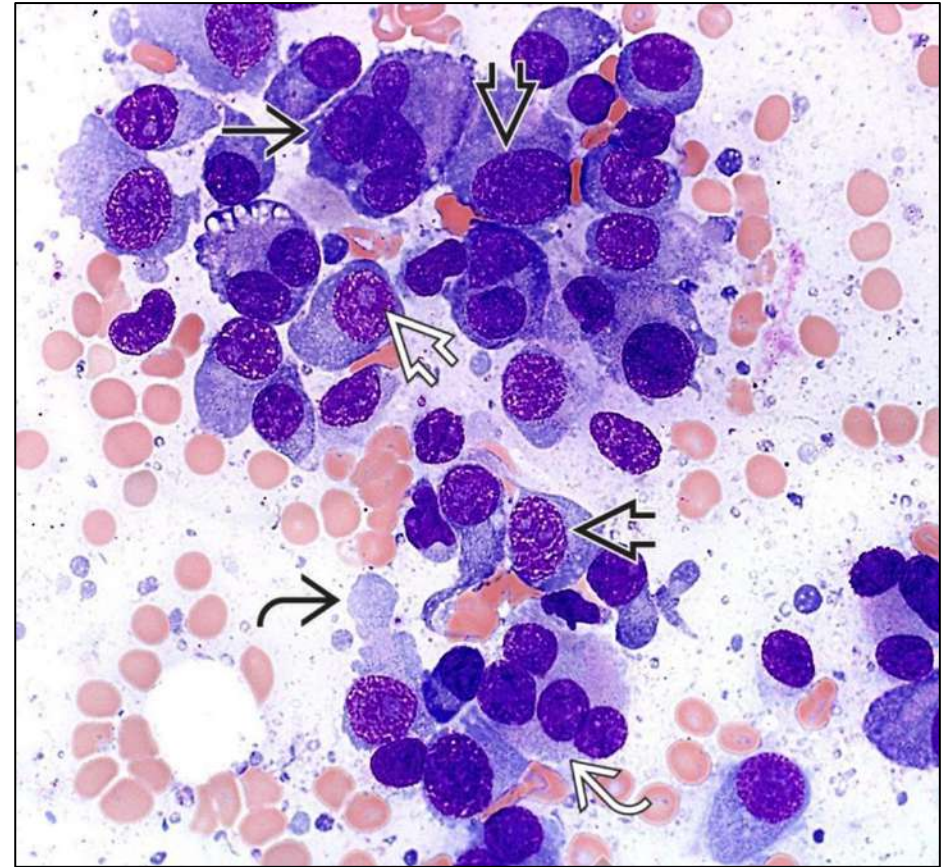


النواة على
المحرف

Multiple myeloma

■ Features of PC atypia are illustrated in this aspirate, including:

- Cellular and nuclear enlargement, nuclear **pleomorphism** (black solid arrow),
- **Multinucleation** (white curved arrow),
- **Dispersed nuclear chromatin** (black open arrow), *بصير شكلو غريب + حكت مش وهم* ←
- **Prominent nucleoli** (white open arrow)
- Cytoplasmic fraying or shedding (black curved arrow).



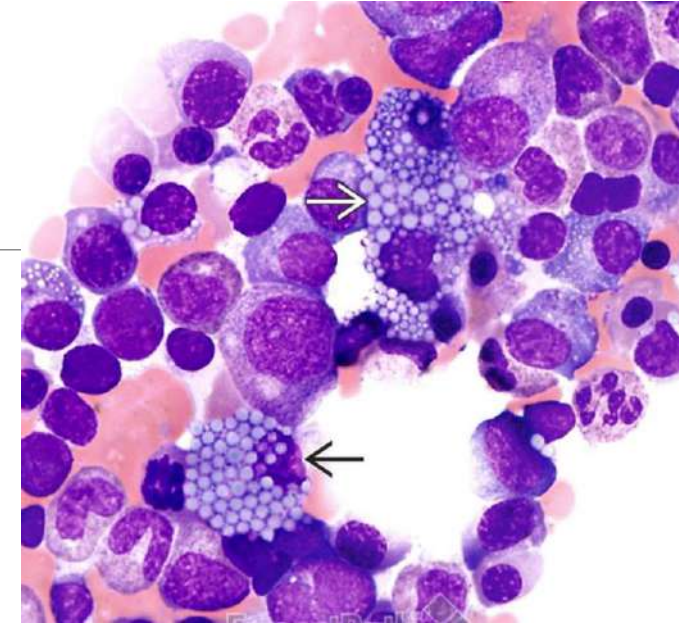
خلايا الخلية
أحجامها
مختلفة

أكثر من نواة
جوان ال cell

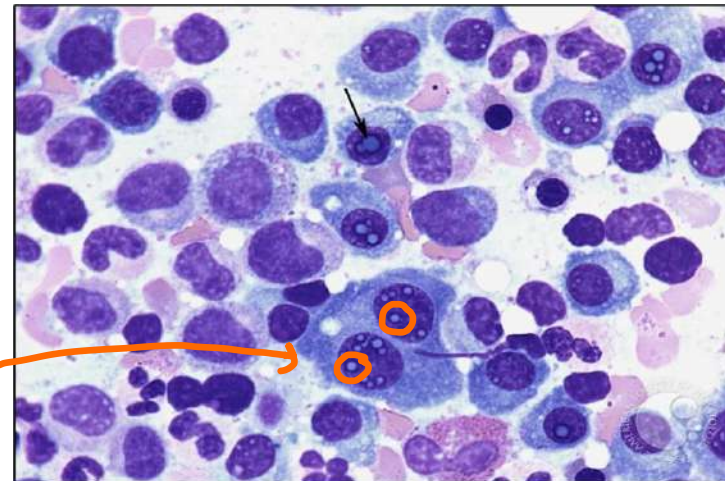
Multiple myeloma

هون شغلات منشوفها اوضح في حالات ال multiple myeloma

- **Russell bodies** (white solid arrow) in the **cytoplasm**. لازم نعرف الاسم لكل وحدة وين
- When multiple Russell bodies are in the cytoplasm of cells, they are referred to as **Mott cells or morula cells, grape-like cells** (black solid arrow).



- If the inclusions are **intranuclear** they are called: **Dutcher bodies** (black arrow)

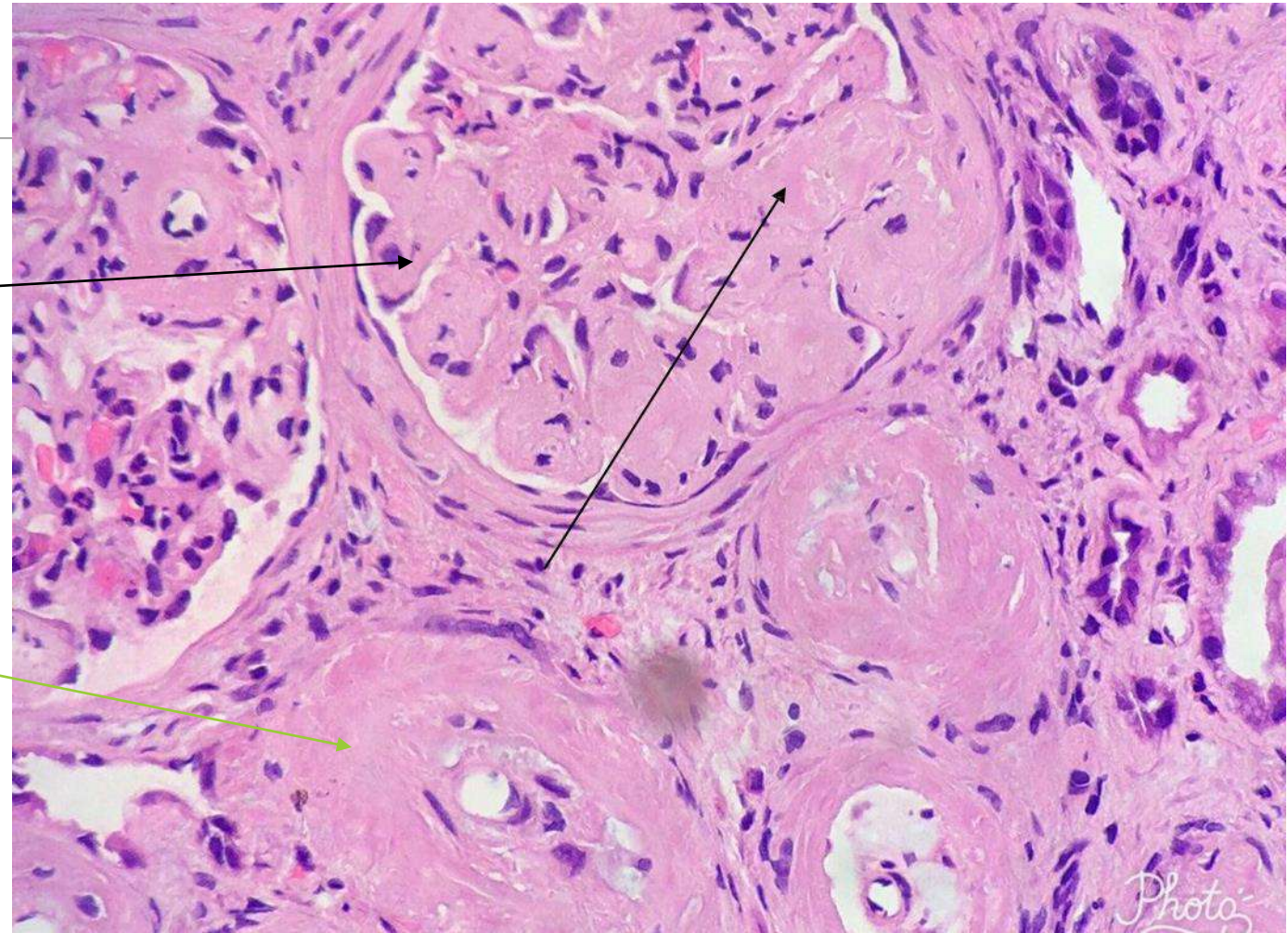


Renal Amyloidosis, Multiple Myeloma

- In the renal cortex, pale pink deposits of amyloid are visible within glomeruli.

لما بتشوف pink material حط ببالك انها ممكن تكون amyloid

- The amorphous pink deposits of amyloid may be found in and around arteries, in interstitium, or in glomeruli.

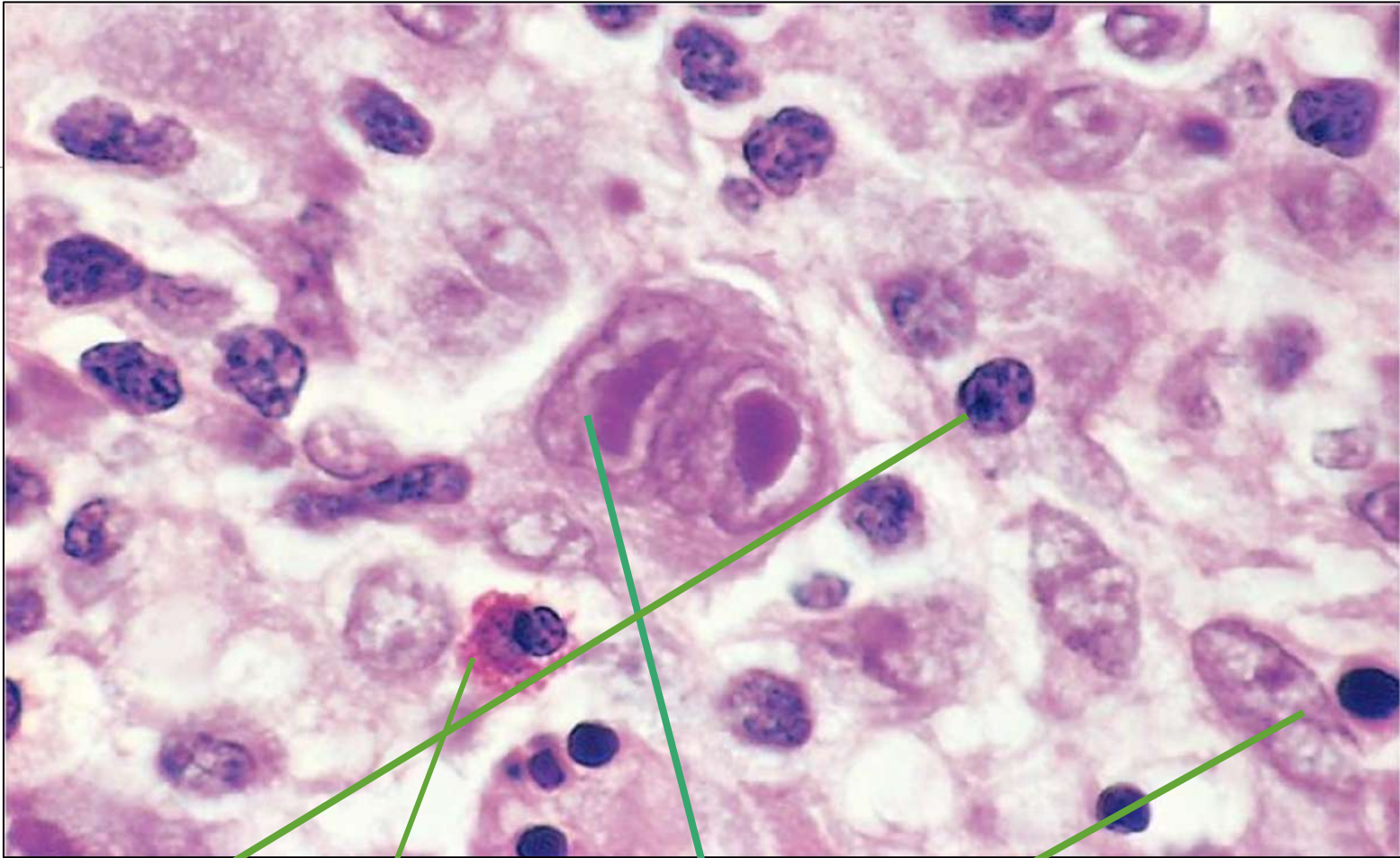


* معلومة فن الدكتور : احفظ الهمزة فتح حسان
حاطلخبطوا بين HL / LPHL + وبين
انواعهم حسان تعرفو التشخيص مع

HL



Hodgkin Lymphoma (HL)

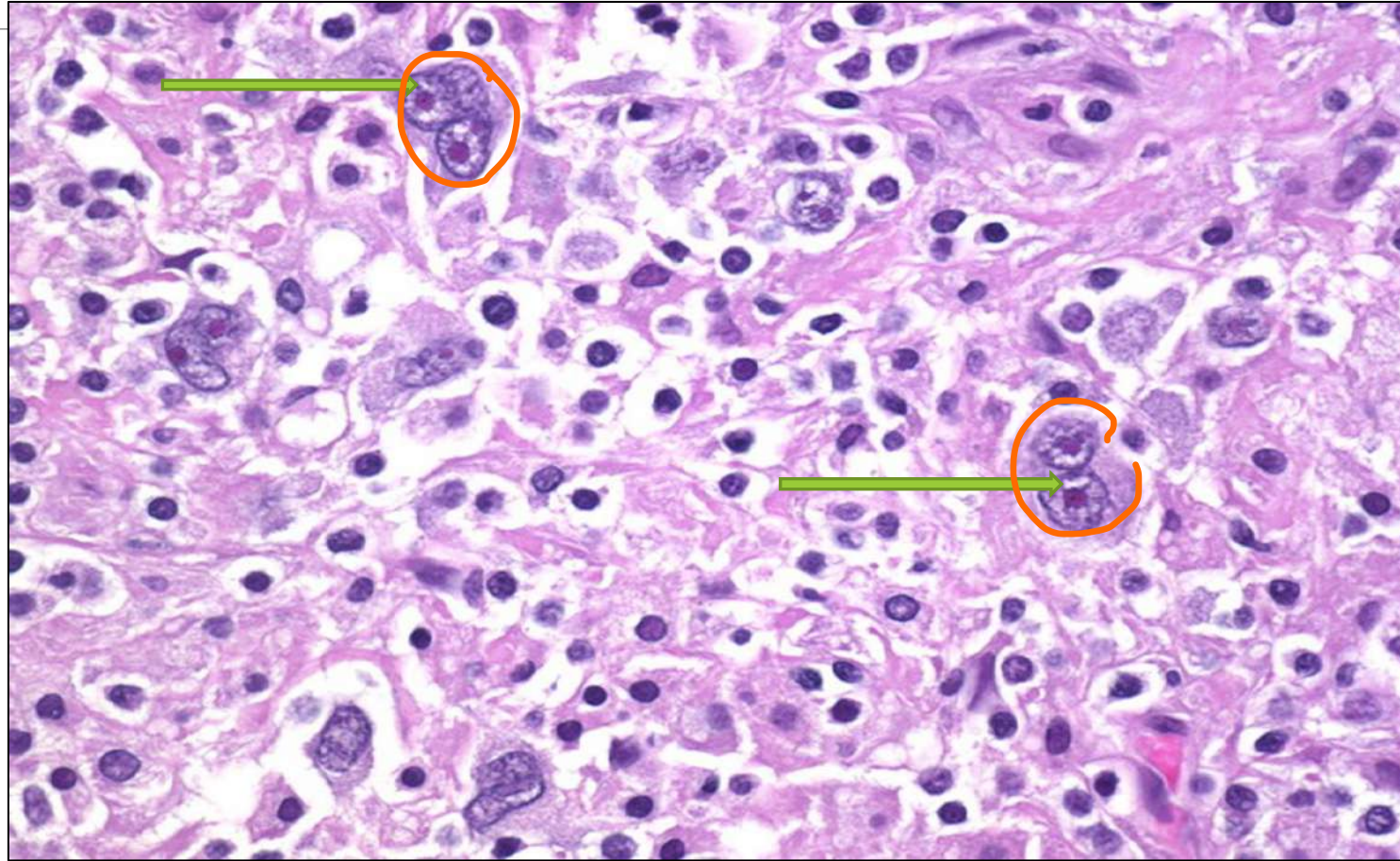


Hodgkin's Lymphoma: showing classic Reed- Sternberg cell (RS), lymphocytes, eosinophil & histiocytes

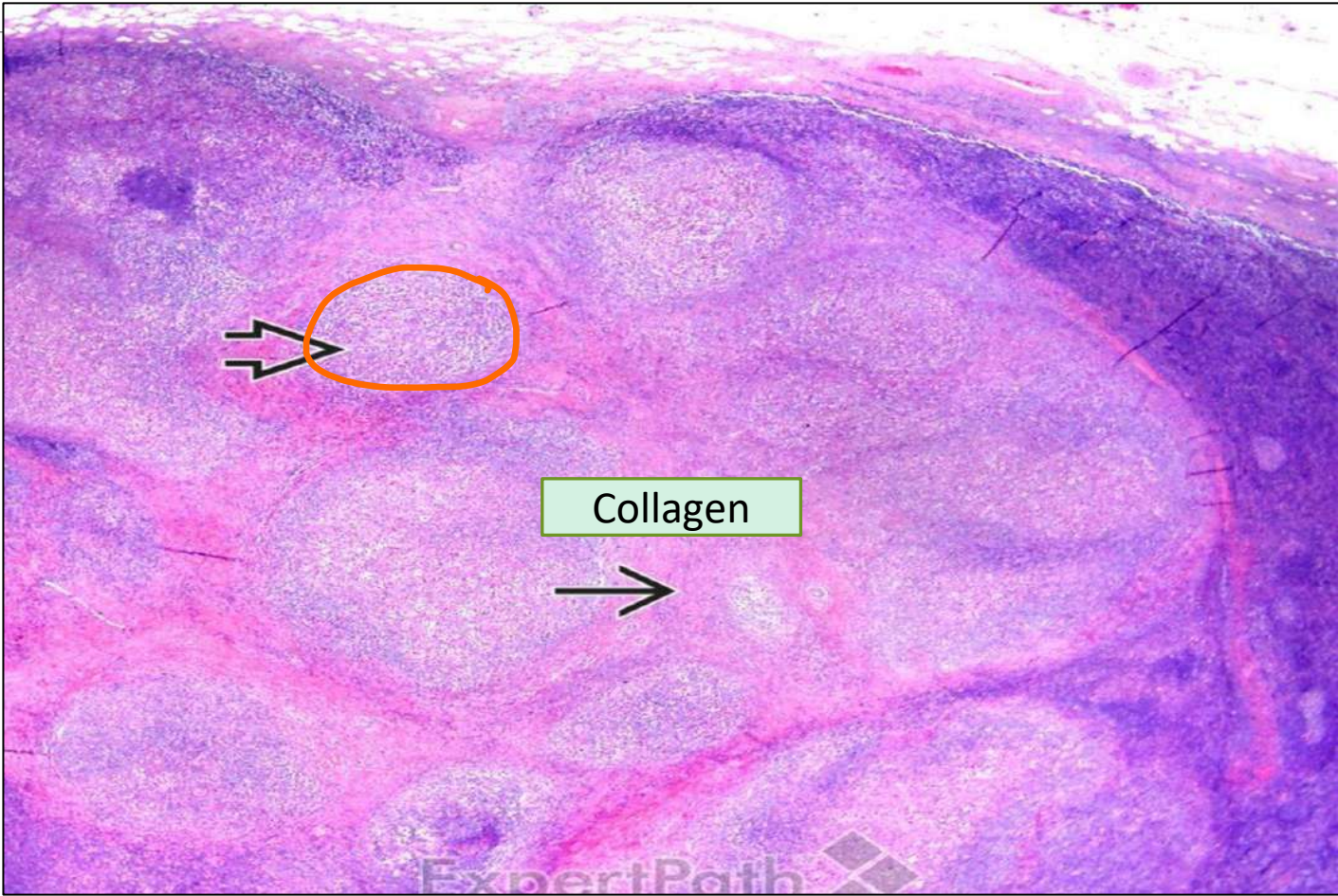
تتميز انو الها حجم كبير + عندها نواتين مقسومتين (كانهم mirror image shape) و الها Nucleus like منطقة clearance و حولها منطقة clearance

HL, RS

- نزي عيون البوحة
- النواتين يشبهو
بعضه تماماً



Nodular Sclerosis HL



pink material
↓
collagen

*ما ننسى انو لو الفحص بوسايتف لهذول يعني :

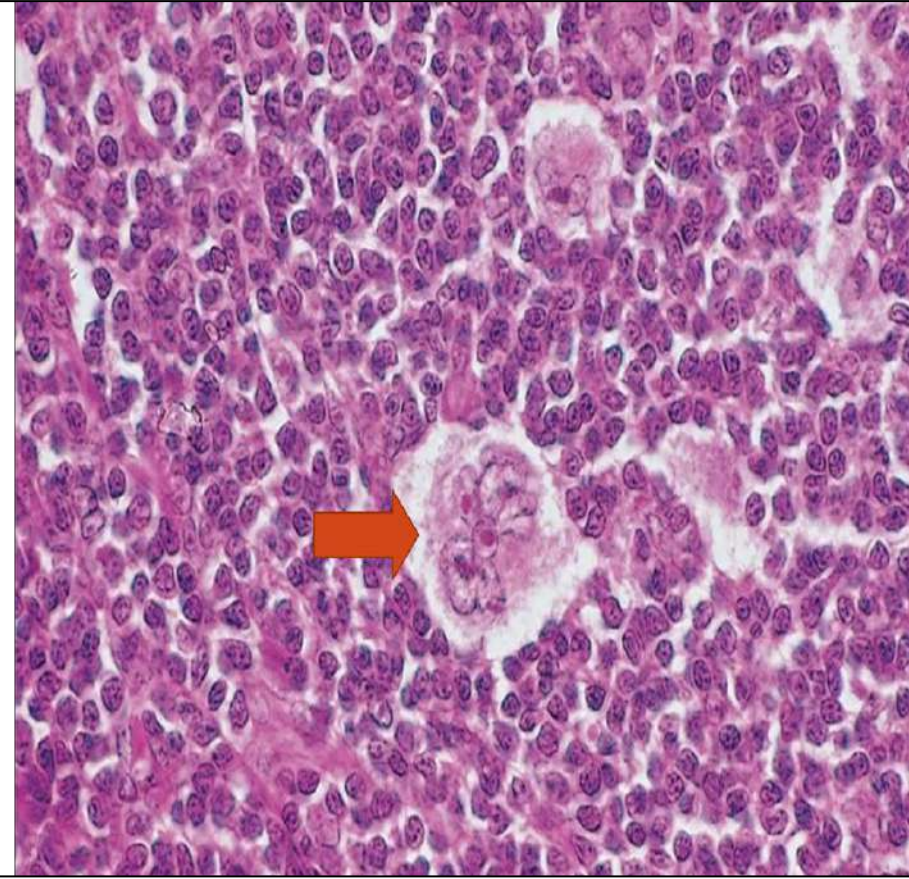
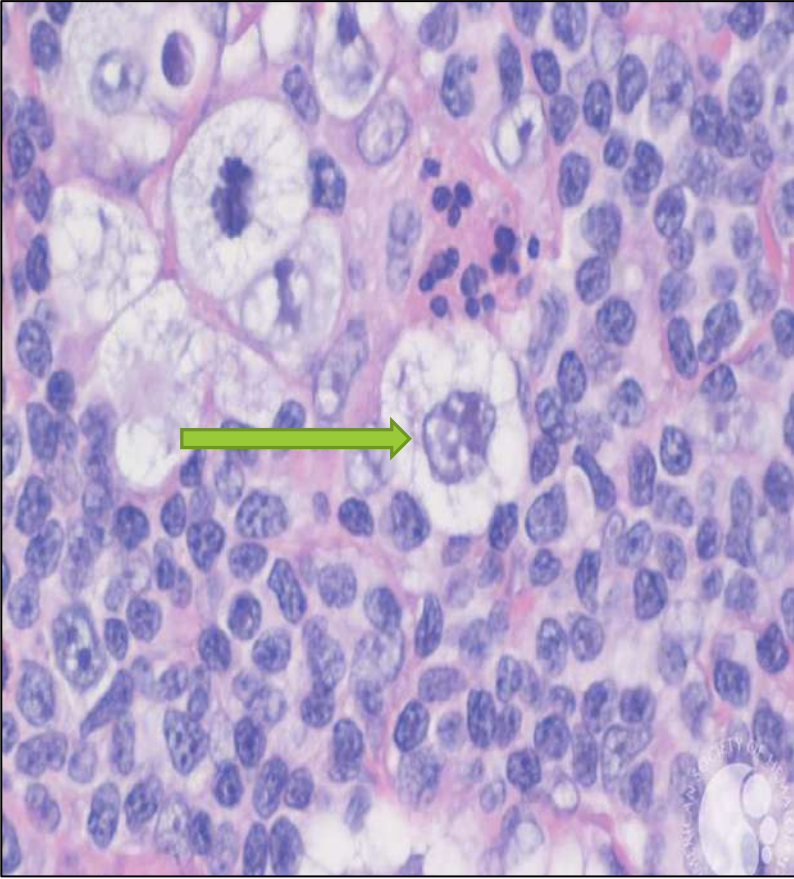
خلايا موجودة في فراغ

Lacunar Cells In Nodular Sclerosis HL

CD15+, CD30+

عهم نعرف

النوع 3 اول
لل HL

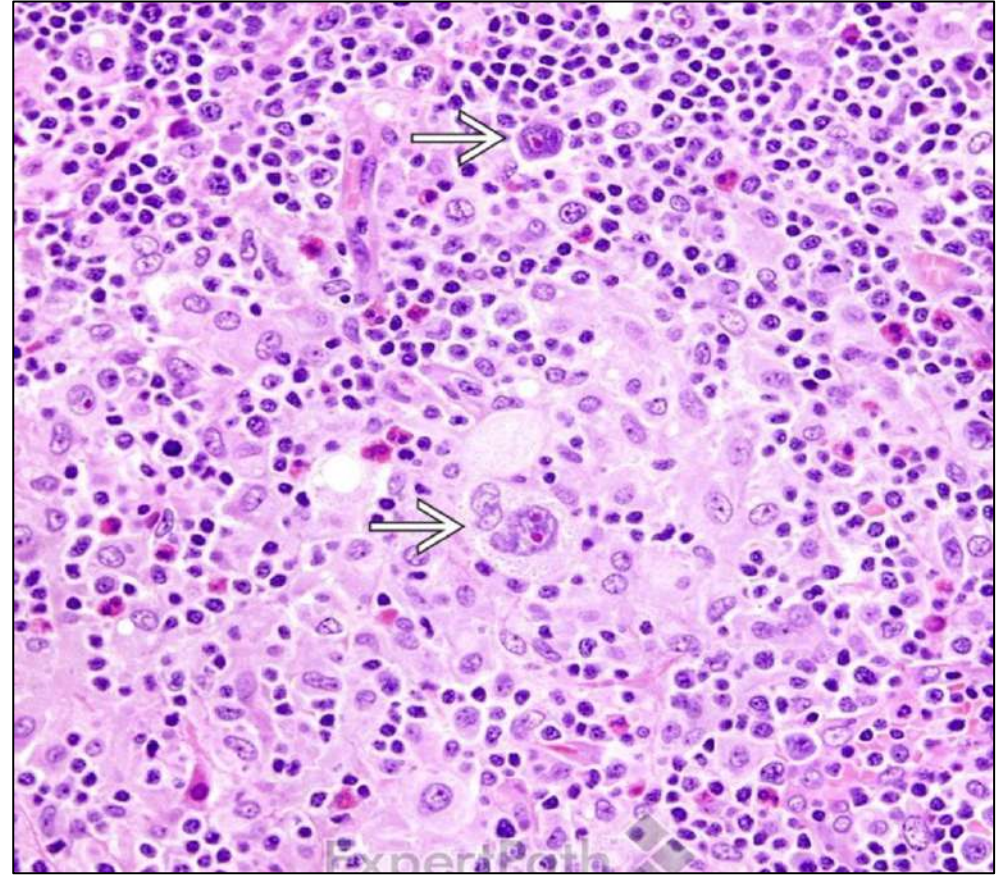


اع تذكر
كدهم عن
الدكتور
عشان نعرف
انها HL
بفضل نحدد
النوع

لما بتشوفو مكس الخلايا هاد كلو مع بعض بتعرفو
mixed cellularity HL انو

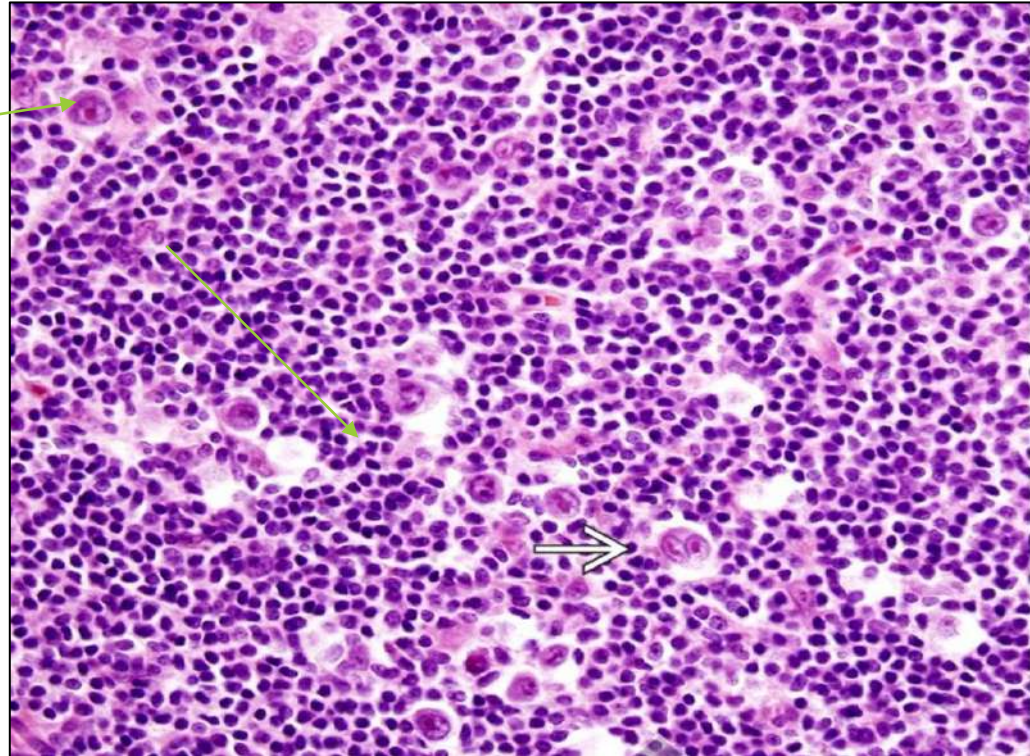
Mixed Cellularity HL

The normal architecture is effaced by **Reed-Sternberg** and **mononuclear Hodgkin (RS+H)** (white solid arrow) cells in a background of small lymphocytes, epithelioid histiocytes, and eosinophils.



Lymphocyte Rich HL

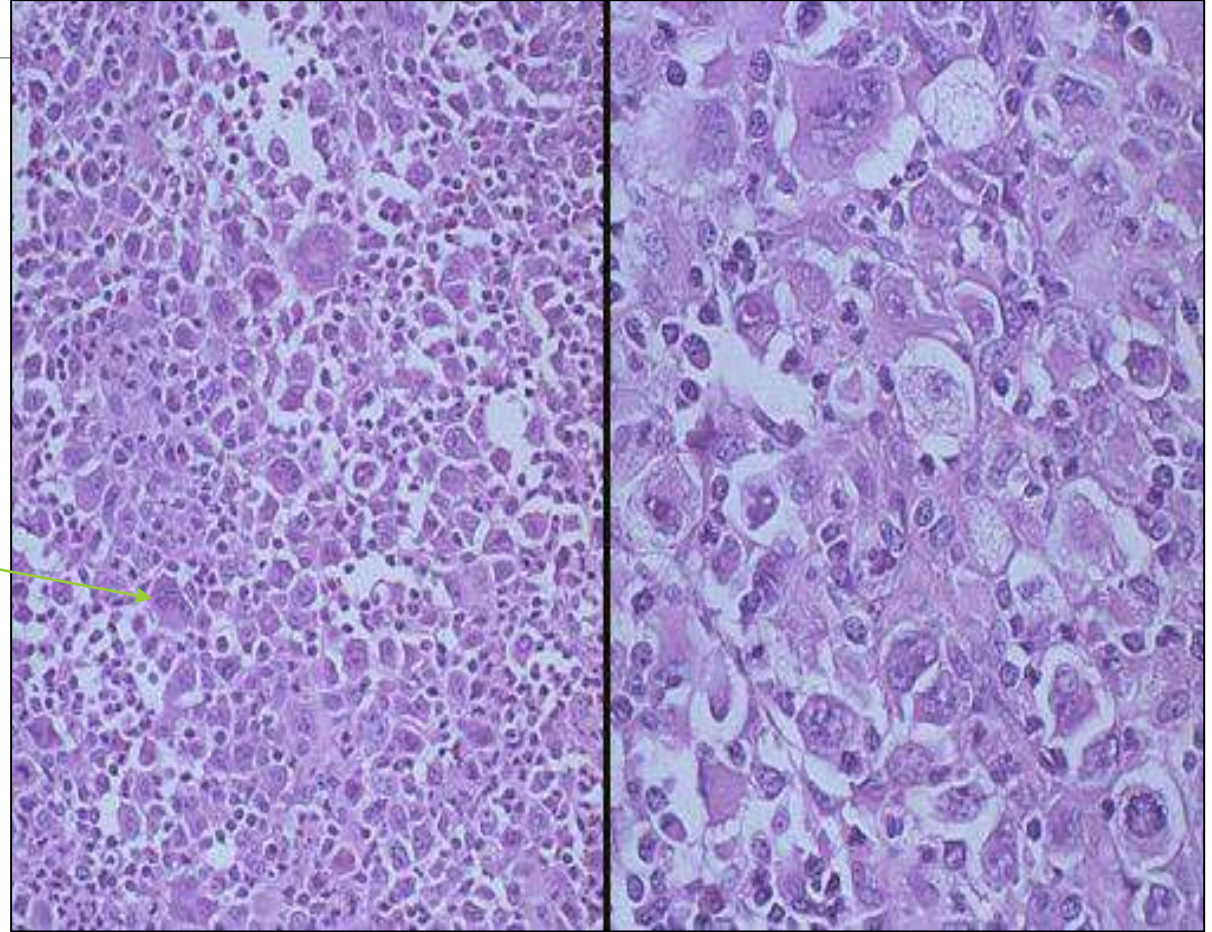
Mononuclear Hodgkin cells and one Reed-Sternberg cell (solid white arrow) in a background of small lymphocytes.



حکمت انوخلین تو کیزاج علم الصور الواضحة
زیر فوقه ، بسن های مشرقه حکمت
ایشوها

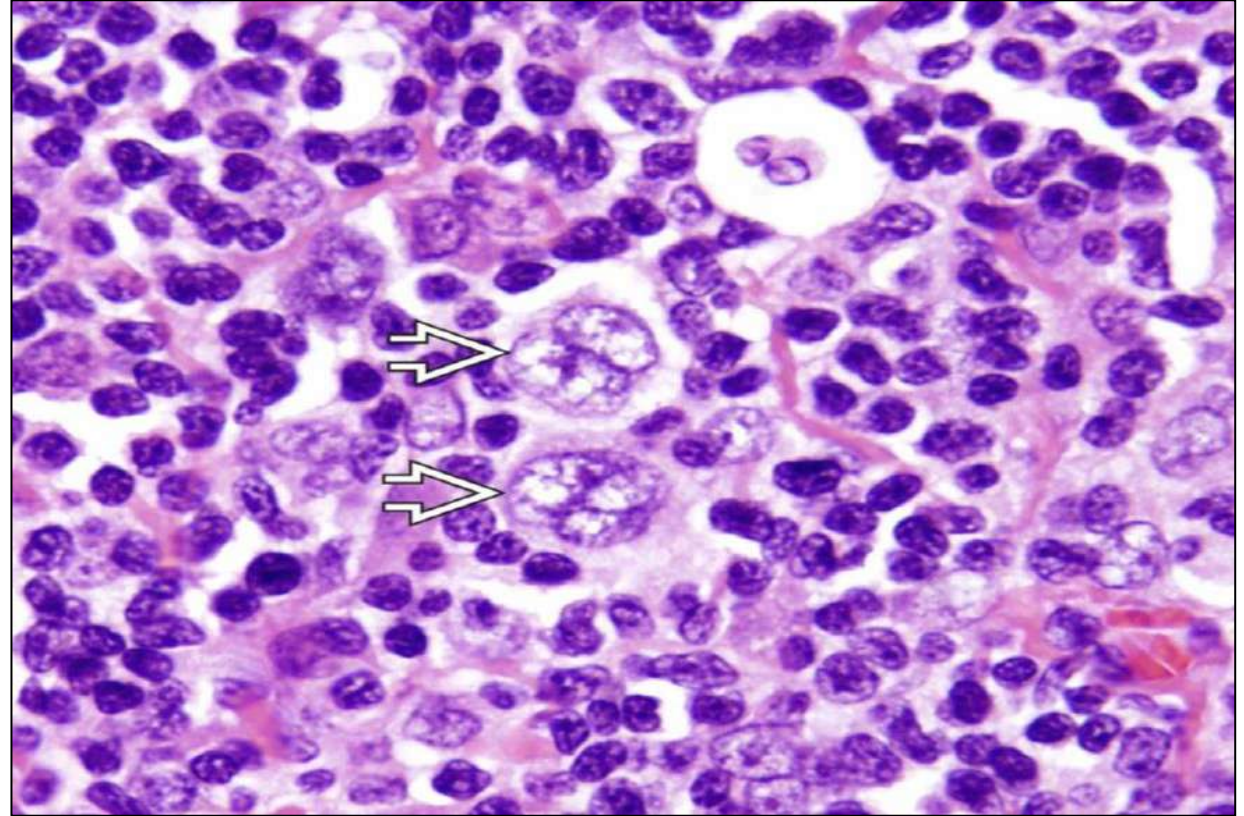
Lymphocyte depleted HL:

Many Reed-Sternberg cells and variants are present, small lymphocytes are depleted



NLPHL, Nodular Lymphocyte predominant (NLPHL)

The large neoplastic cells, known as **lymphocyte-predominant (LP) cells (lymphohistiocytic (L&H))** (white open arrow), often have **multilobated nuclear contours** and **resemble popcorn**.



CD15-, CD30-

لازم آذ كوھا
ھكت



Thank you

يُدَبِّرُ الْأَمْرَ
فَلَا تَفْلَحُ

Good luck!

