

An anatomical illustration of a lymph node in cross-section. The outer layer is the cortex, containing lymphoid follicles. The inner region is the medulla, containing medullary cords and medullary sinusoids. The illustration uses various colors: light green for the capsule and cortex, purple for the follicles, and yellow for the medulla. A blue and red vessel is shown entering from the right.

# *Lymphoid Pathology*

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AWMC.

# Lymphoid organ

**Two types of lymphoid organ:**

**1. Central lymphoid organ –**

Bone marrow

Thymus

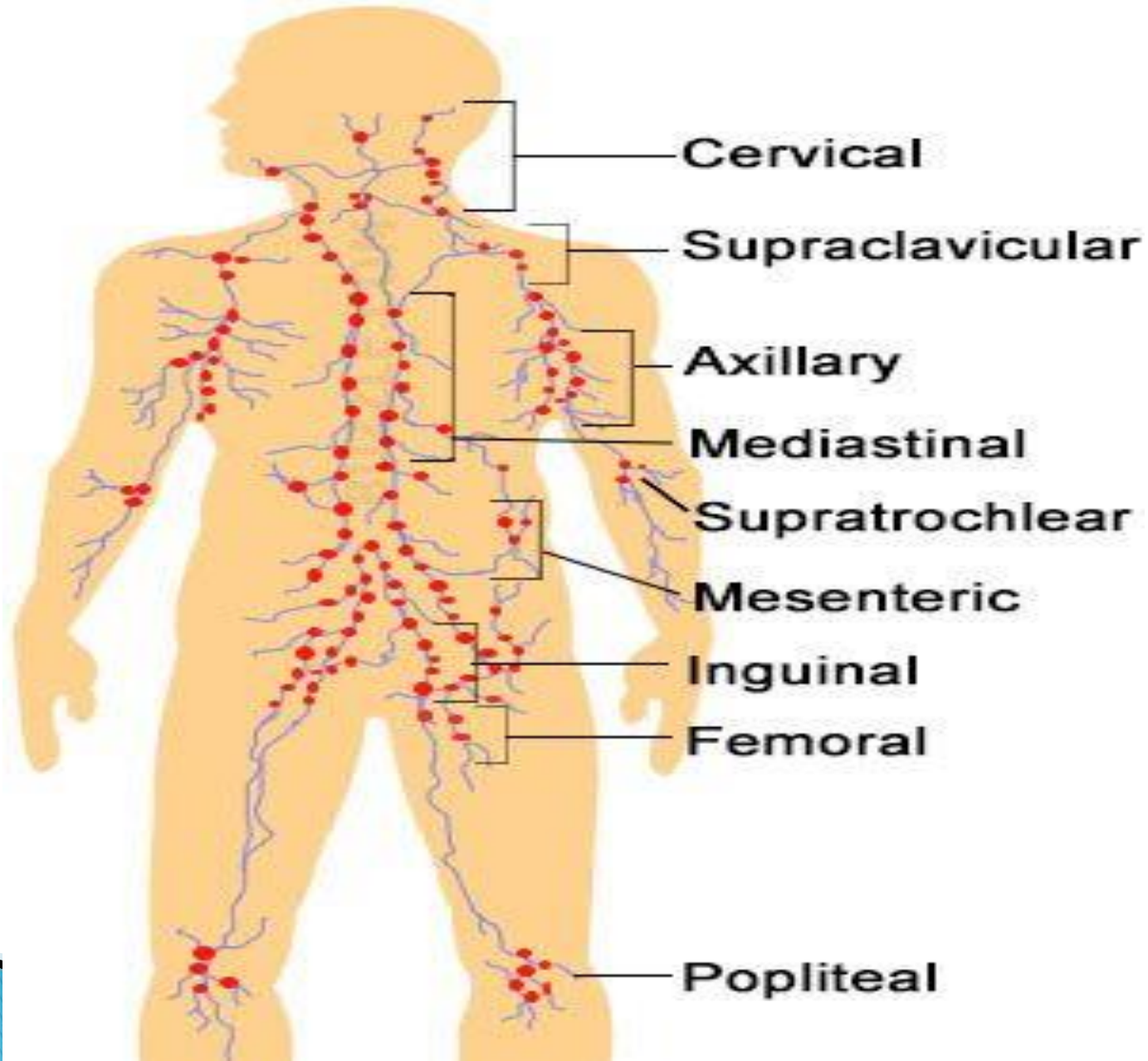
**2. Peripheral lymphoid organ –**

Lymph nodes, spleen,

tonsils, adenoids and

Peyer's patches.

# Lymph nodal distribution

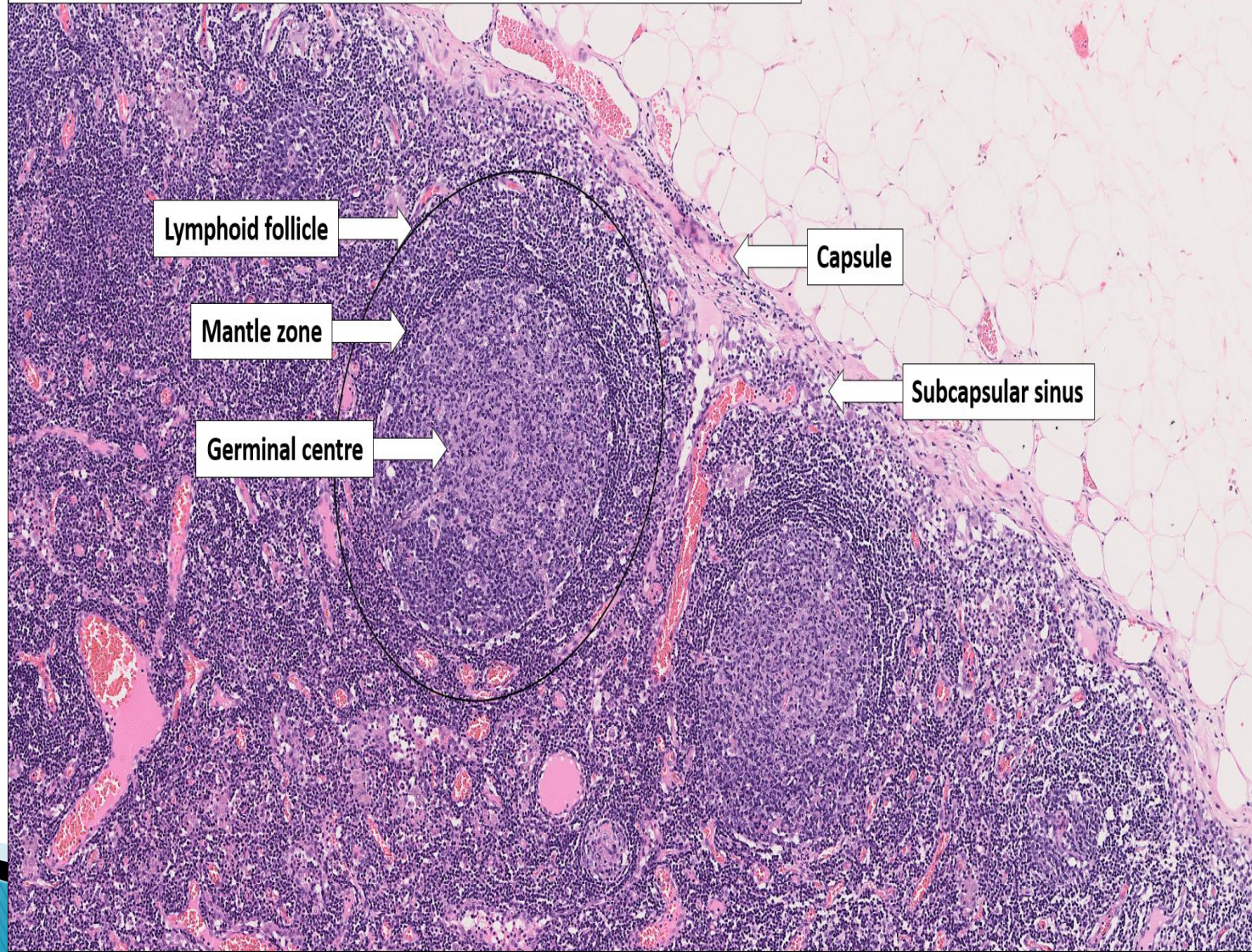


# Histology of lymph node

They are discrete encapsulated structures that contain well-organized B-cell and T-cell zones which are richly invested with phagocytes and antigen-presenting cells.

**Lymph node (high power):**

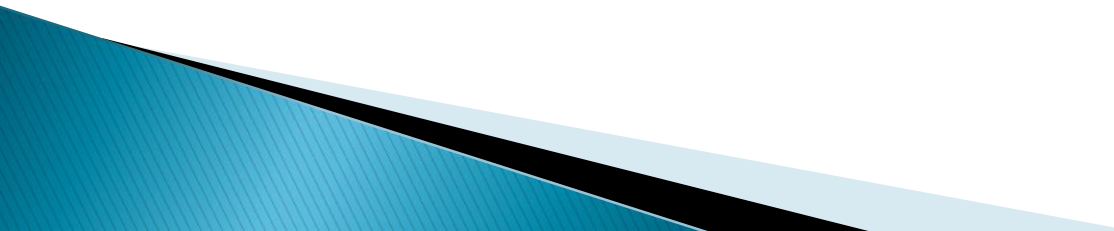
Cortex, showing lymph node capsule, subcapsular sinuses and lymphoid follicles.



# **Lymphadenopathy and lymphadenitis:**

**Lymphadenopathy:** It refers to the enlargement of the lymph node.

**Lymphadenitis:** It refers to inflammation of lymph node.

- ▶ Chronic non-specific lymphadenitis
  - ▶ Inflammatory
  - ▶ Neoplastic
  - ▶ Others
- 

❑ **Inflammatory: a. Infective**

▶ **Bacterial- Tuberculosis**

▶ Other- Streptococcus, staphylococcus, cat scratch disease, brucellosis, syphilis, leprosy

▶ **Viral-** Infectious mononucleosis

Cytomegalovirus

HIV

▶ **Fungal-** Histoplasmosis, Coccidiomycosis

▶ **Parasitic-**Toxoplasmosis, leishmaniasis, trypanosomiasis, filariasis

▶ **Chlamydial-** Lymphogranuloma venerum

▶ **Rickettsial-** Scrub typhus

## **b. Immunological disease:**

- Rheumatoid arthritis
- Mixed connective tissue disease
- Systemic lupus erythematosus
- Serum sickness

### **□ Neoplastic:**

**Primary-** Lymphoma

Hodgkin Lymphoma

Non-Hodgkin Lymphoma

**Secondary-** Metastatic carcinoma

❑ **Other causes:**

- ▶ **Sarcoidosis**
- ▶ Dermatopathic lymphadenitis
- ▶ Lymphomatoid granulomatosis
- ▶ Castleman's disease



# Lymphoid Pathology at Ad-din Hospital

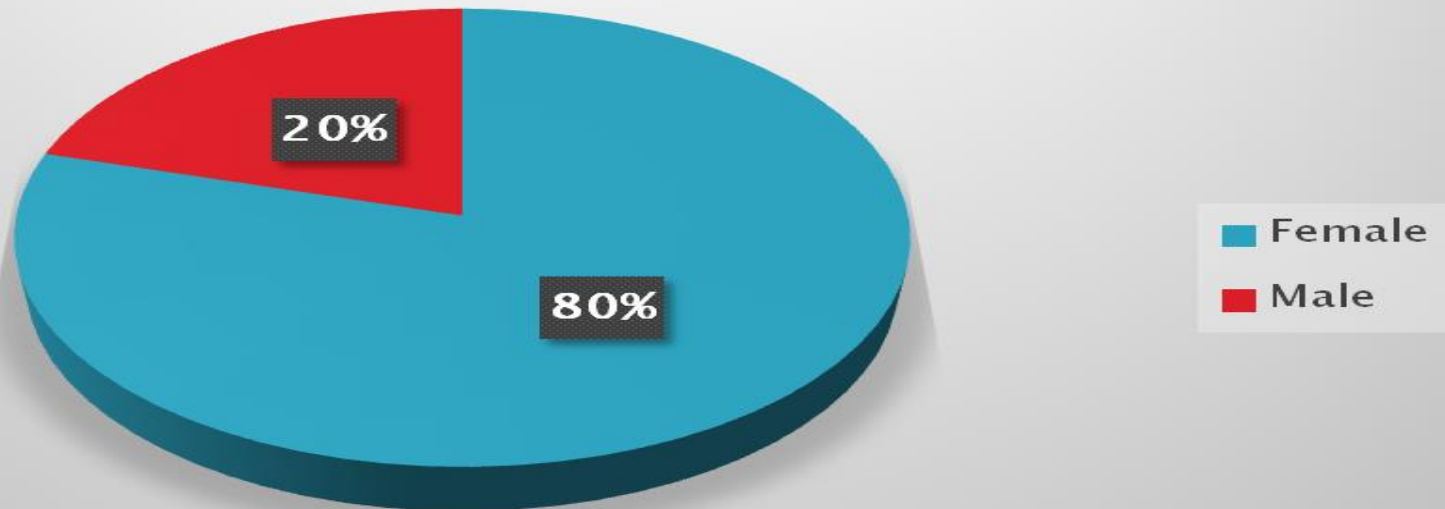
Total sample in 5 years (2019 to 2023)-122

Female -97

Male - 25

Sex distribution of lymph node  
sample

Total No – 122



# Age distribution of Lymph node sample

Age	Female	Male	Total
11-15	5	3	8
16-20	13	3	16
21-25	15	1	16
26-30	16	2	18
31-35	15	5	20
36-40	8	2	10
41-45	2	1	3
46-50	9	3	12
51-55	2	0	2
56-60	7	1	8
61-65	3	3	6
66-70	1	0	1
71-75	0	1	1
>75	1	0	1
Total	97	25	122

# Diseases pattern of lymph node biopsy:

**Total sample- 122**

- ▶ Reactive changes- 68 (56%)
- ▶ Tuberculosis- 39 (32%)
- ▶ **Malignancy- 15 (12%)**

# Age & sex distribution of reactive change(N=68)

Age	Female	Male	Total
11-15	3	2	5
16-20	8	2	10
21-25	11	1	12
26-30	8	2	10
31-35	7	2	9
36-40	5	1	6
41-45	2	1	3
46-50	4	1	5
51-55	2	0	2
56-60	3	0	3
61-65	2	1	3
Total	55(81%)	13(19%)	68(100%)

# Age & sex distribution of tuberculosis (N=39)

Age	Female	Male	Total
11-15	2	1	3
16-20	3	0	3
21-25	4	0	4
26-30	8	0	8
31-35	6	3	9
36-40	1	1	2
41-45	0	0	0
46-50	4	2	6
51-55	0	0	0
56-60	3	0	3
61-65	1	0	1
Total	32(82%)	7(18%)	39(100%)

# Age & sex distribution of malignancy (N=15)


Age	Female	Male	Total
16-20	2	1	3
21-25	0	0	0
26-30	0	0	0
31-35	2	0	2
36-40	2	0	2
41-45	0	0	0
46-50	1	0	1
51-55	0	0	0
56-60	1	1	2
61-65	0	2	2
66-70	1	0	1
71-75	0	1	1
>75	1	0	1
Total	10(67%)	5(33%)	15(100%)

# Nature of malignancy

Nature of malignancy	Female	Male	Total
Hodgkin lymphoma (HL)	1	1	2
Non-Hodgkin lymphoma (NHL)	1	0	1
Angioimmunoblastic lymphadenopathy / Peripheral T-cell lymphoma (PTCL)	2	2	4
<b>Metastatic undifferentiated carcinoma (MUC)</b>	<b>3</b>	<b>2</b>	<b>5</b>
Metastatic malignant melanoma (MMM)	1	0	1
Metastatic papillary thyroid carcinoma (MPTC)	1	0	1
Metastatic small cell carcinoma (MSCC)	1	0	1
Total	10(67%)	5(33%)	15(100%)

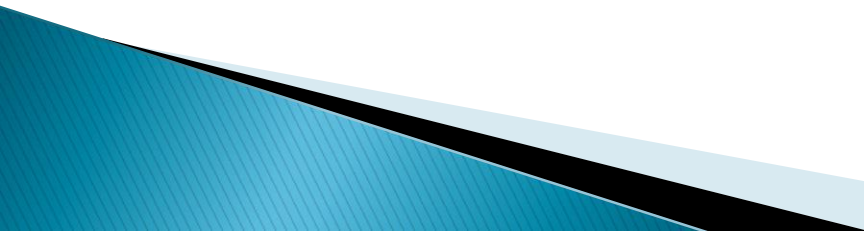
# Diagnostic approach to a patient of lymphadenopathy:

## History Taking:

- ▶ Age of patient
  - ▶ Duration of lymphadenopathy
  - ▶ Epidemiological clue
  - ▶ Any travel history
  - ▶ Associated symptoms
  - ▶ Time course of enlargement
  - ▶ Recent infection, recent immunization or medication
- 



## **Clinical Examination:**

- ▶ Site of lymph node
  - ▶ Either it is lymph node or not
  - ▶ Tender /non tender
  - ▶ Mobile or separate/Fixed and matted
  - ▶ Firm and rubbery/Painless and stony hard
- 

# Laboratory Diagnosis

## A. FNAC (Fine needle aspiration cytology):

- ▶ Non-guided: from superficial, palpable lymph nodes

- ▶ Guided:

  - USG guided: deep-seated or very small lymph nodes

  - CT guided: hilar and peri-pancreatic lymph nodes

## **B. Histopathology:**

- ▶ Core needle biopsy
- ▶ Excisional biopsy

## **C. Other special test:**

- ▶ PCR( Polymerase chain reaction)- TB, viral infection
- ▶ Gene expert- suspected TB
- ▶ Immunohistochemistry (IHC)- CD-15, CD-30, CD- 3,5 used for diagnosis of lymphomas.

## **D. Blood test :**

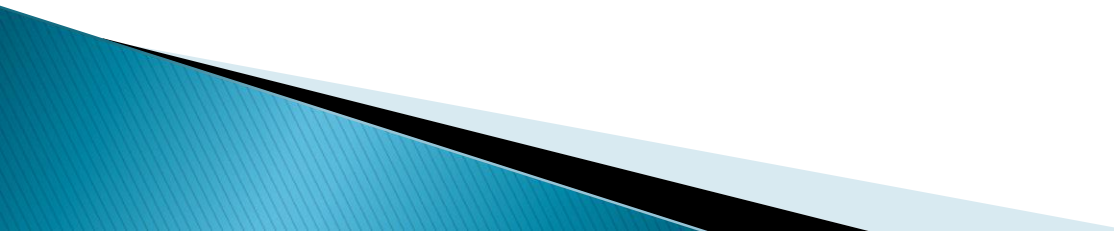
- CBC
- Biochemistry

## **E. Radiological test:**

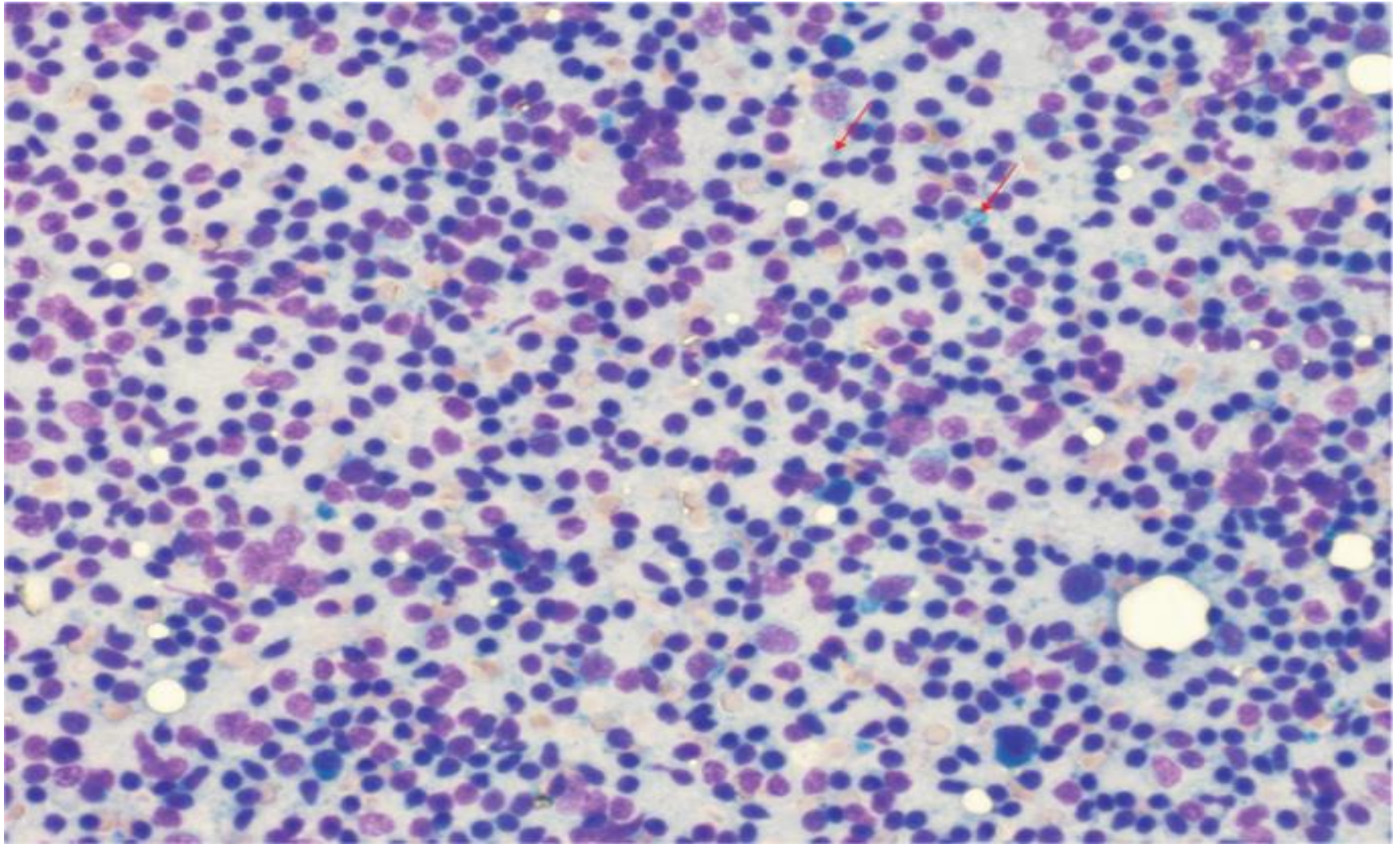
- Ultrasonogram (USG)
  - CT scan
- 

# **Chronic Nonspecific Lymphadenitis:**

Chronic immunological stimuli produces several different patterns of lymph node reaction. Such as-

- ▶ **Reactive follicular hyperplasia**
  - ▶ **Diffuse paracortical hyperplasia**
  - ▶ **Sinus histiocytosis**
  - ▶ **Mixed**
- 

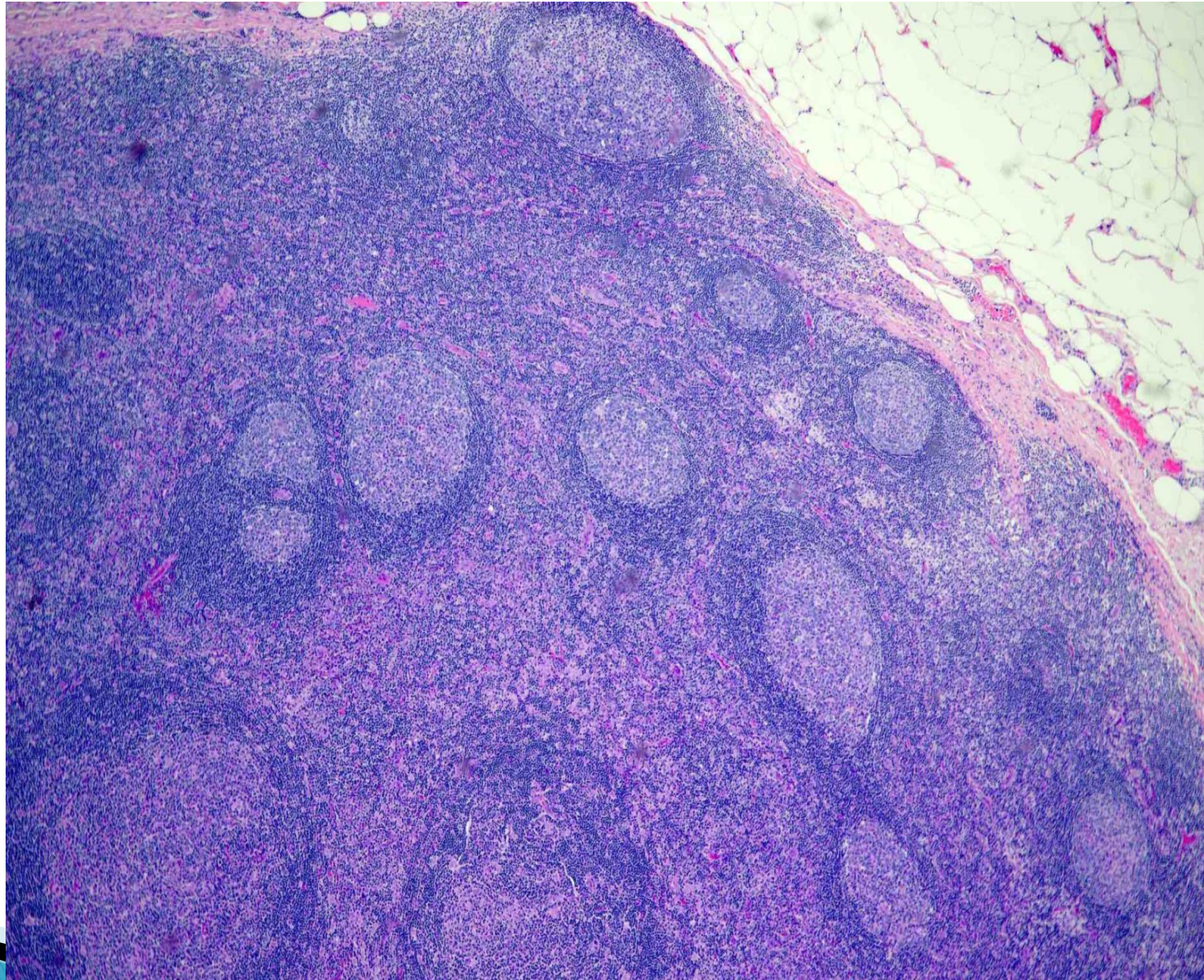
# Cytology- Chronic Nonspecific Lymphadenitis



lymphocytes at various stages of maturation with tingible body macrophages

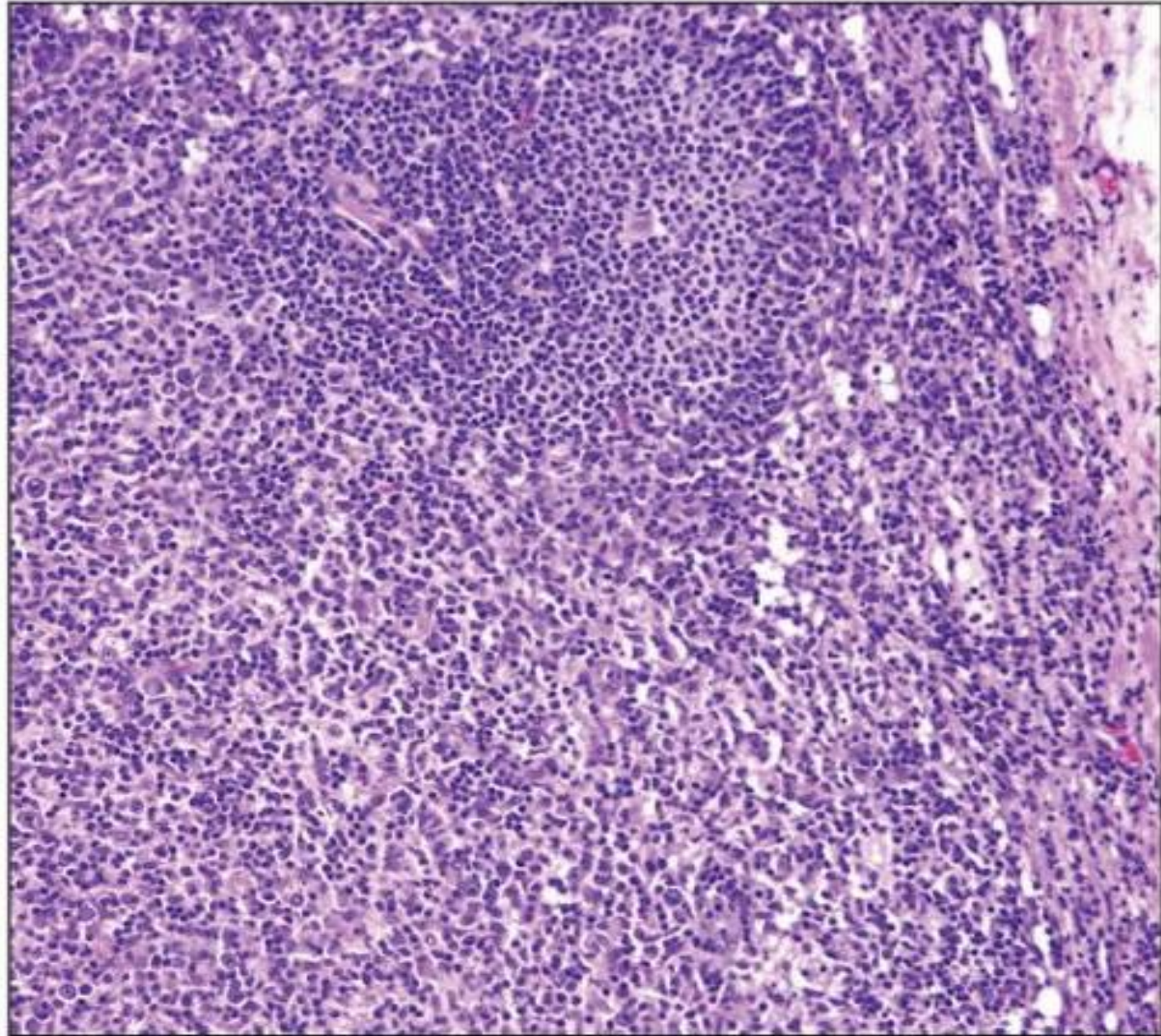
# Follicular hyperplasia

- ▶ Enlarged lymphoid follicles of various size and shape with prominent germinal center
- ▶ eg-  
Rheumatoid arthritis,  
toxoplasmosis



# Paracortical hyperplasia

- ▶ Paracortical zones are expanded with a heterogeneous population of cells
- ▶ eg- acute viral infections (e.g., infectious mononucleosis), SLE, Drug reaction.

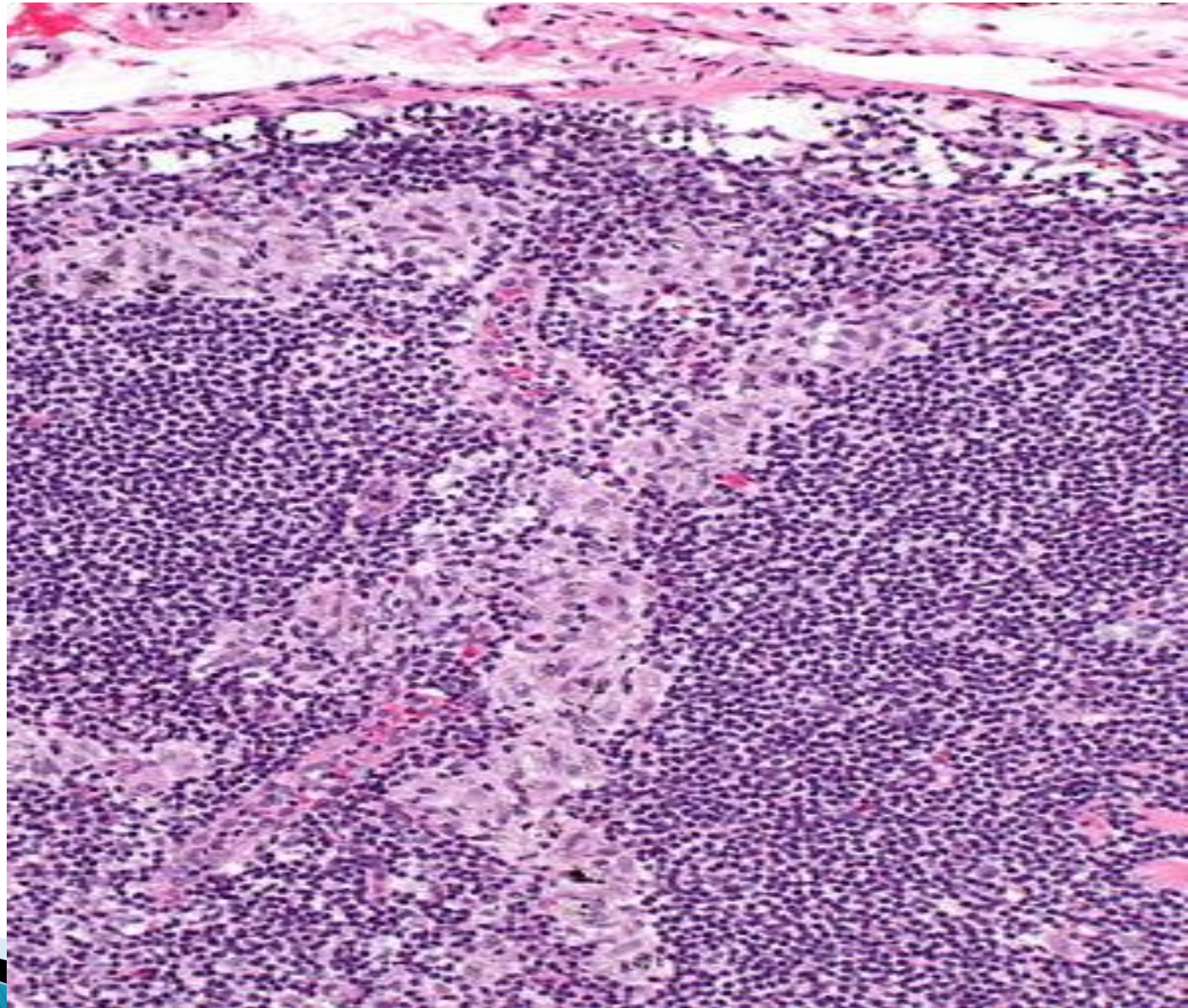




# Sinus histiocytosis

Sinuses are prominent and are lined by hyperplastic sinus histiocytes

- ▶ eg- lymph nodes draining cancers such as carcinoma of breast.



# Granulomatous Lymphadenitis:

## A. Infectious:


### ❑ Suppurative (purulent):

- **Cat scratch lymphadenitis** (*Bartonella henselae*)
- Tularemia lymphadenitis (*Francisella tularensis*)
- *Yersinia* lymphadenitis (*Yersinia enterocolitica*)
- Various fungal infections

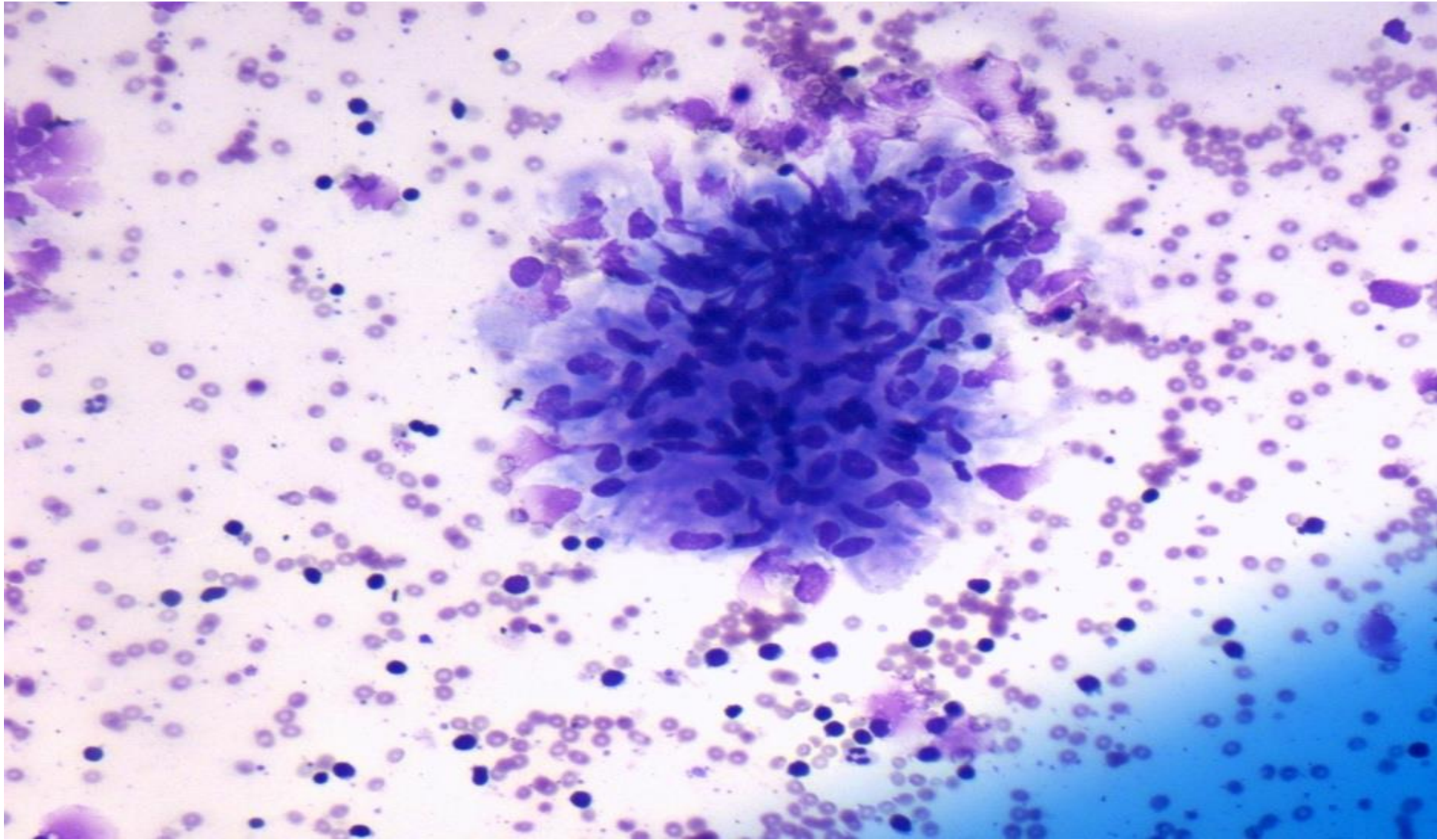
## ❑ Non-suppurative:

- **Tuberculous lymphadenitis (*Mycobacterium tuberculosis* spp.)**
- Atypical mycobacterial infection
- Bacillus Calmette-Guérin (BCG) lymphadenitis
- *Toxoplasma* lymphadenitis
- Hansen disease or leprosy (*M. leprae*)
- Syphilis
- Brucellosis
- Fungal lymphadenitis  
(*Coccidioides*, *Cryptococcus*, *Histoplasma*, *Pneumocystis*)

## **B. Noninfectious:**

- **Systemic sarcoidosis**
  - **Foreign body (berylliosis, silicosis)**
  - Malignancies (lymphoma, carcinoma, especially breast, uterus, lung, stomach)
  - Systemic inflammatory / autoimmune conditions (lupus [SLE], rheumatoid arthritis [RA], granulomatosis with polyangiitis [GPA])
  - Toxic (chemotherapy, heavy metals, beryllium, zirconium, silicon)
  - Histiocytic inflammatory (Rosai-Dorfman disease, Castleman disease)
- 

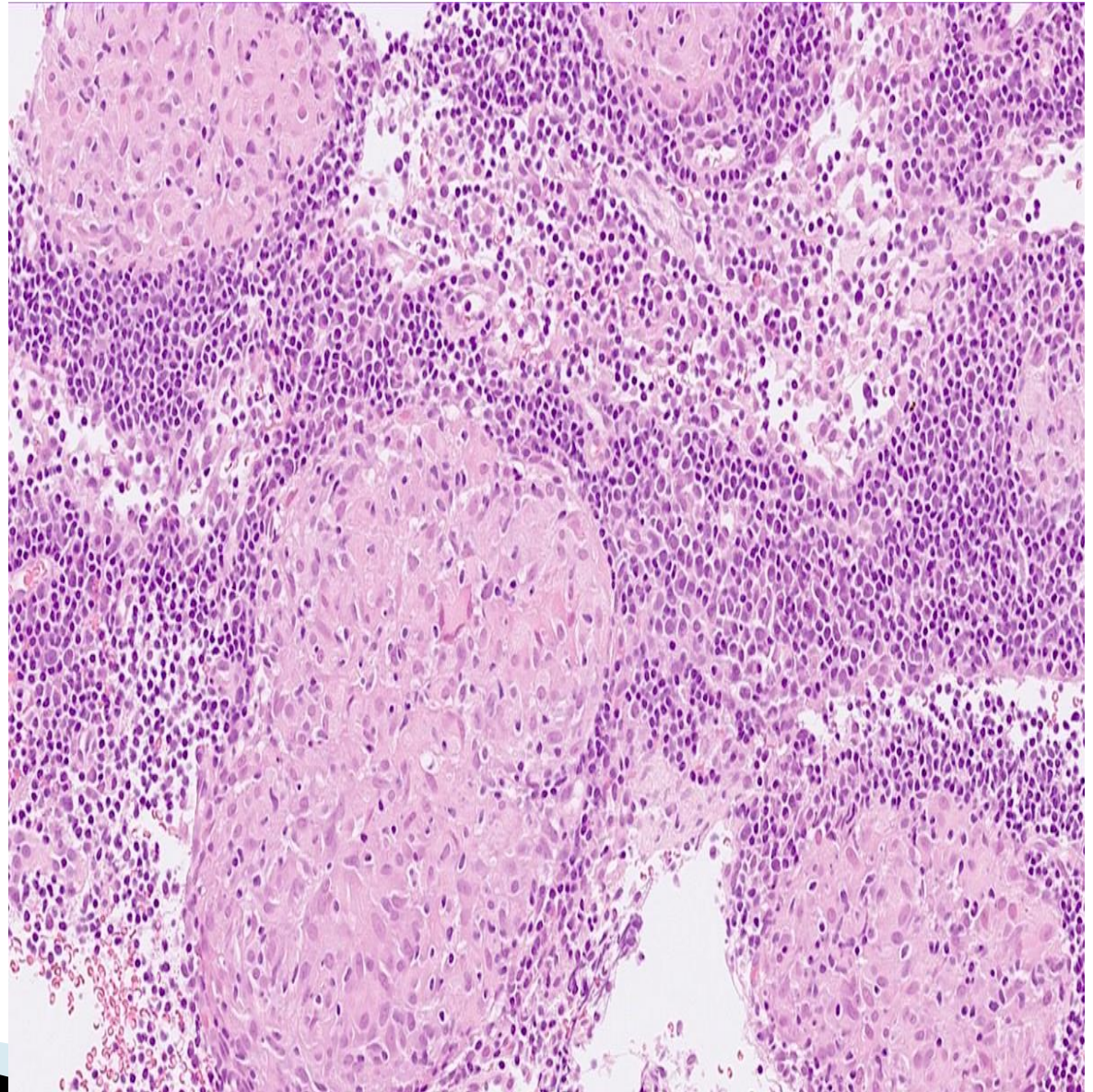
# Cytology- Granulomatous Inflammation



Cluster of epithelioid cells in a blood mixed necrotic background

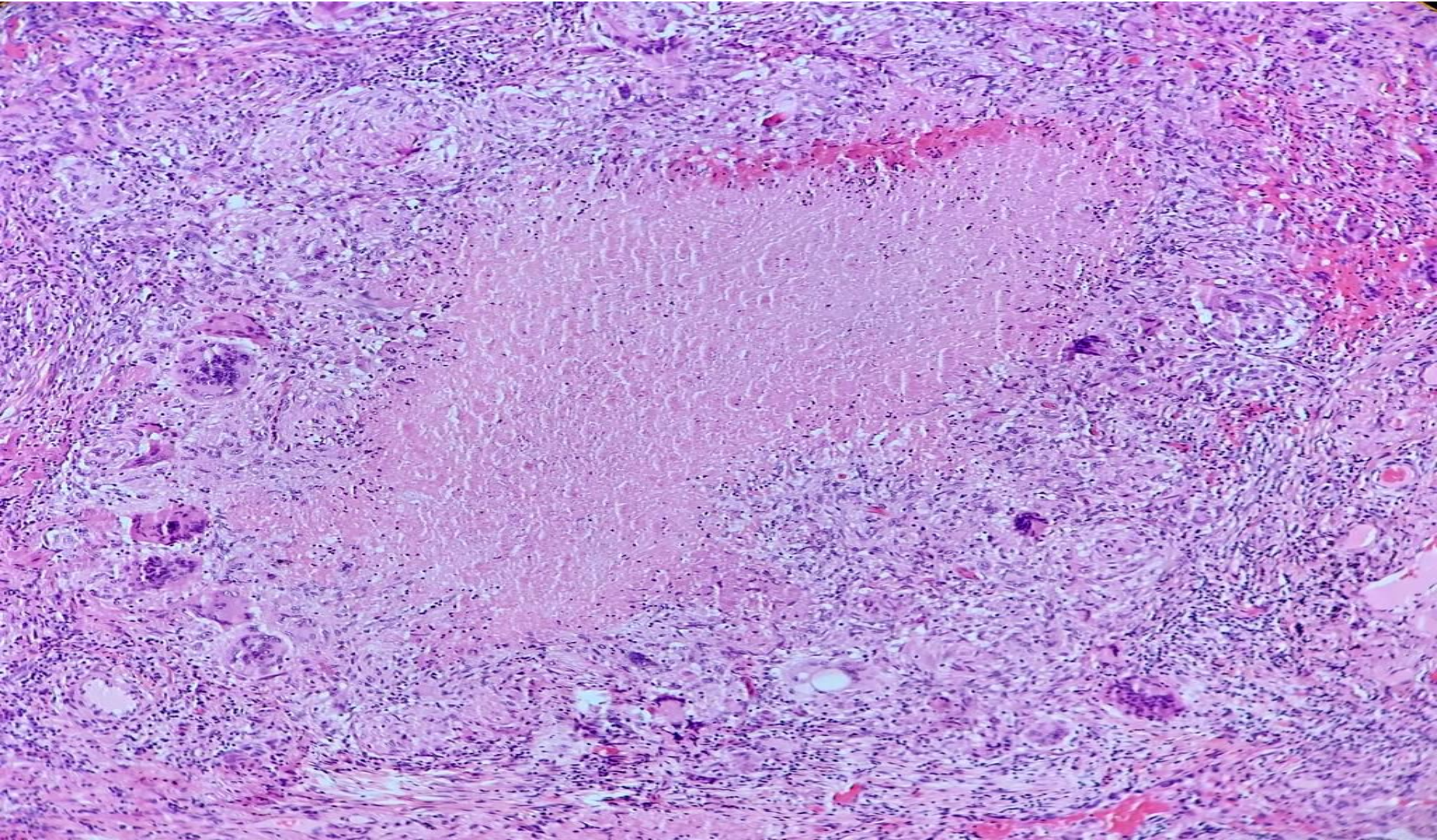
# Biopsy- Granulomatous Lymphadenitis

- ▶ Collection of epithelioid cells
- ▶ Surrounded by a rim of inflammatory cells including lymphocytes, histiocytes and plasma cells
- ▶ Multinucleated giant cells are often present



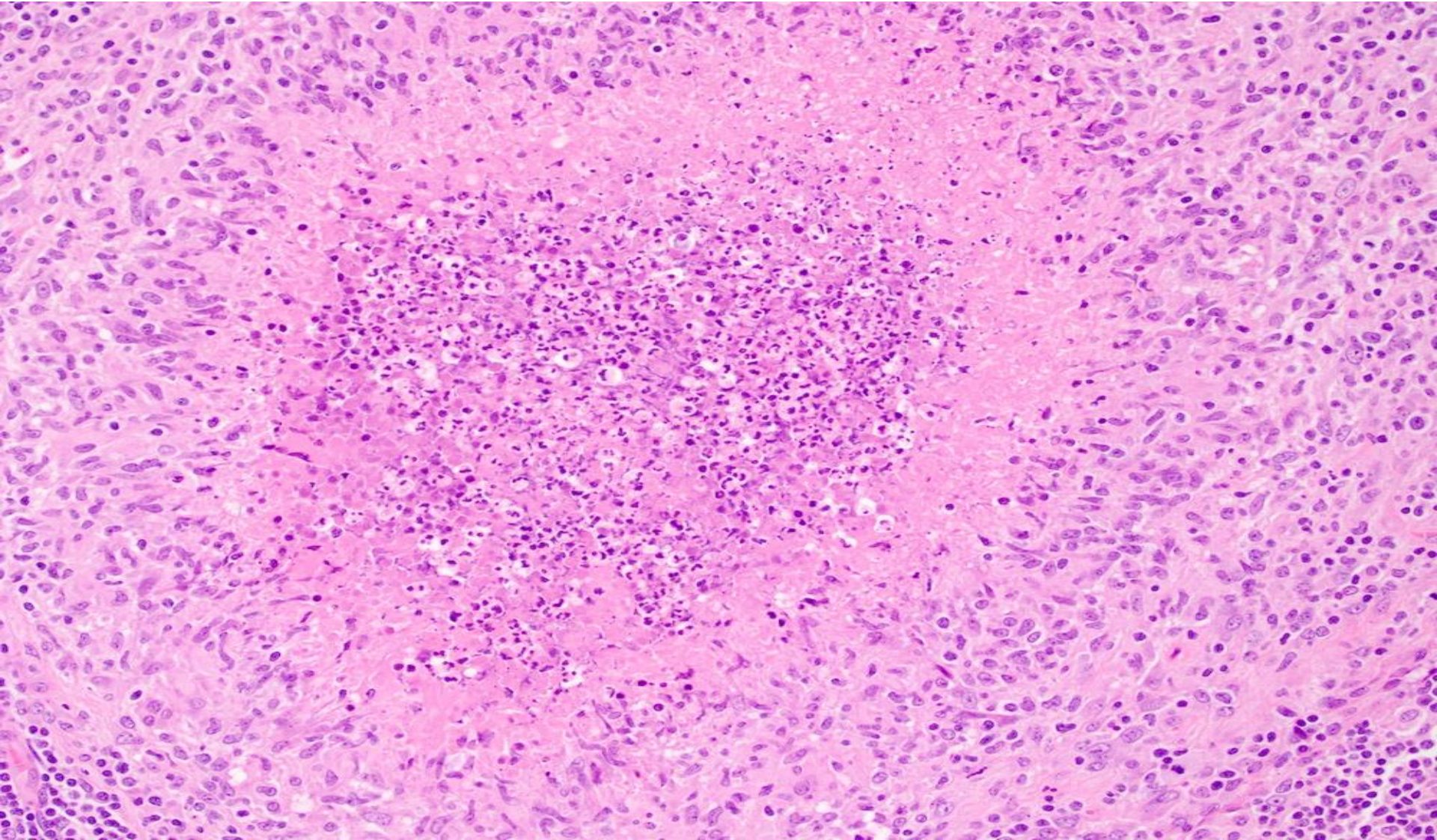
# Tuberculous Lymphadenitis

Central area of caseous necrosis surrounded by a rim of chronic inflammatory cells, including epithelioid cells & Langhan's giant cell



# Cat Scratch disease

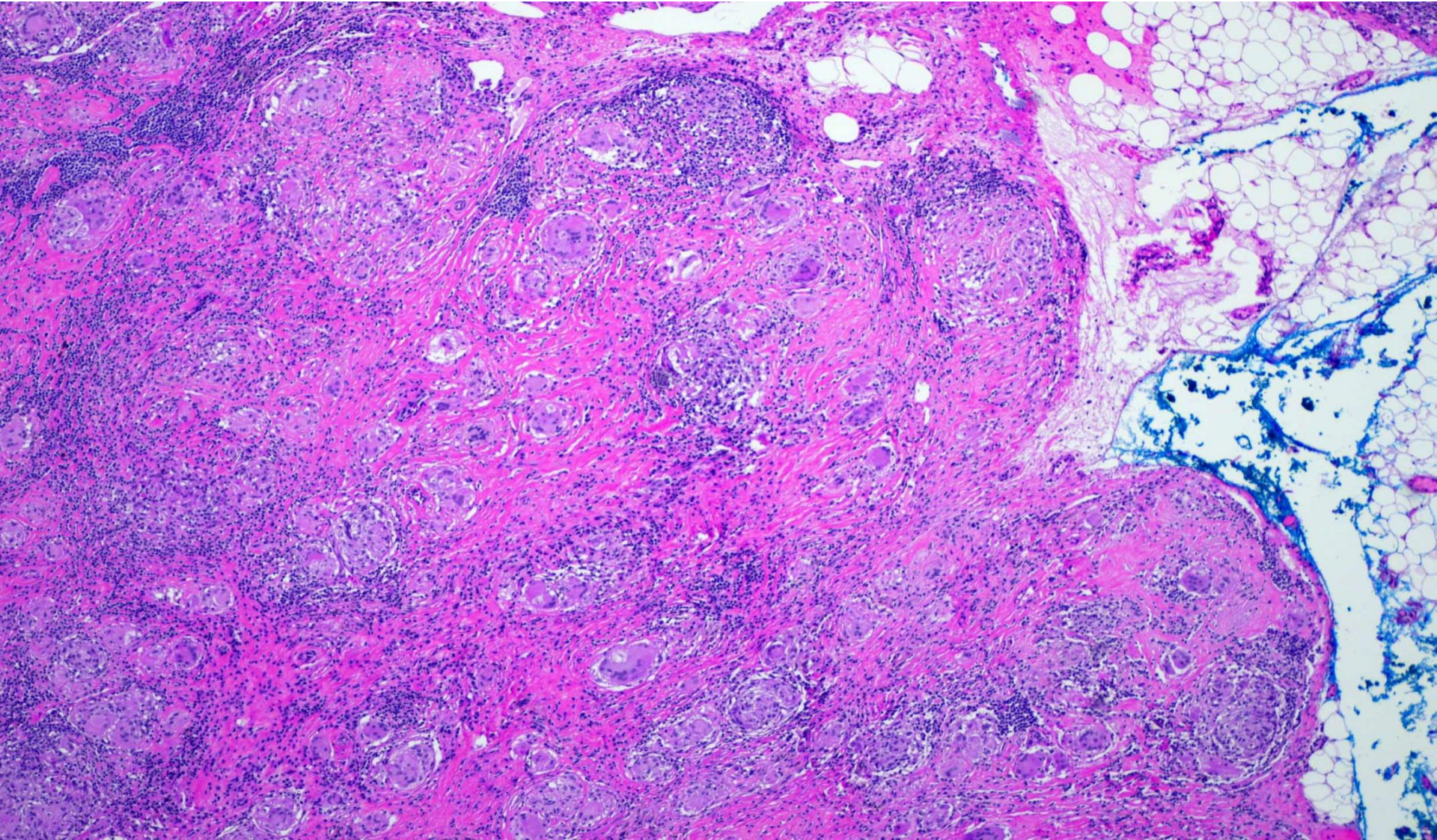
Granuloma with central necrosis and suppurative inflammation surrounded by palisading histiocytes.



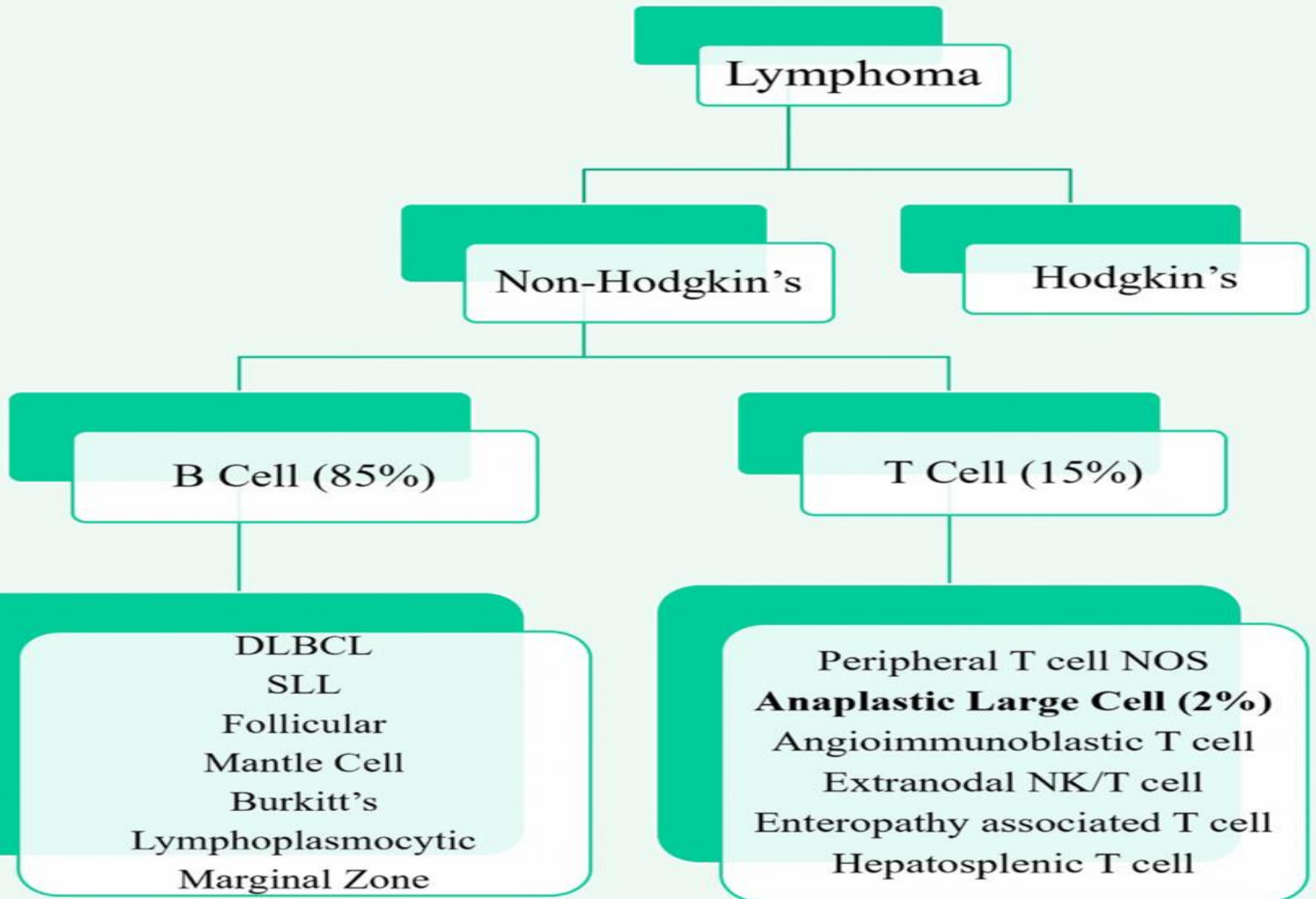


# Sarcoidosis

Multiple coalescing non-necrotizing epithelioid granulomas with focal, dense lymphocytic reaction and multinucleated giant cells with dense fibrosis and hyalinization



# Lymphoid Neoplasms



# Hodgkin lymphoma

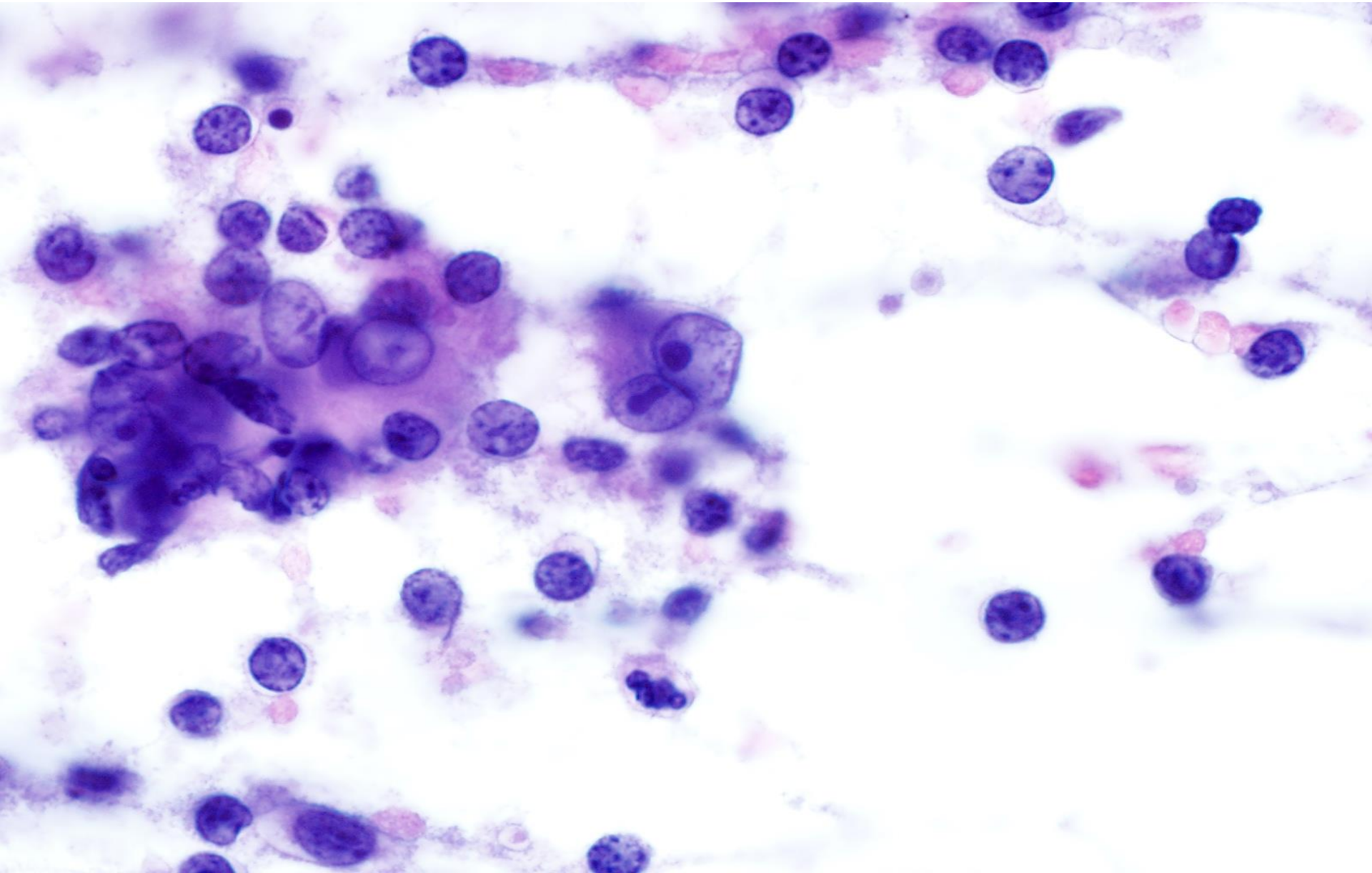
```
graph TD; HL[Hodgkin lymphoma] --> NLPHL[Nodular lymphocyte predominant Hodgkin lymphoma]; HL --> CHL[Classic Hodgkin lymphoma]; CHL --> NSCL[• Nodular sclerosis classic Hodgkin lymphoma]; CHL --> LRL[• Lymphocyte-rich classic Hodgkin lymphoma]; CHL --> MCEL[• Mixed cellularity classic Hodgkin lymphoma]; CHL --> LDEL[• Lymphocyte-depleted classic Hodgkin lymphoma];
```

Nodular lymphocyte predominant Hodgkin lymphoma

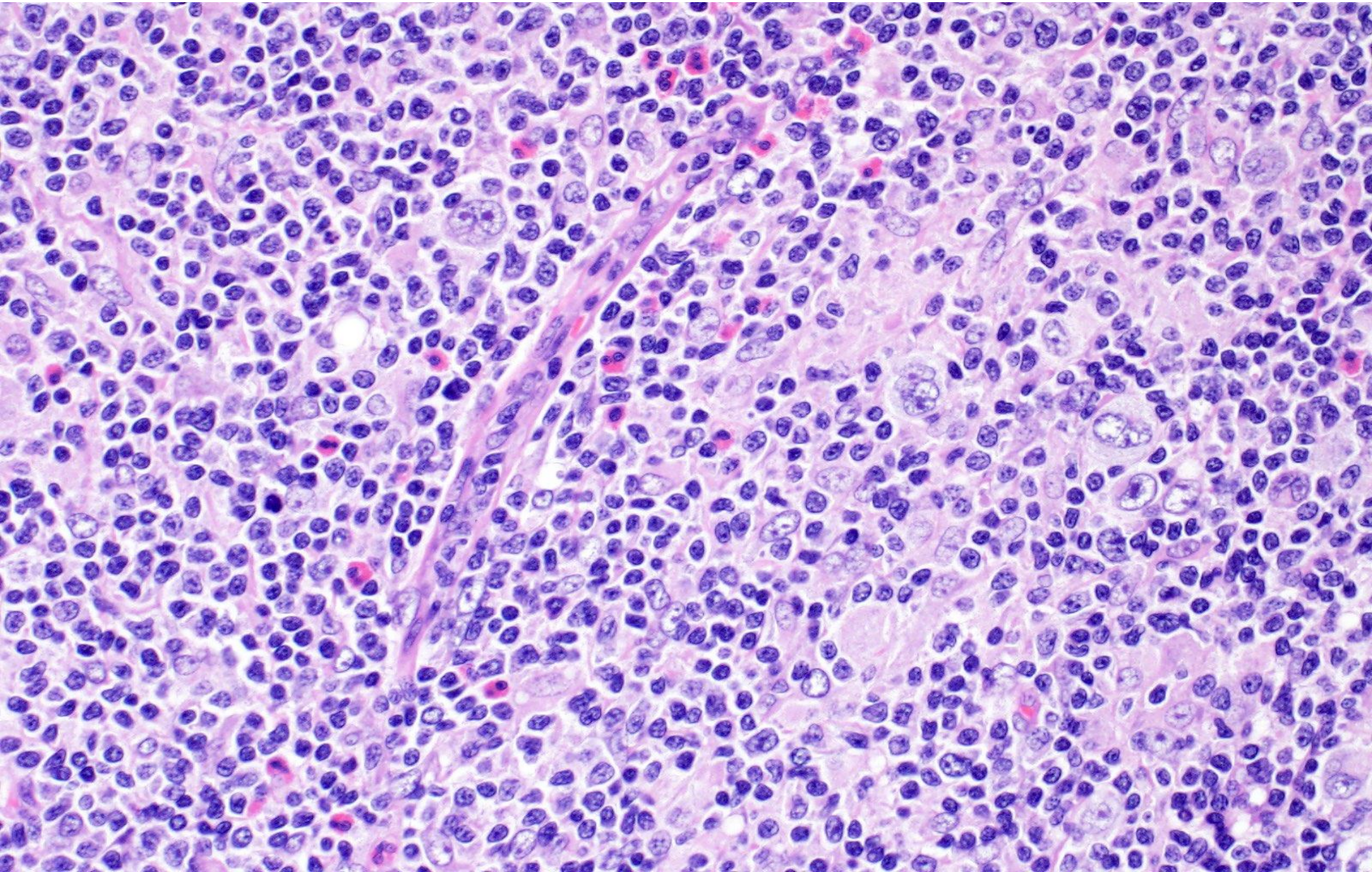
## Classic Hodgkin lymphoma

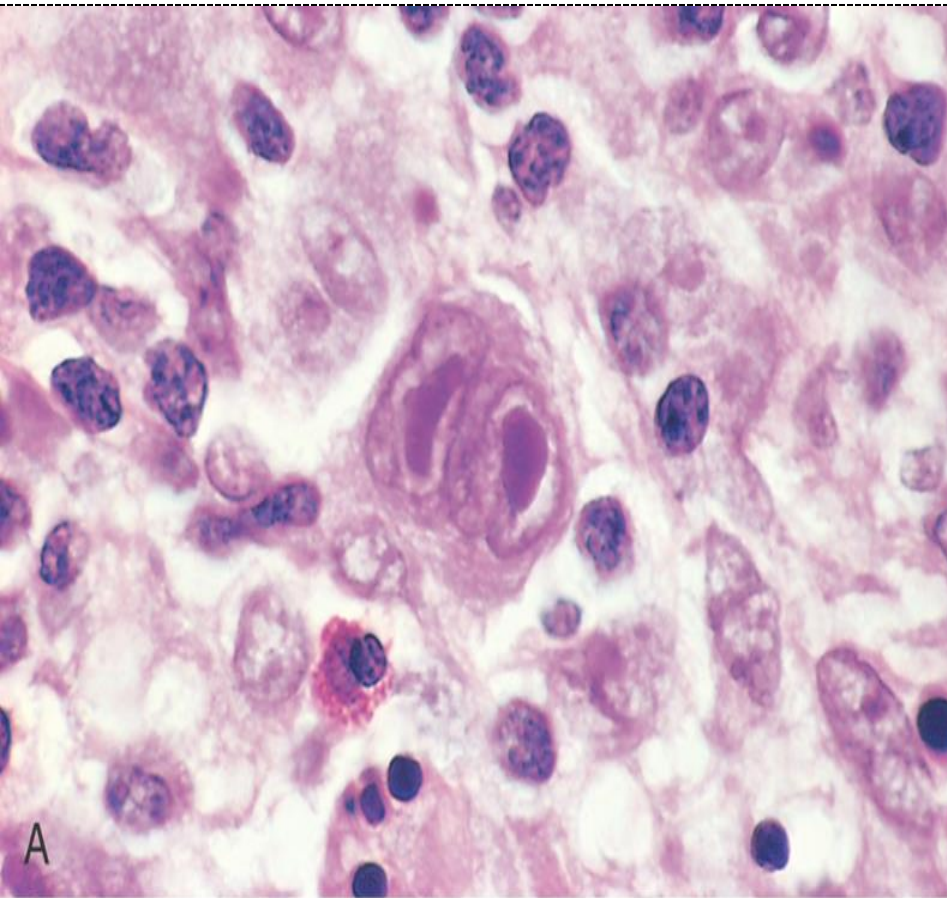
- Nodular sclerosis classic Hodgkin lymphoma
- Lymphocyte-rich classic Hodgkin lymphoma
- Mixed cellularity classic Hodgkin lymphoma
- Lymphocyte-depleted classic Hodgkin lymphoma

# Cytology- Hodgkin lymphoma

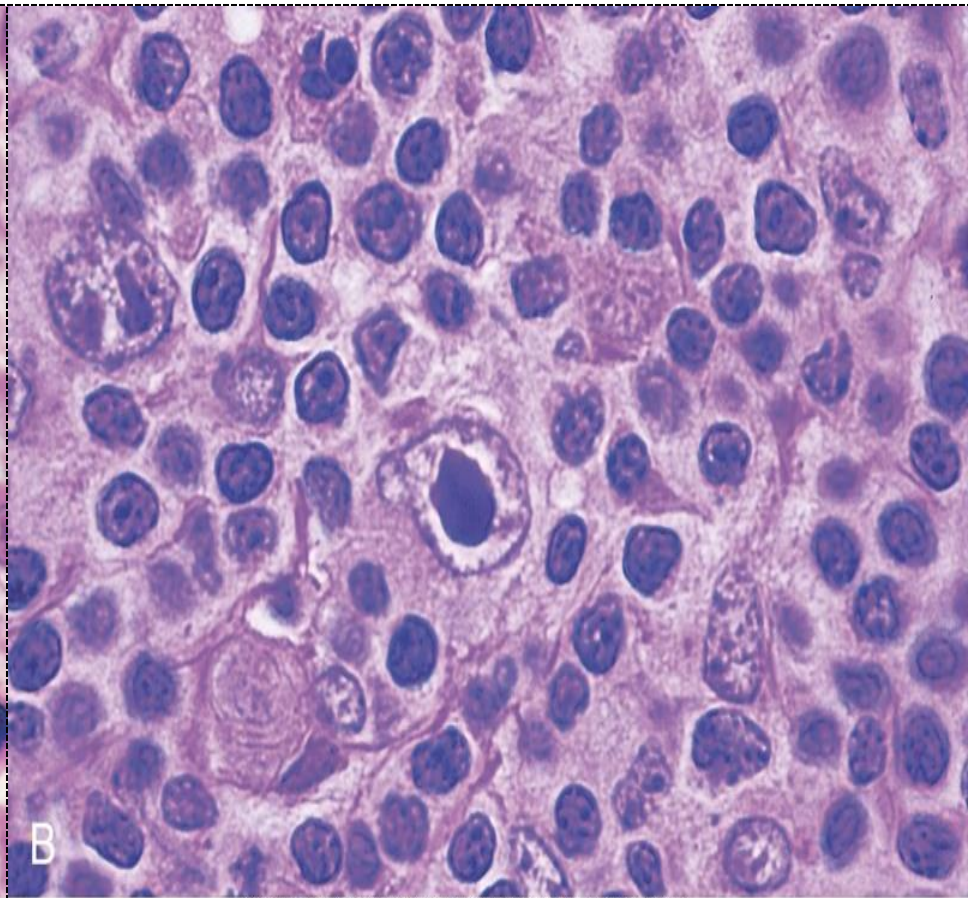


# Hodgkin lymphoma: Scattered Reed-Sternberg cells in a background of small lymphocytes and eosinophils





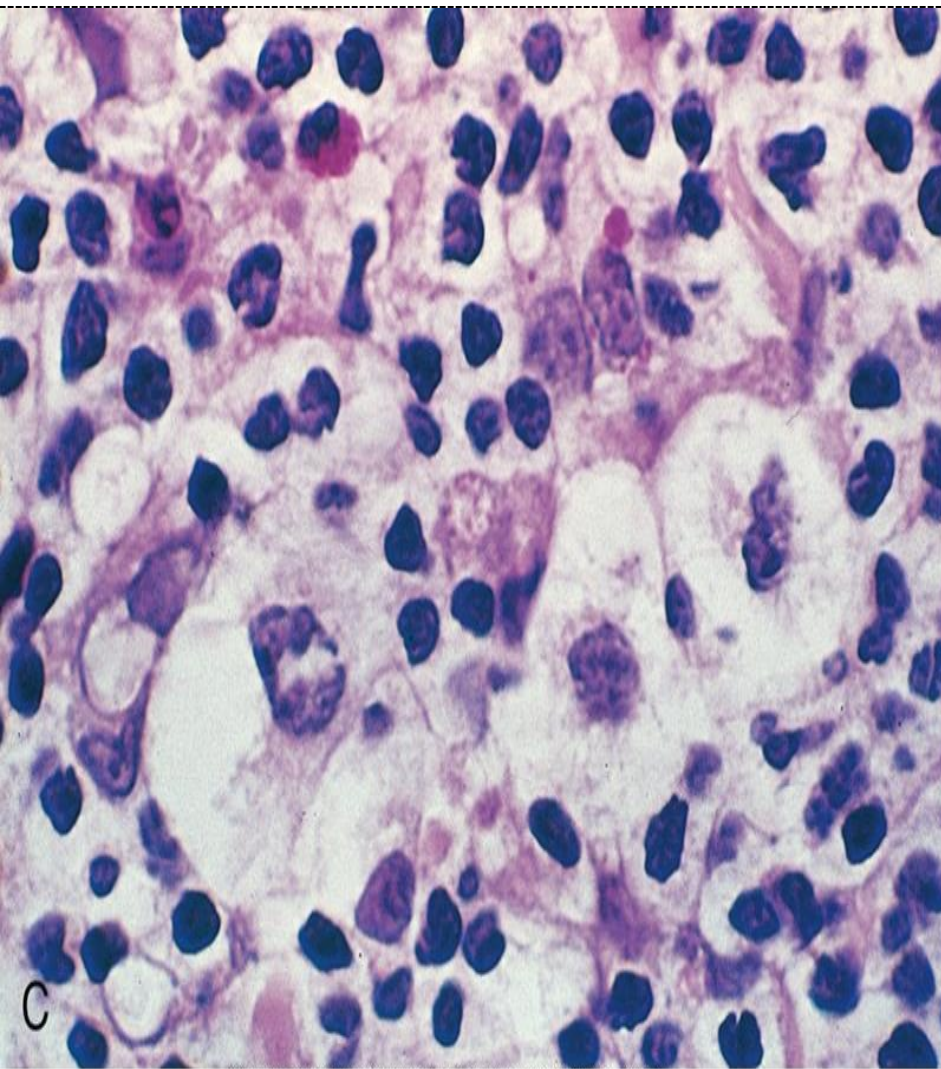
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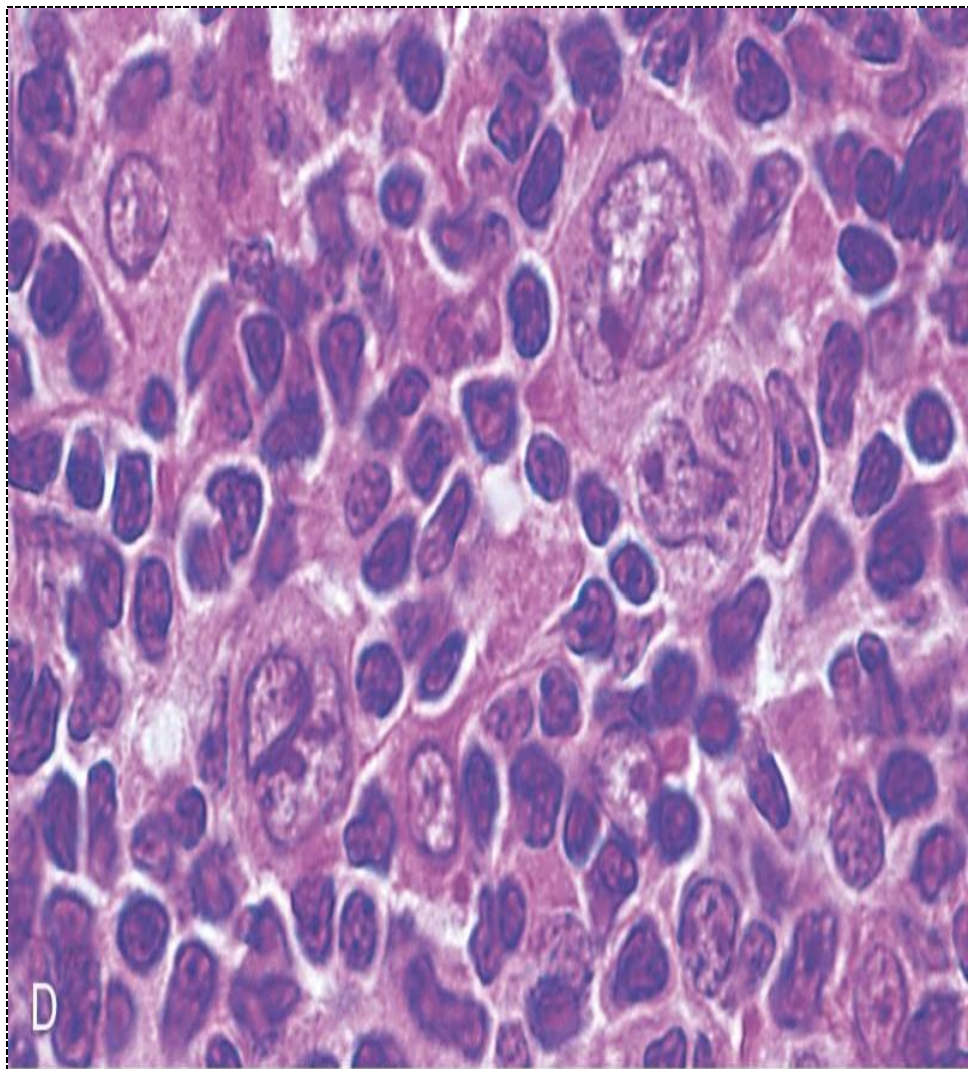
Diagnostic Reed-Sternberg cell.

Mononuclear variant of RS cell



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Lacunar variant

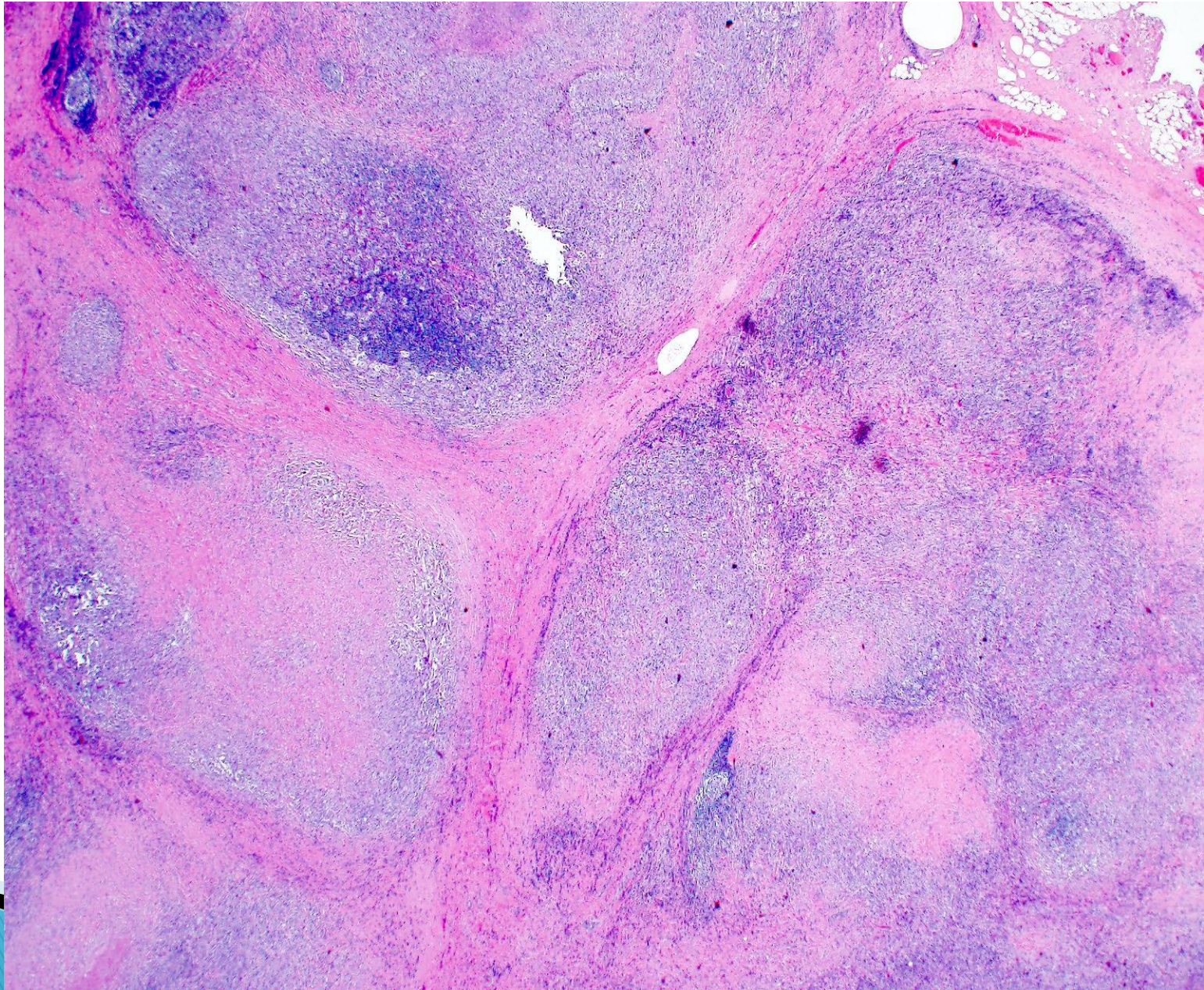


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Lymphohistiocytic variant.

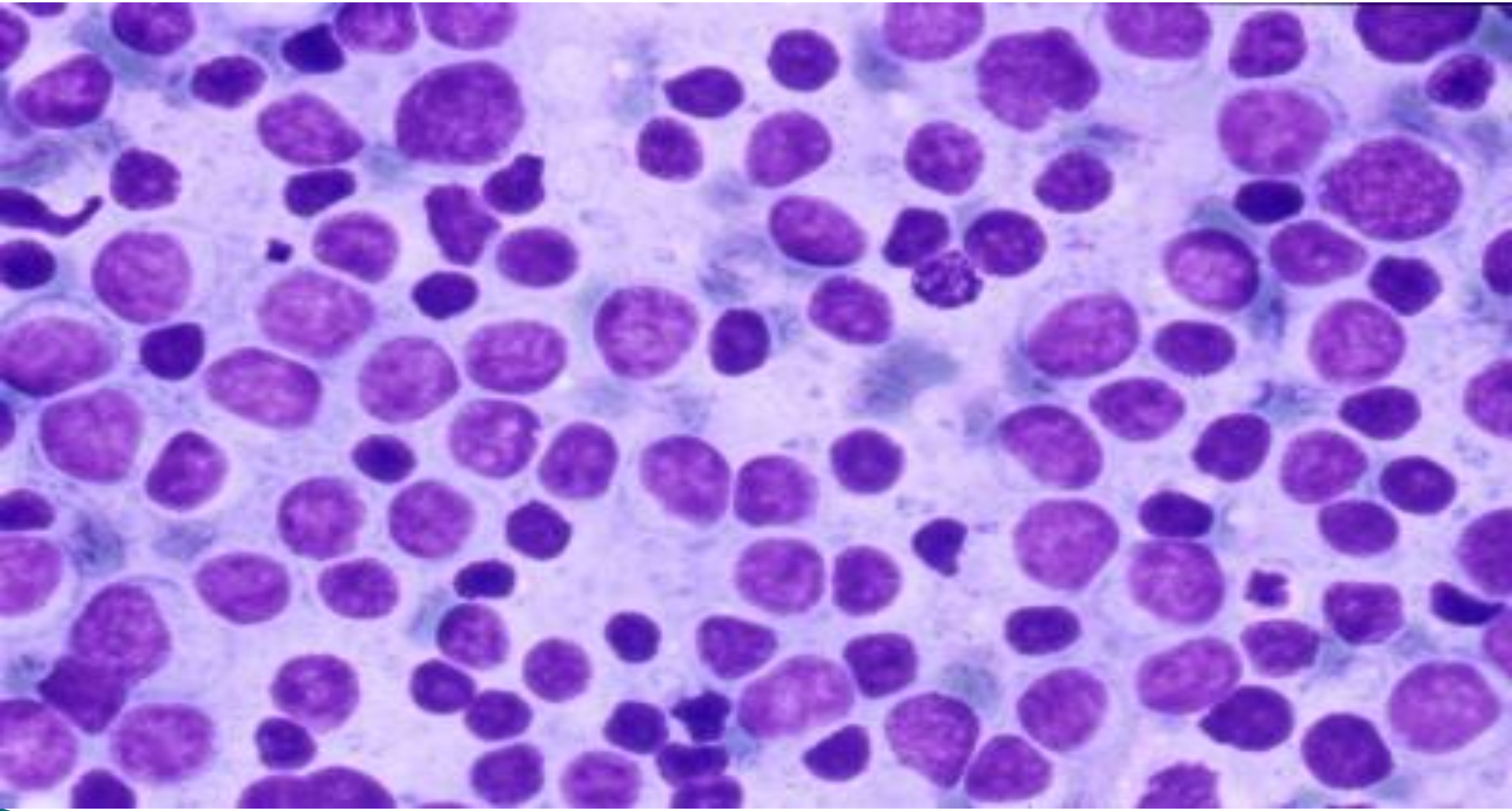
# Hodgkin lymphoma- Nodular sclerosis

Lymph  
node  
involved  
by  
nodular  
sclerosis  
CHL,  
with  
bands of  
dense  
fibrosis  
creating a  
nodular  
growth  
pattern



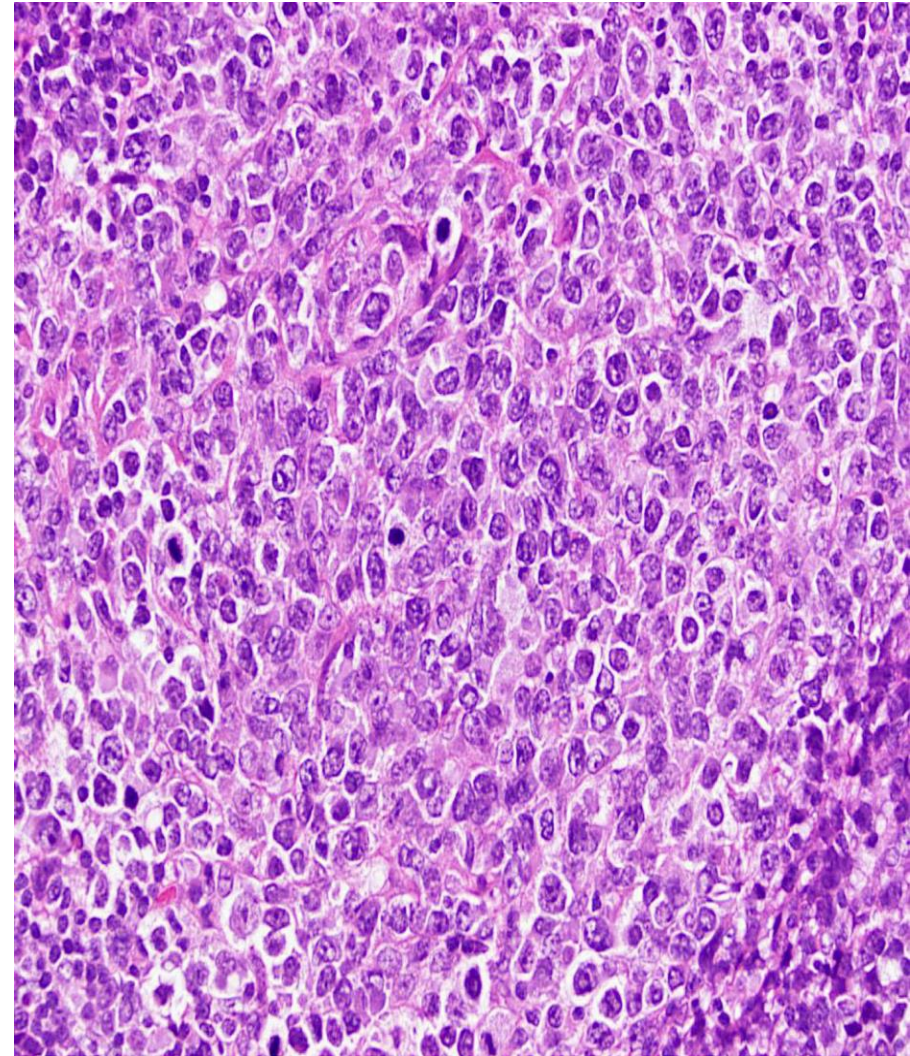
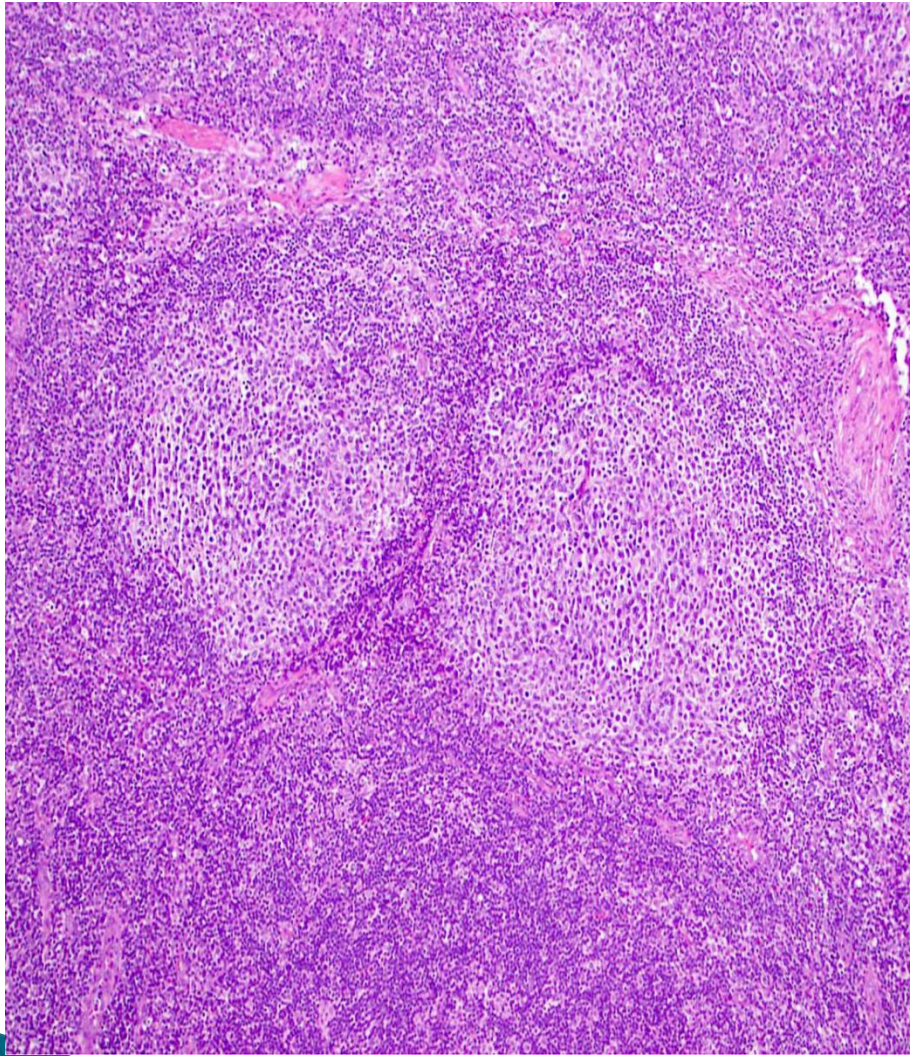


# Cytology- Non-Hodgkin lymphoma



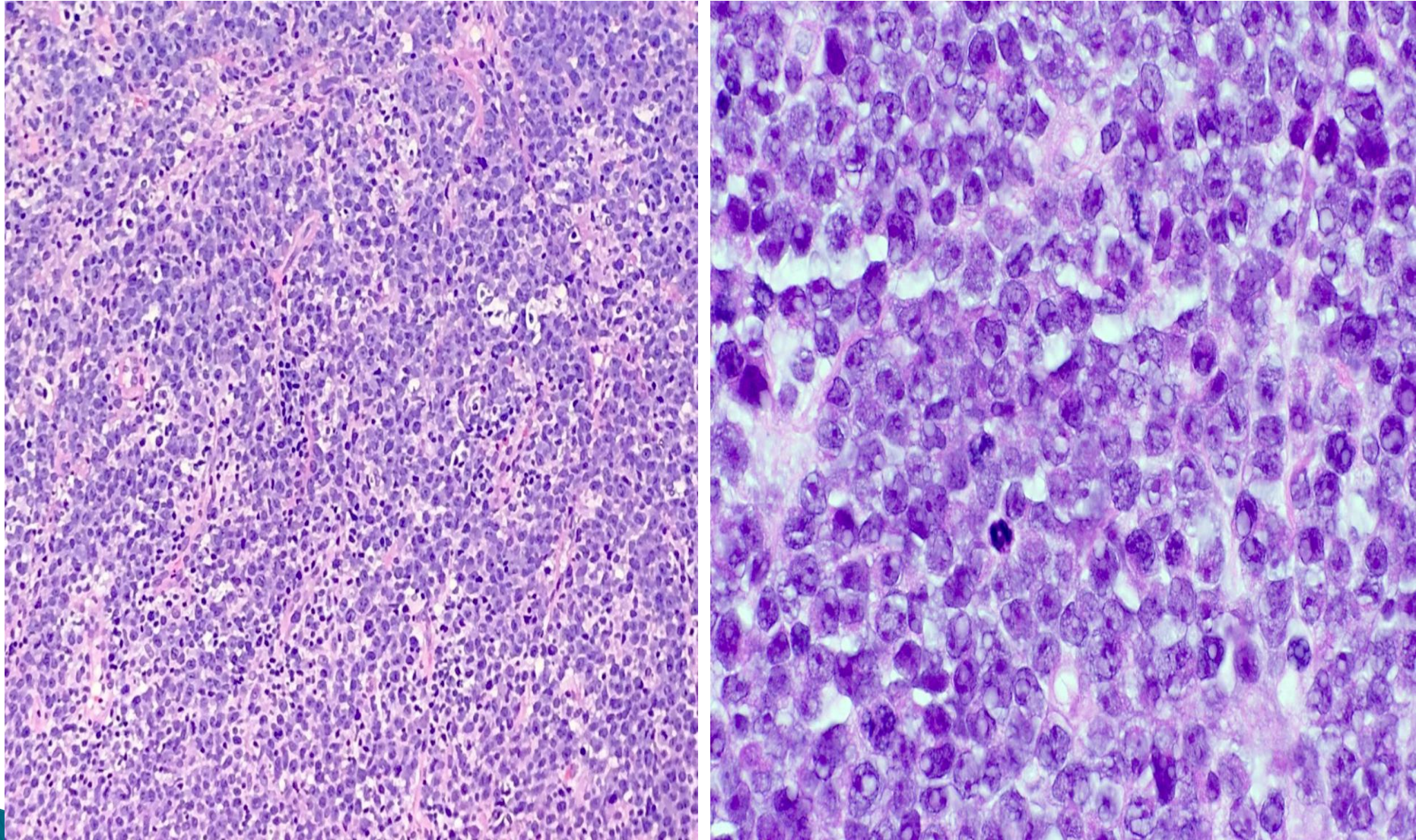
Atypical lymphoid cells with vesicular chromatin & prominent nucleoli

# Non-Hodgkin lymphoma-Follicular lymphoma



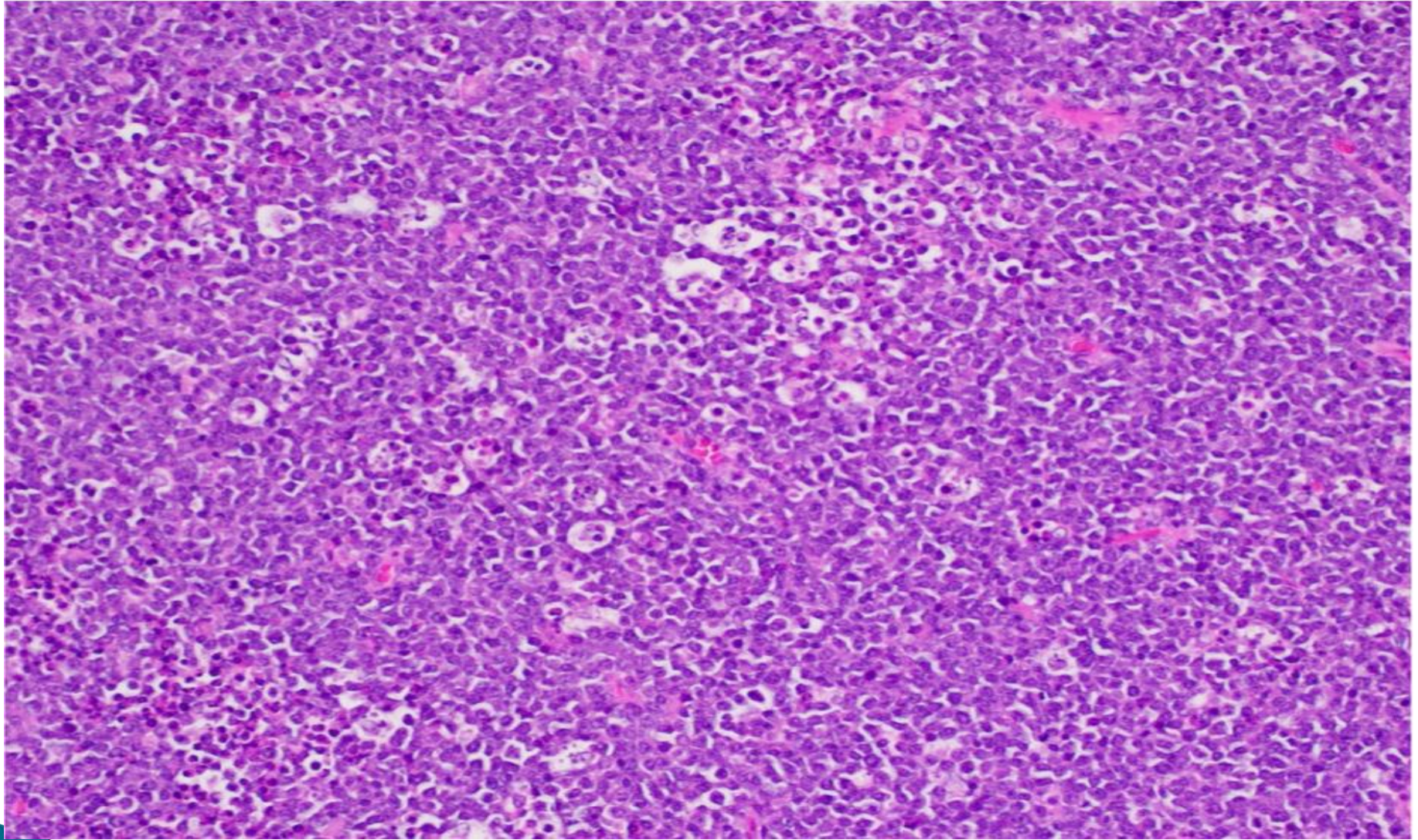
The follicles are composed of a homogeneous population of large lymphoid cells.

# NHL- Diffuse large B cell lymphoma



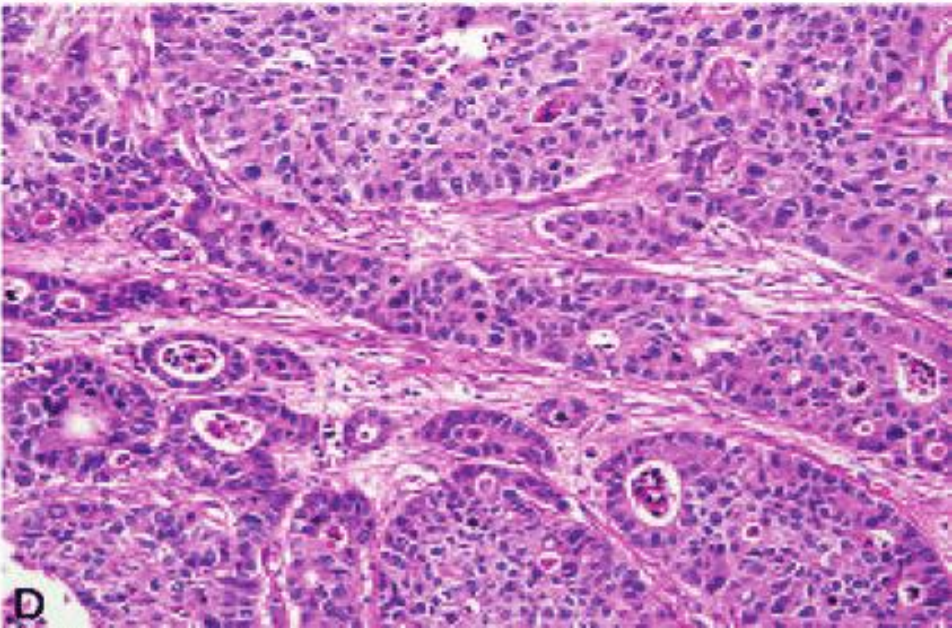
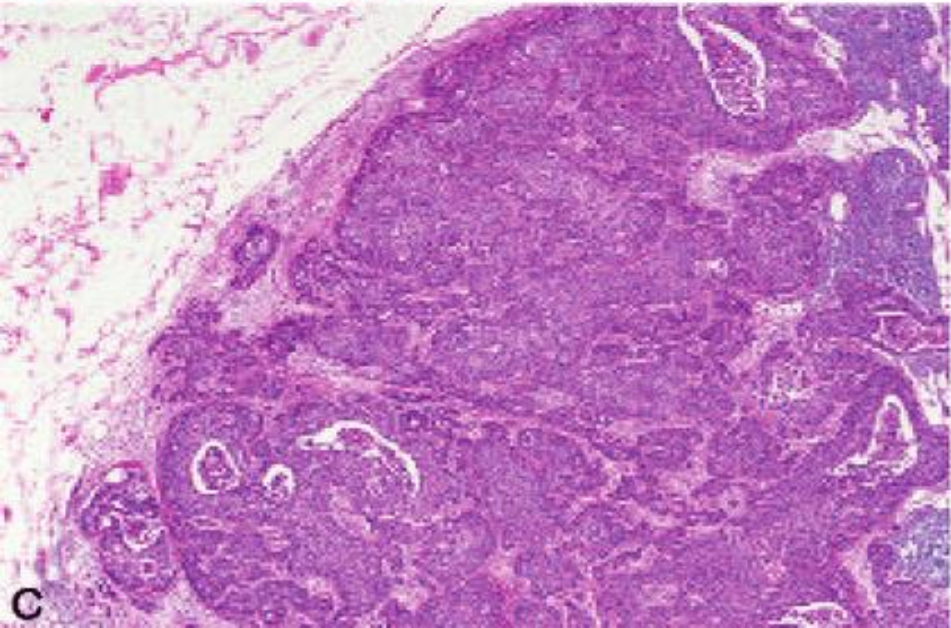
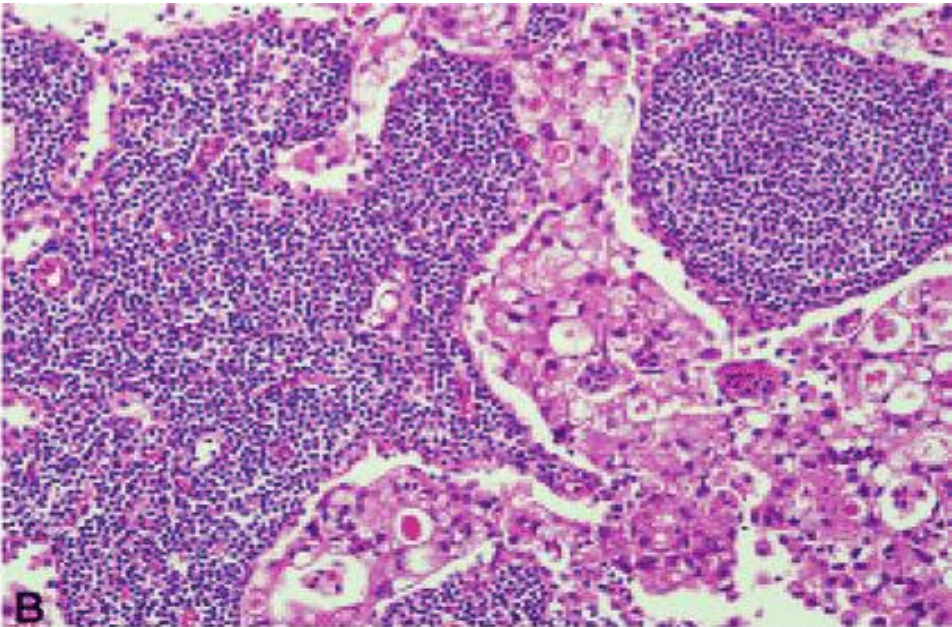
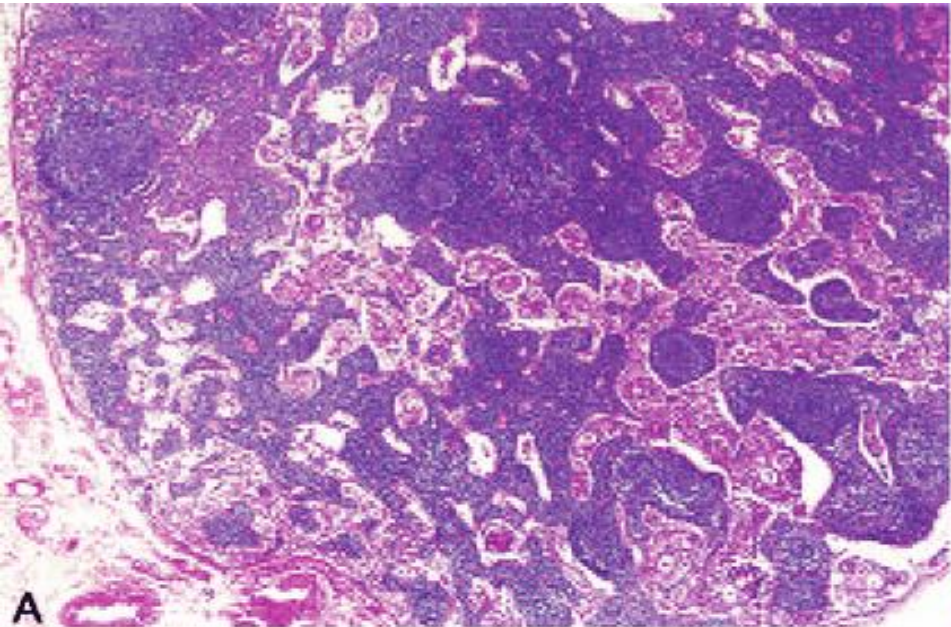
Diffuse infiltrate of large atypical lymphoid cells.

# NHL- Burkitt Lymphoma

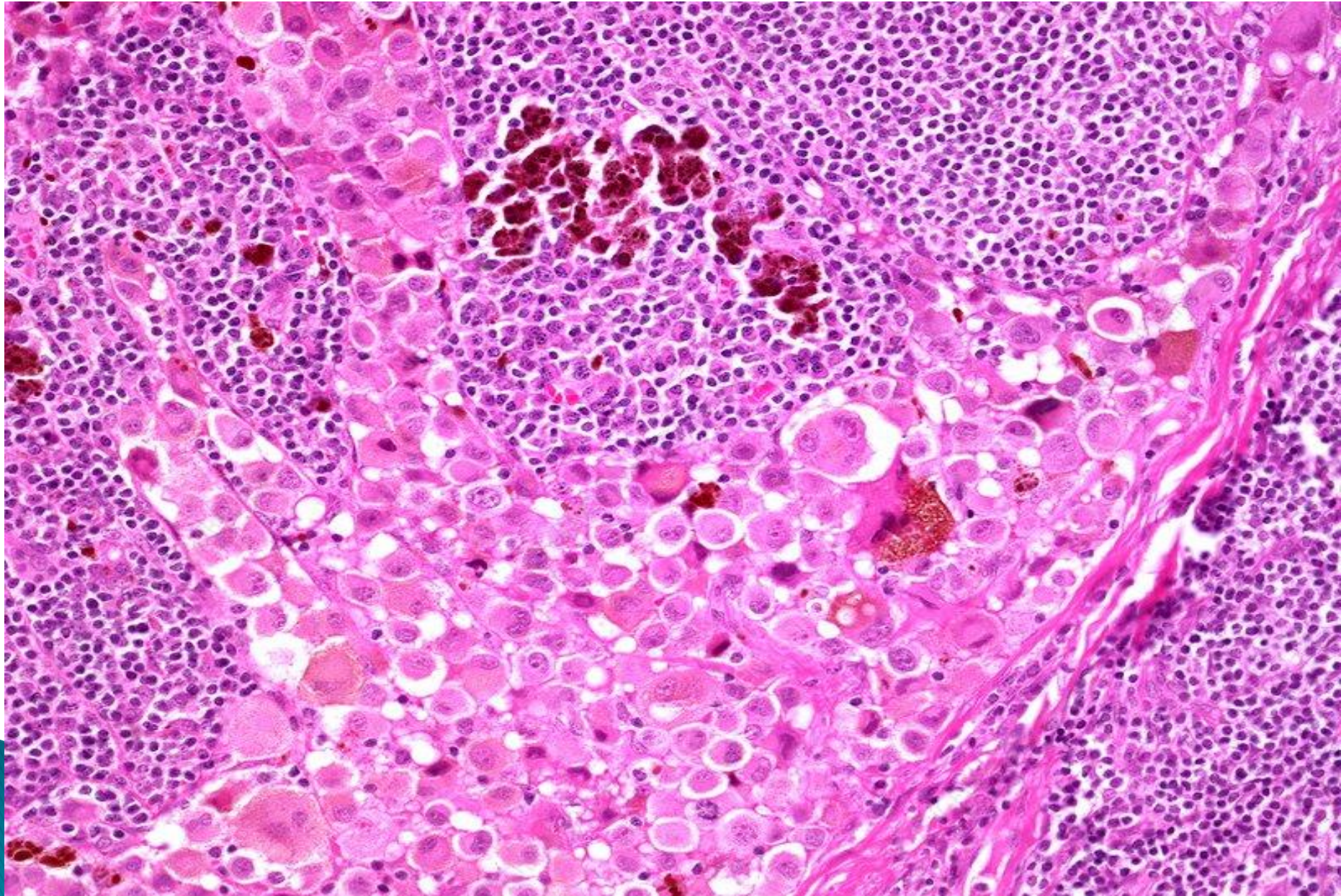


Typical starry sky appearance

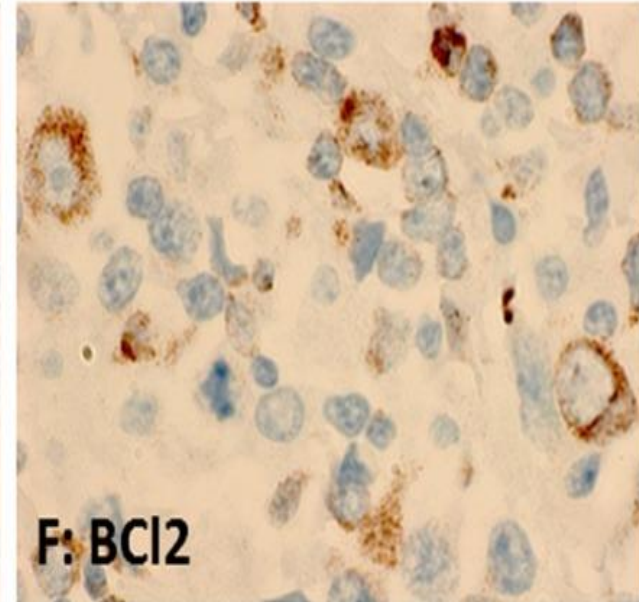
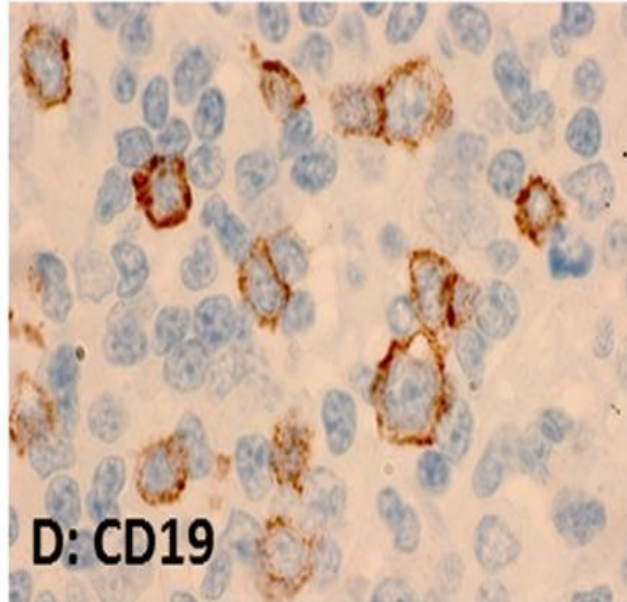
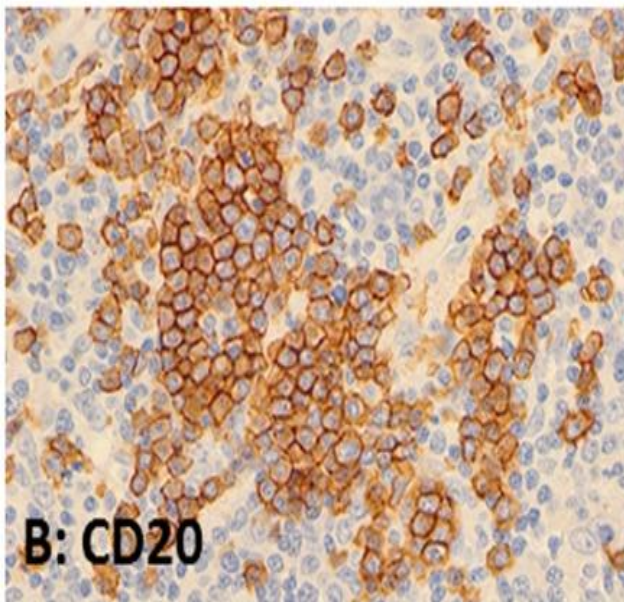
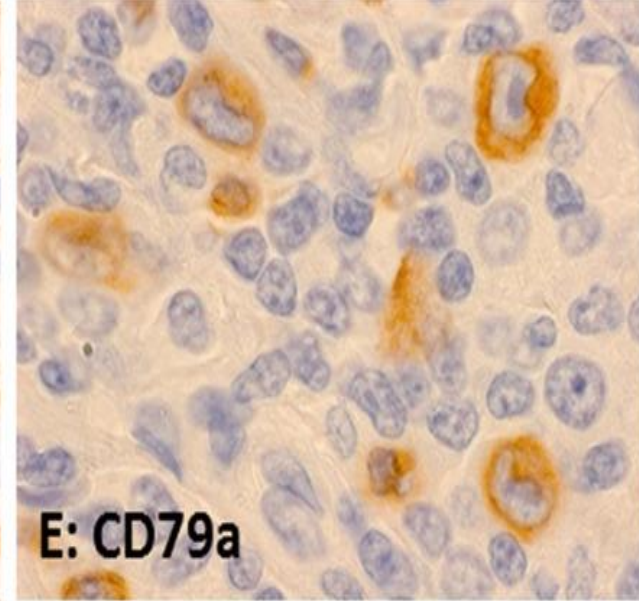
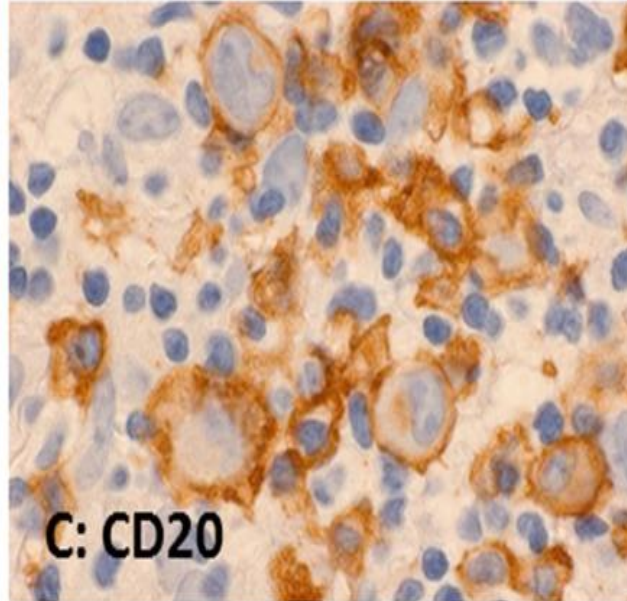
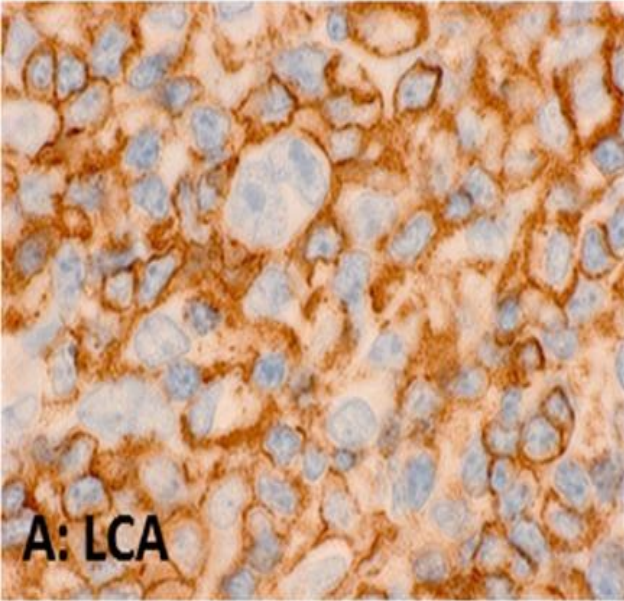
# Metastatic adenocarcinoma in lymph nodes




# Metastatic melanoma in lymph nodes



# Hodgkin Lymphoma- Immunohistochemistry



A bouquet of white daisies with yellow centers and green foliage is shown in the background. In the foreground, a small white paper tag with a scalloped edge is pinned to the bouquet with a small red ladybug. The tag has the words "Thank you!" written in black cursive script.

Thank  
you!