

Diseases of LYMPH NODES

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OUTLINES

- **Introduction**
- **Lymphadenopathy**
- **Lymphadenitis**
- **Reactive hyperplasia**
- **Metastatic carcinoma of the LN**
- **Non Hodgkin`s lymphoma**
- **Hodgkin`s lymphoma**
- **Splenomegally**

INTRODUCTION

- **Lymphocytes and Monocytes:**

- Circulate in the blood
- Accumulate in
 - Discrete organised collections (RE system): LNs, spleen, thymus, tonsils, adenoids and payers' patches
 - Less formed collections: BM, lungs, GIT and other tissues

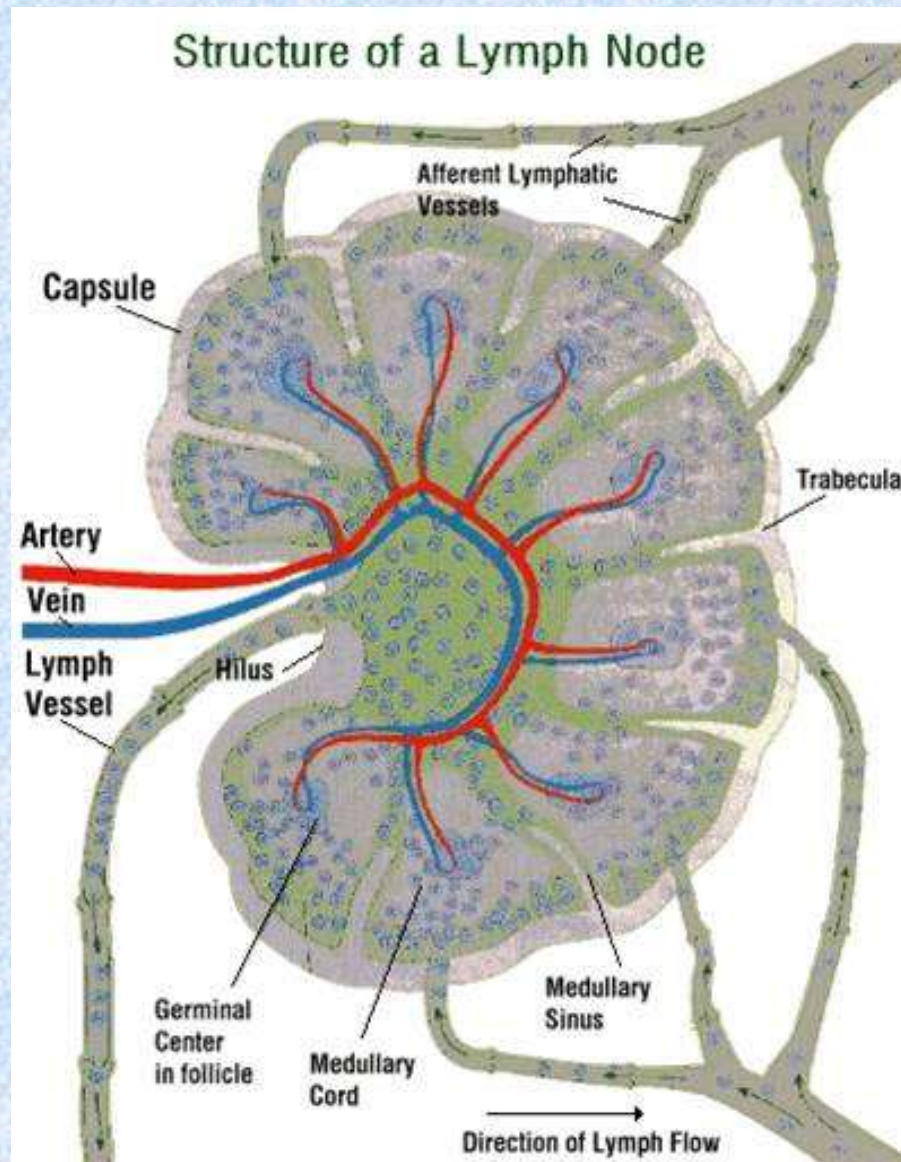
- **Normal LNs:**

- Grossly (clinically): small, bean shaped arranged in groups (e.g. cervical, axillary and inguinal)
- Seldom palpable

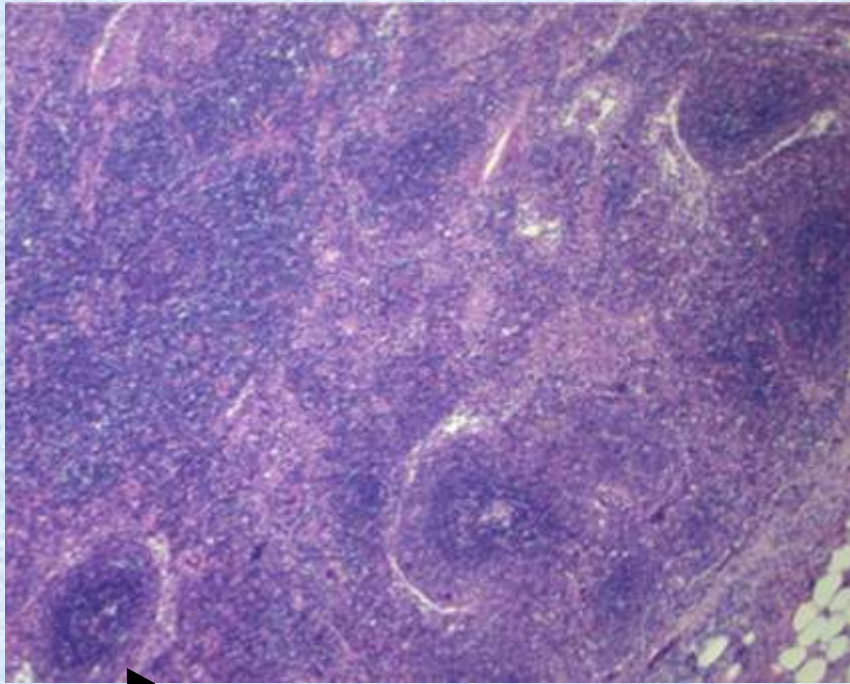
The diagram illustrates the internal structure of a lymph node. It is divided into an outer cortex and an inner medulla. The cortex contains primary lymphoid follicles (yellow circles) and the paracortical area (mostly T cells, blue). The medulla contains medullary cords (macrophages and plasma cells, red) and medullary sinuses (pink). Afferent lymphatic vessels enter the node, and efferent lymphatic vessels exit. Arteries and veins are also shown. The marginal sinus is located at the bottom of the node. The germinal center is located within the secondary lymphoid follicle (mostly B cells, yellow). The diagram is labeled with the following components:

- primary lymphoid follicle
- afferent lymphatic vessel
- paracortical area (mostly T cells)
- secondary lymphoid follicle (mostly B cells)
- germinal center
- cortex
- medullary cords (macrophages and plasma cells)
- medullary sinus
- artery
- vein
- efferent lymphatic vessel
- marginal sinus

INTRODUCTION



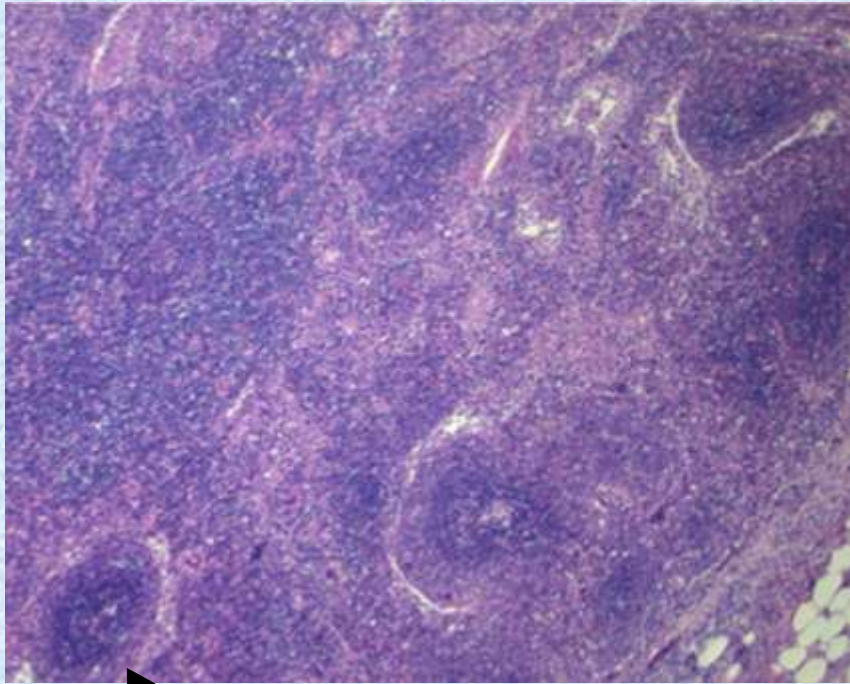
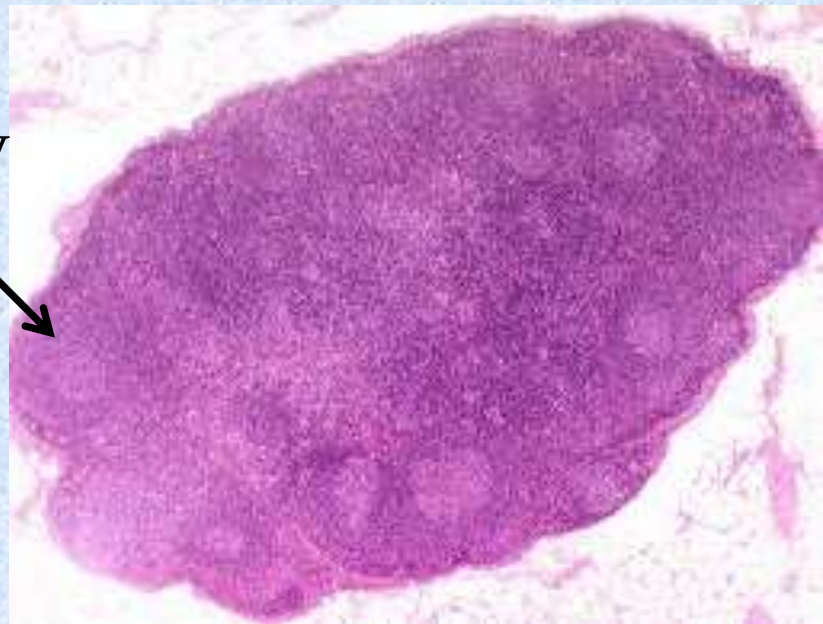
INTRODUCTION



Primary
follicle

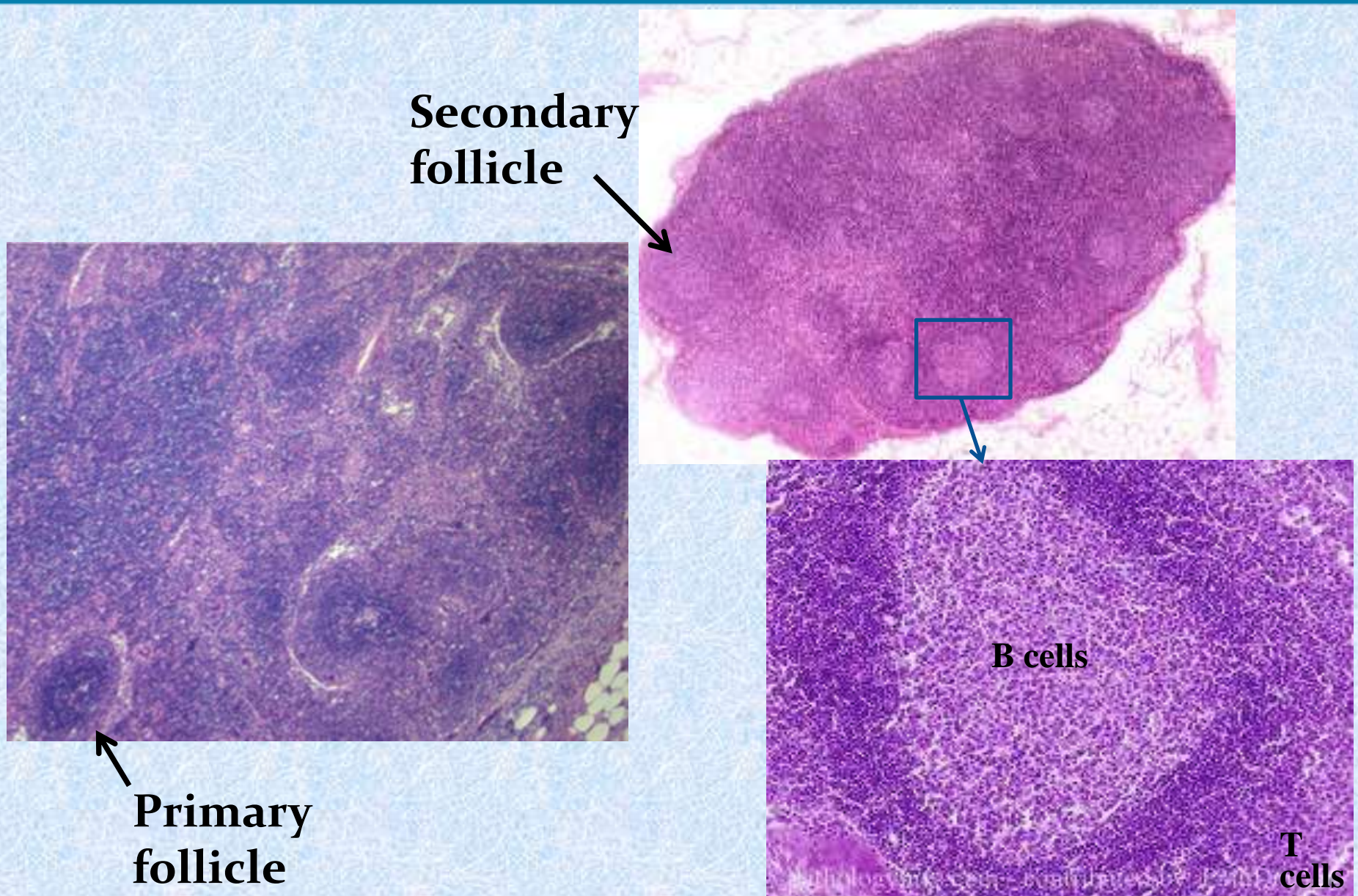
INTRODUCTION

**Secondary
follicle**



**Primary
follicle**

INTRODUCTION



LYMPHADENOPATHY

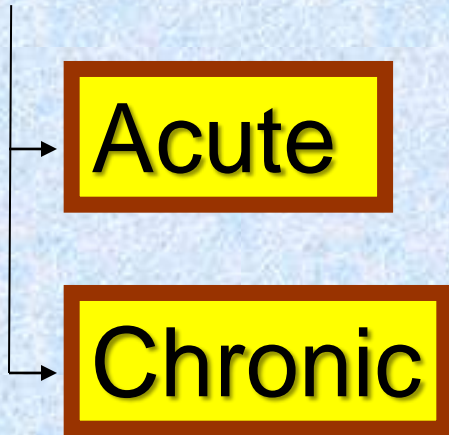
- **Definition:**
 - Enlargement of one or more groups of lymph nodes
- **Types**
 - Localized: involve one group of LNs
 - Generalized: involve more than one group of LNs
- **Causes**
 - ❑ **Inflammatory (lymphadenitis):**
 - Acute or chronic lymphadenitis
 - Specific or non-specific lymphadenitis (**examples**)
 - ❑ **Hematologic:** Leukemias
 - ❑ **Metabolic:** Some metabolic diseases
 - ❑ **Neoplastic:**
 - Primary: Lymphoma
 - Secondary (metastatic): commonly carcinoma
 - ❑ **Others:** Reactive hyperplasia of LN

LYMPHADENITIS

- ***Definition:***
 - Inflammation of the lymph node

LYMPHADENITIS

- ***Definition:***
 - Inflammation of the lymph node
- ***Types***

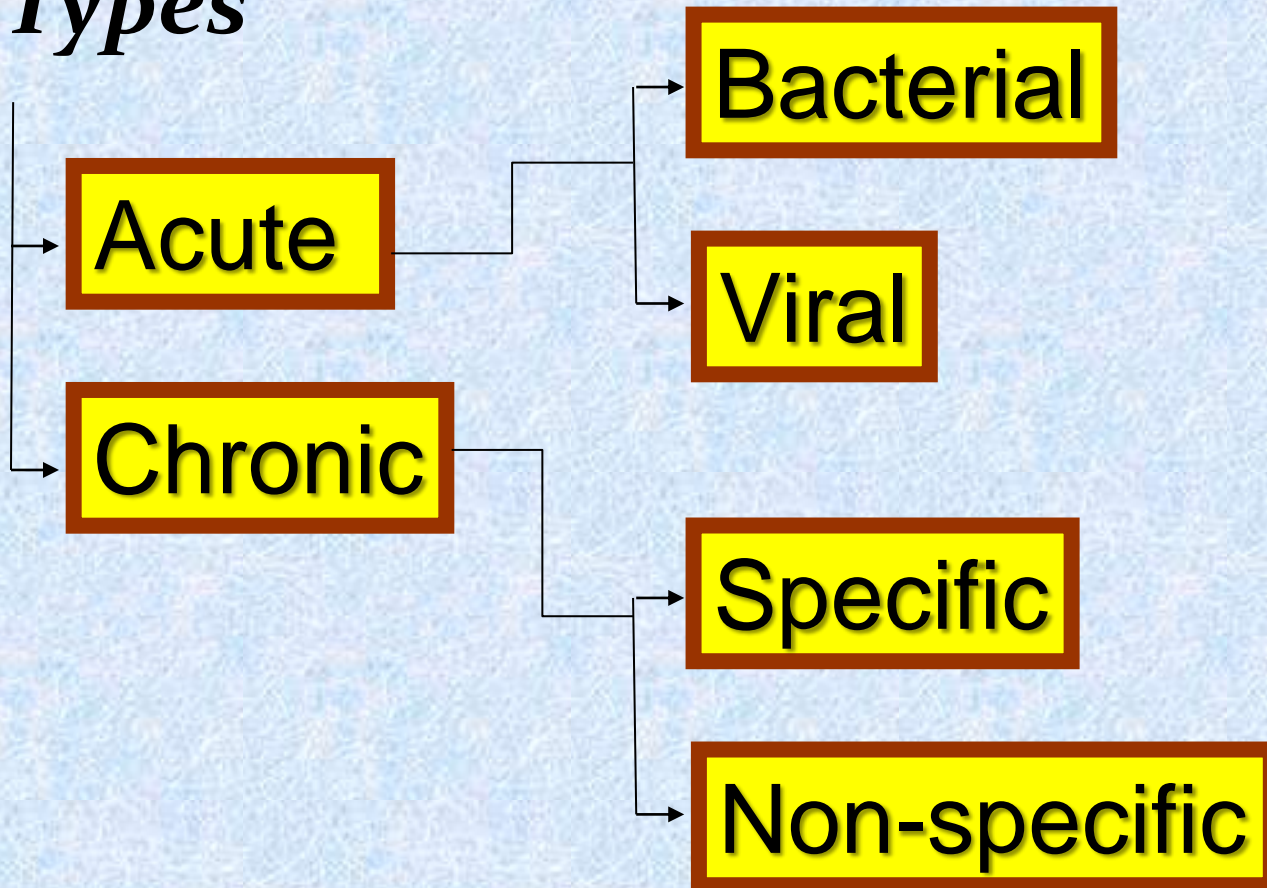


LYMPHADENITIS

- ***Definition:***

- Inflammation of the lymph node

- ***Types***

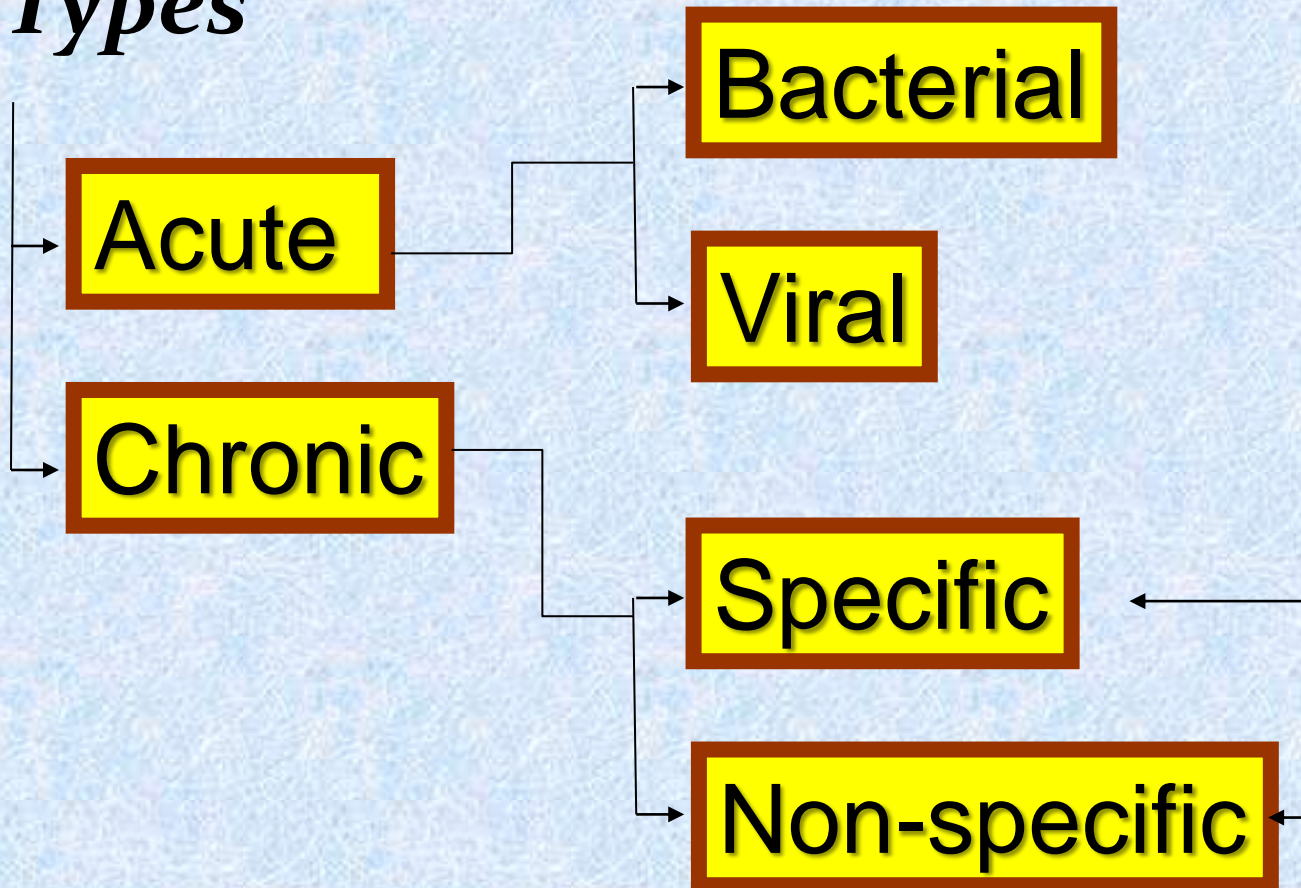


LYMPHADENITIS

- **Definition:**

- Inflammation of the lymph node

- **Types**



See general
pathology

LYMPHADENITIS

- *Types*

Bacterial

- Affects L.Ns. draining acute infective lesions (acute tonsillitis → acute cervical lymphadenitis)
- Grossly: enlarged red and tender L.Ns.
- Microscopically: infiltration of the L.N. by acute inflammatory cells (**mention**)

LYMPHADENITIS

- *Types*

Viral

Infectious mononucleosis

- ♦ **Cause:** EB virus
- ♦ **C/P:** fever, sore throat, generalized lymphadenopathy
- ♦ **Lymph node:**
Expansion of the inter-follicular areas by:
 - numerous immunoblasts
 - small lymphocytes
 - plasma cells
 - macrophages

REACTIVE HYPERPLASIA

❑ Definition:

- Non-specific, non neoplastic enlargement of the LNs due to proliferation of lymphoid tissue

❑ Clinically:

- Non painful LN enlargement involving one or more groups
- LNs are diffusely enlarged, soft, discrete and not fused.

❑ Significance:

- DD of lymphoma, clinically and histologically (see later)

❑ Types:

- Follicular
- Paracortical
- Sinusal

REACTIVE HYPERPLASIA

1. Follicular hyperplasia:

- Due to preferential stimulation of follicular B cells
- Occurs in Rheumatoid arthritis, Sjogren's syndrome and Toxoplasmosis or any irritation at draining area.
- M/P:
 - Numerous variable sized secondary follicles.
 - Large germinal centers.
 - Follicles are surrounded by well-distinct mantle zones.
 - Lymphocytes does not break lymph node capsule

REACTIVE HYPERPLASIA

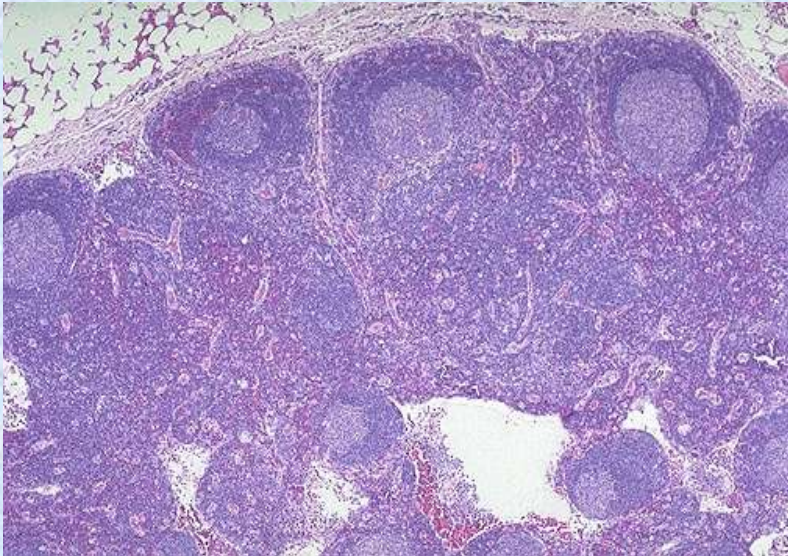
2. Para-cortical hyperplasia:

- Due to preferential stimulation of the para-follicular T cells
- Can be seen in
 - SLE
 - viral lymphadenopathy, as infectious mononucleosis
 - drug-induced lymphadenopathy

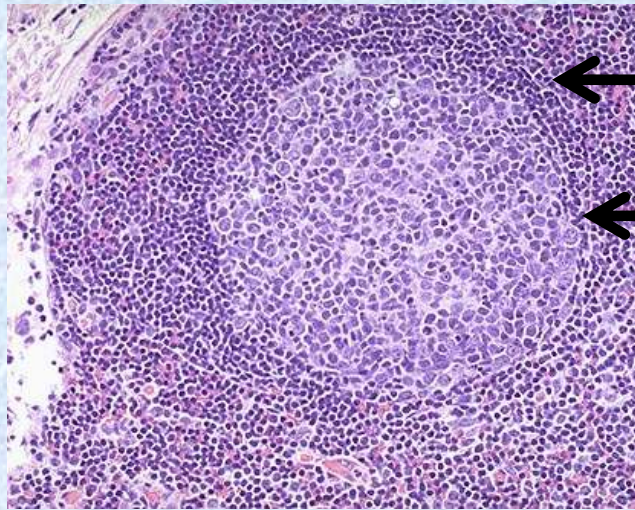
3. Sinusal hyperplasia:

- Due to preferential distention of lymph sinuses by benign histocytes accompanied by lymphocytes
 1. Sinus histiocytosis with massive lymphadenopathy
 2. Langerhans cell histiocytosis

REACTIVE HYPERPLASIA

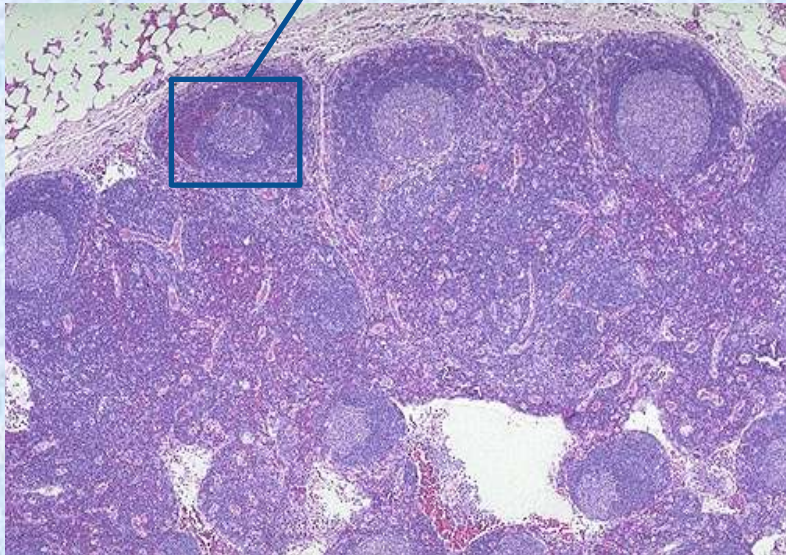


REACTIVE HYPERPLASIA

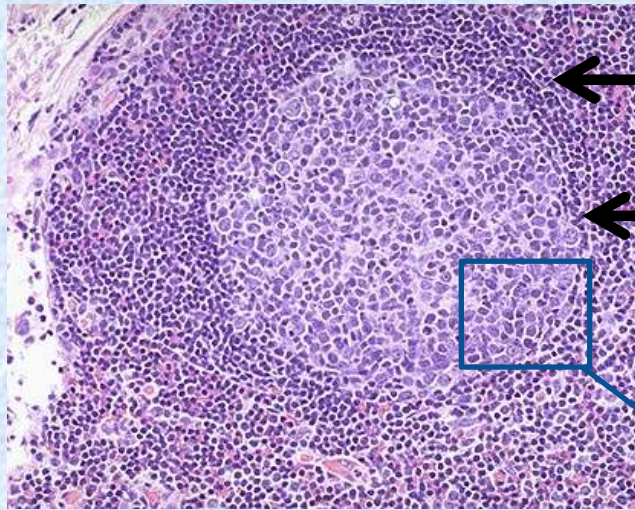


← Mantle zone

← Secondary follicle

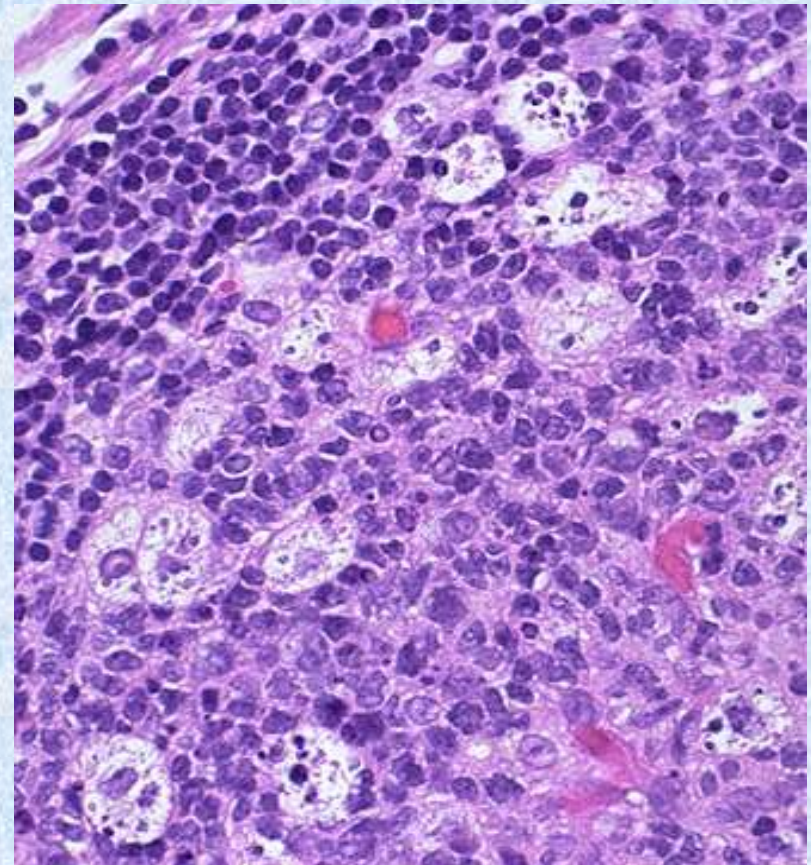
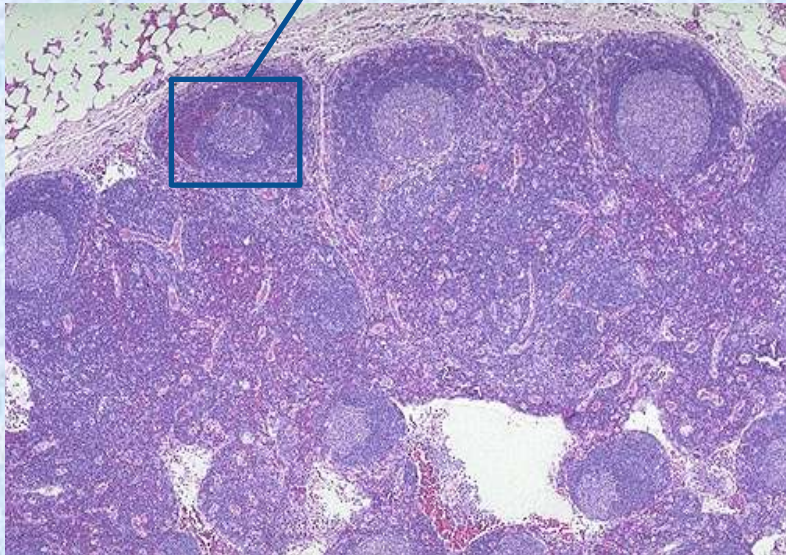


REACTIVE HYPERPLASIA



← Mantle zone

← Secondary follicle



Tumours of the lymph nodes

TUMOURS OF LNs

Metastatic

**Primary
(Lymphoma)**

TUMOURS OF LNs

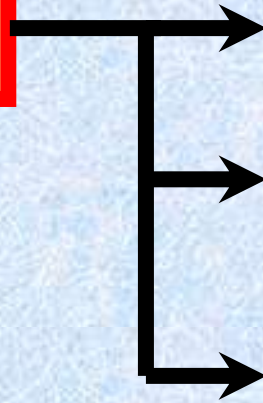
Metastatic

Carcinoma

Melanoma

Sarcoma

**Primary
(Lymphoma)**



TUMOURS OF LNs

Metastatic

Carcinoma

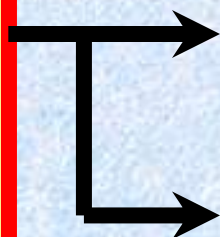
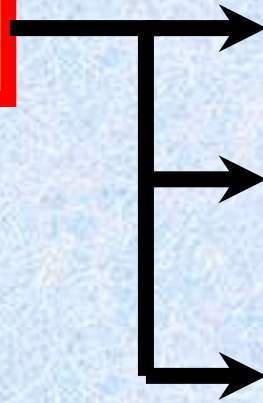
Melanoma

Sarcoma

**Primary
(Lymphoma)**

Hodgkin`s

Non-Hodgkin`s



METASTATIC TUMOURS

Metastatic carcinoma of the LN

- **Definition:**

- Involvement of the LN tissue by malignant epithelial cells

- **Common sites:**

- Axillary LN: in breast cancer
- Cervical LN: in thyroid and naso-pharyngeal cancers
- Porta-hepatis LN: in hepatic, GB and pancreatic cancers
- Mesenteric LNs: in cancer colon and rectum
- Iliac and para-aortic LN: as in cancer bladder and cancer cervix

- **Grossly**

- Multiple, enlarged discrete or fused LNs with greyish white cut section

METASTATIC TUMOURS

Metastatic carcinoma of the LN

- **M/P:**

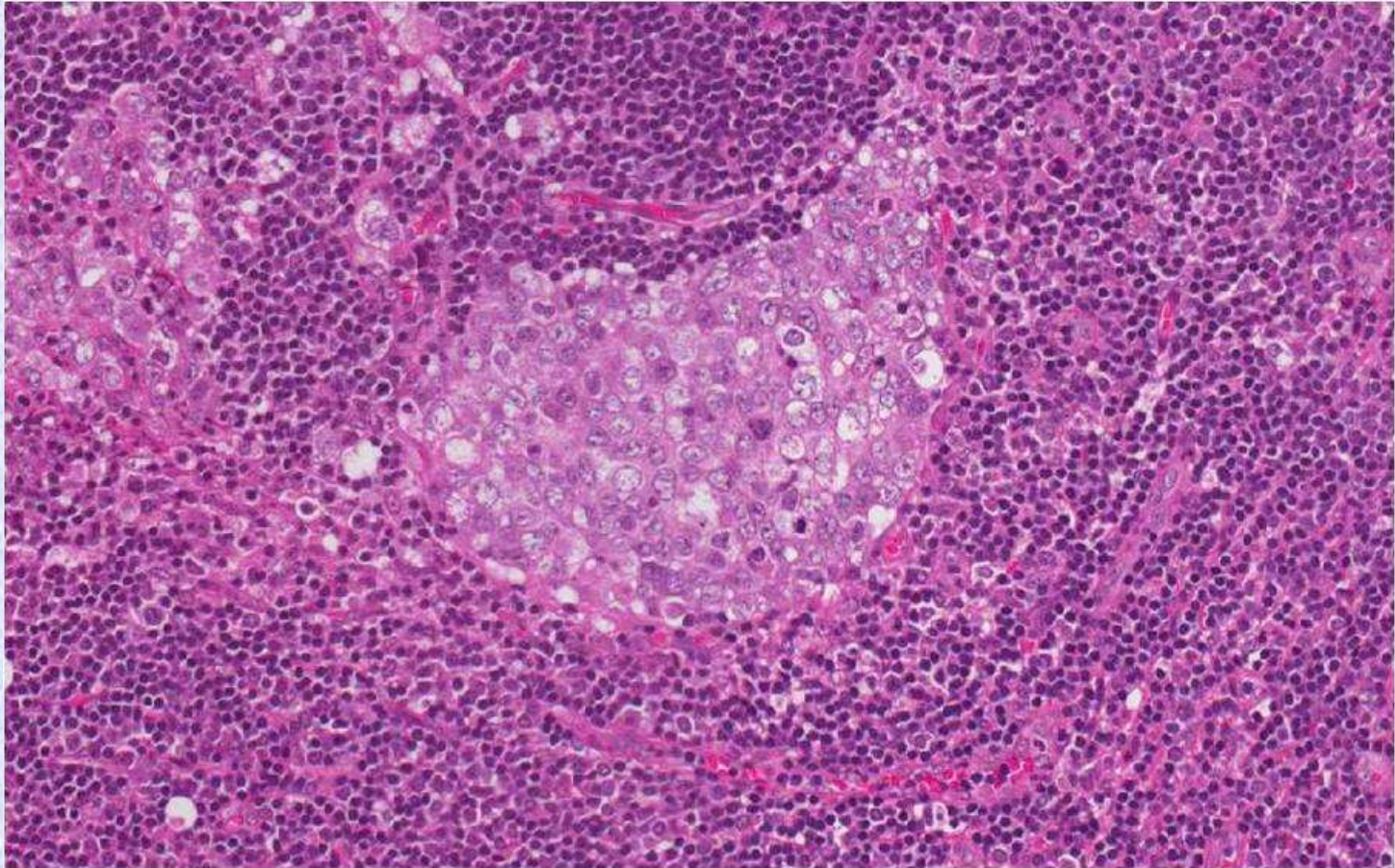
- Early: deposition of malignant epithelial cells in the sub-capsular lymph sinuses (mention features of malignancy)
- In advanced cases: LN tissue is partially, sub-totally or totally replaced by the neoplastic cells
- The metastatic cells are similar to the primary tumour cells (arrange in sheets, nests, glands, papillae.....)
- The nearby lymphoid tissue (if present) show features of lymphoid hyperplasia

- **Clinical importance:**

- LN metastasis is considered during TNM staging; treatment and prognosis of cancer patients

METASTATIC TUMOURS

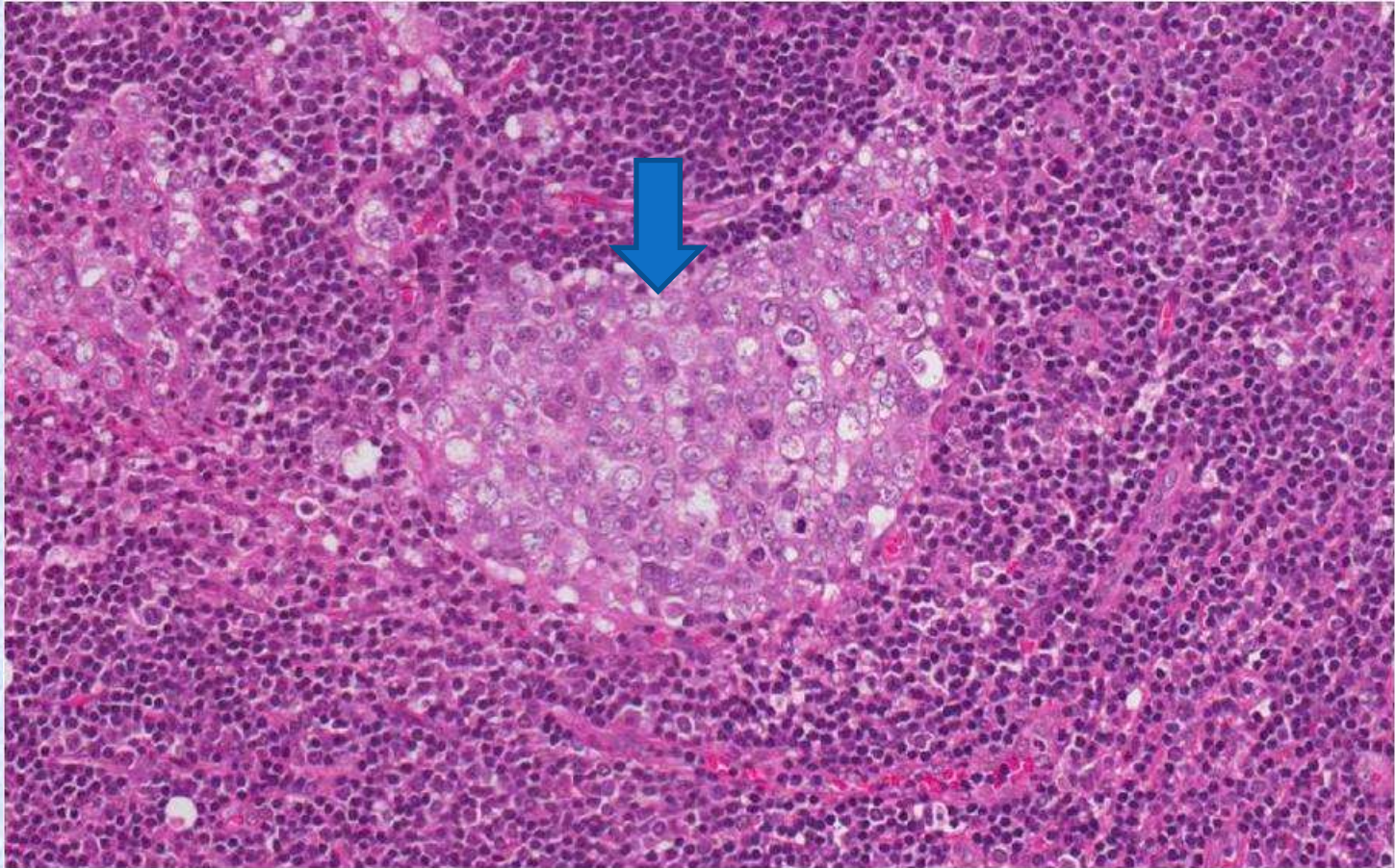
Metastatic carcinoma of the LN



Comment ???

METASTATIC TUMOURS

Metastatic carcinoma of the LN



Comment ???

LYMPHOMA

- Definition:

- Malignant tumours of lymphoid tissue.

- Clinically

- Starts
 - **Nodal**
 - involves one group of LNs
 - then spreads to other groups
 - If not treated; malignant cells can infiltrates different organs
 - **Extra-nodal** as tonsils and nasopharynx

LYMPHOMA

- **Grossly:**

- Multiple painless lymph node enlargement
- Firstly discrete but become fused as tumor cells infiltrate peri-nodal tissues.
- Cut surface is homogenous and gray or pink in color

- **M/P:**

- Effacement of normal nodal architecture is a common general feature
- Other histological features vary according to the type of lymphoma

LYMPHOMA

Types

LYMPHOMA

Types



**Non-Hodgkin`s Lymphoma
(NHL)**

LYMPHOMA

Types



```
graph TD; A[Types] --> B[Non-Hodgkin's Lymphoma (NHL)]; A --> C[Hodgkin's Lymphoma (HL)];
```

**Non-Hodgkin's Lymphoma
(NHL)**

**Hodgkin's Lymphoma
(HL)**

Non-Hodgkin`s Lymphoma

Rappaport classification

- Well differentiated lymphocytic lymphoma
- Poorly differentiated lymphocytic lymphoma
- Histiocytic lymphoma

Working Formulation

- Low grade
- Intermediate grade
- High grade

Real/WHO (2001)

- B-cell lymphomas
- T-cell lymphomas

Non-Hodgkin`s Lymphoma

Real/WHO (2001)

B cell lymphoma

Precursor B cell lymphoma

- Precursor B cell leukemia/ lymphoma

Peripheral B cell neoplasms

1. B cell chronic lymphocytic leukemia/ small lymphocytic lymphoma (CLL/SLL)
2. Lymphoplasmocytic lymphoma
3. Mantle cell lymphoma
4. Follicular lymphoma
5. Marginal zone lymphoma
6. Extranodal lymphoma of mucosa associated lymphoid tissue (MALT).
7. Plasmacytoma/ multiple myeloma
8. Diffuse large B cell lymphoma
9. Mediastinal large B cell lymphoma
10. Burkitt's lymphoma

T cell lymphoma

Precursor T cell lymphoma

- Precursor T cell leukemia/ lymphoma

Peripheral T cell neoplasms

1. T cell (CLL/SLL)
2. Large granular lymphocytic leukemia
3. Mycosis fungoides & Sezary syndrome
4. Peripheral T cell lymphoma unspecified
5. Angio-immunoblastic T cell lymphoma
6. Natural killer/T cell lymphoma
7. Intestinal T cell lymphoma
8. Adult T cell leukemia/ lymphoma
9. Anaplastic large T cell lymphoma

Non-Hodgkin`s Lymphoma

Working Formulation

- ☐ Solely based on the morphology of H&E sections.
- ☐ Has therapeutic and prognostic validity.
- ☐ Depends on:

- **Architectural features (low magnification):**

- follicular proliferation
- diffuse proliferation

- **Cytological features (high magnification):**

- Cell size**

- small
 - large
 - mixed small and large

- Nuclear outline**

- cleaved (indented)
 - non-cleaved

Non-Hodgkin's Lymphoma

Working Formulation

Low Grade	Intermediate Grade	High Grade
Small lymphocytic	Follicular large cell	Immunoblastic
Follicular small cell	Diffuse small cells	Lymphblastic
Follicular mixed small and large cell	Diffuse mixed cell	Burkitt's lymphoma
	Diffuse large cell	

Non-Hodgkin's LymphomaA1

Low grade NHL



```
graph TD; A[Low grade NHL] --> B[Diffuse small lymphocytic lymphoma (SLL)]; A --> C[Follicular lymphoma (FL)];
```

Diffuse small lymphocytic lymphoma (SLL)

Follicular lymphoma (FL)

Non-Hodgkin`s Lymphoma

Low grade NHL

Diffuse small lymphocytic lymphoma (SLL)

- Clinical features:

- Affects old age (~ 60 years)
- Generalized lymphadenopathy
- Hepato-splenomegaly is common.
- May be accompanied with chronic lymphocytic leukemia

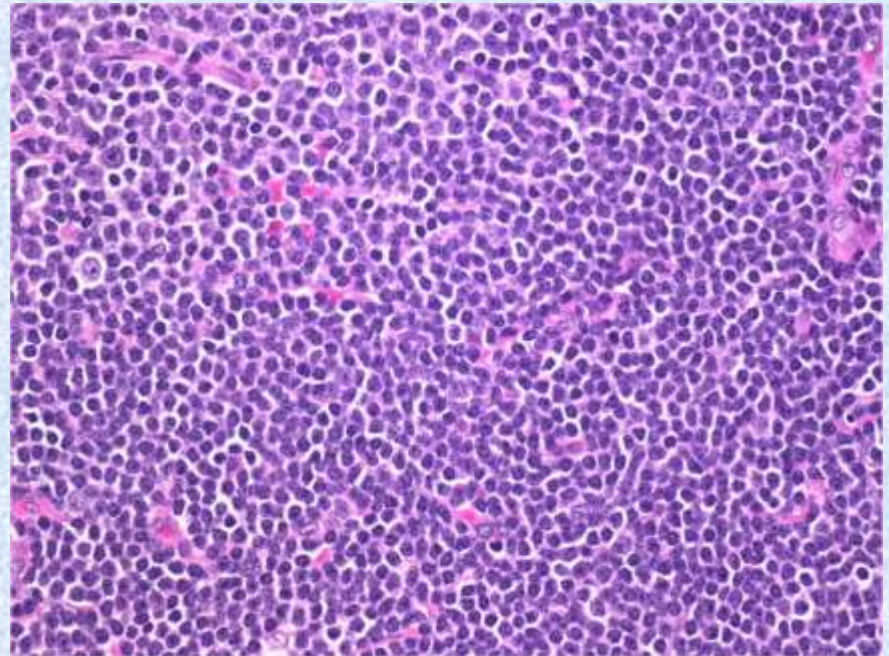
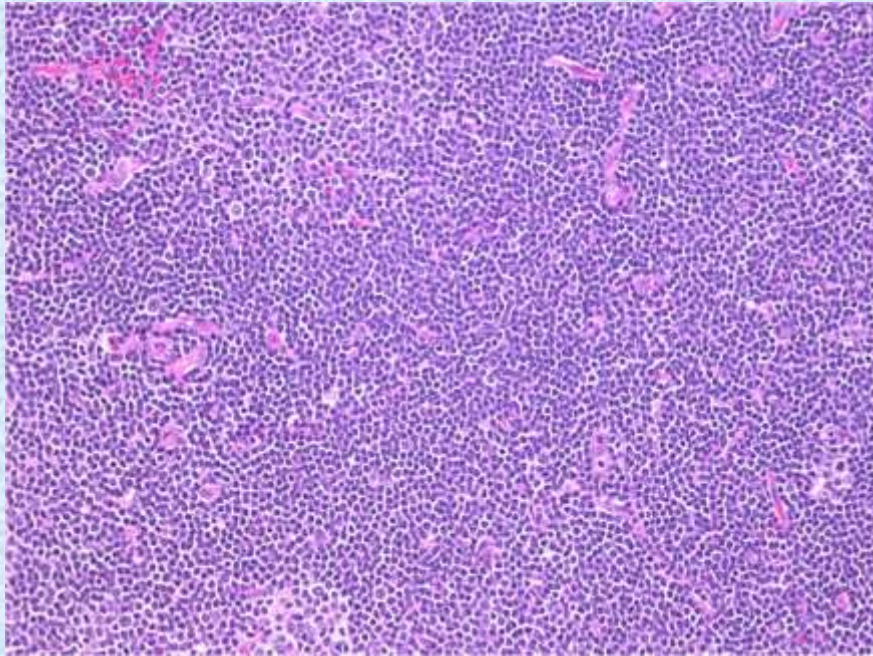
- Pathological features:

- ◆ Effacement of nodal architecture by a diffuse infiltrate of small lymphocytes
- ◆ The lymphocytes have:
 - scant cytoplasm
 - dark stained nuclei
 - inconspicuous nucleoli.
 - rare mitotic activity.

Non-Hodgkin`s Lymphoma

Low grade NHL

Diffuse small lymphocytic lymphoma (SLL)



Non-Hodgkin`s Lymphoma

Low grade NHL

Follicular lymphoma (FL)

- Clinical features:

- Affects old age (~ 60 years)
- Generalized lymphadenopathy and splenomegaly.
- Extra-nodal sites (e.g. GIT) may be involved

- Pathological features:

- ☐ Effacement of nodal architecture by neoplastic follicles
- ☐ The follicles resample secondary follicles, but with:
 - crowding of follicles and compression of inter-follicular tissue.
 - lacking mantle zones
 - lacking tingible-body macrophages
 - the neoplastic lymphocytes are monoclonal (by IHC)

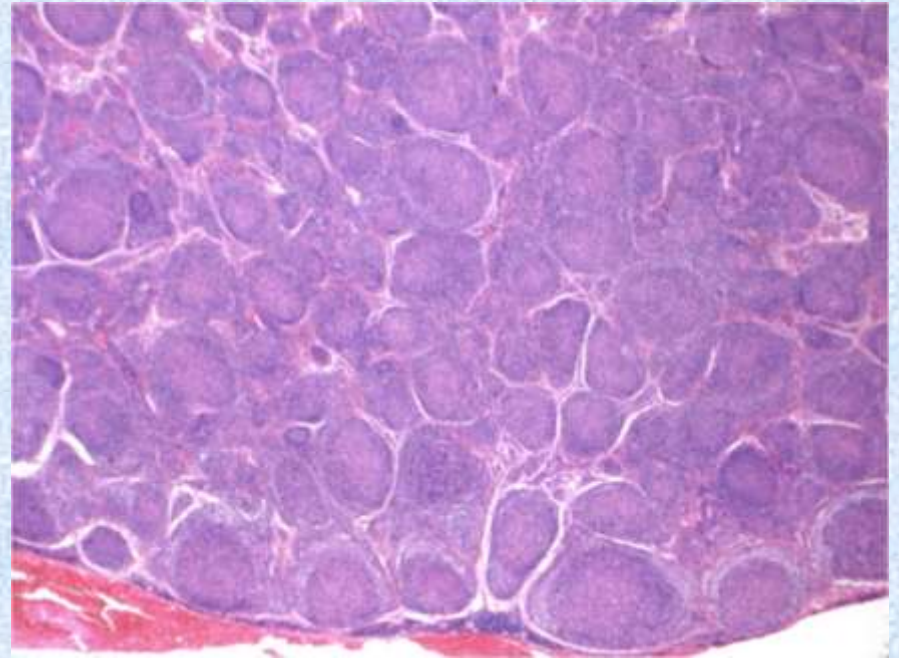
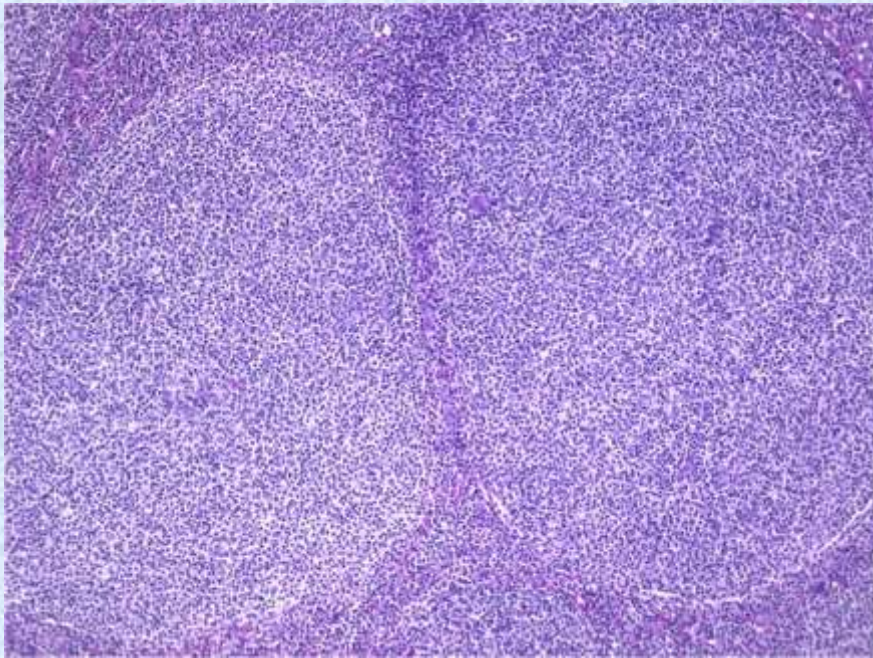
Non-Hodgkin`s Lymphoma

Follicular lymphoma (FL)

- **Types:** Three types of FL (based on cell morphology):
 - A. FL with predominantly small cleaved cell (**low grade**):
 - Cells are slightly larger than normal lymphocytes
 - Scanty cytoplasm.
 - Irregular nuclear contour with prominent indentations.
 - Few mitosis
 - B. FL with mixed small and large cell type (**low grade**):
 - Component of the small cells described above
 - The follicles contain large number of large cleaved or non-cleaved cells accounting to 20-25% of the cell count.
 - C. FL with predominantly large cells (**intermediate grade**).

Non-Hodgkin`s Lymphoma

Follicular lymphoma (FL)



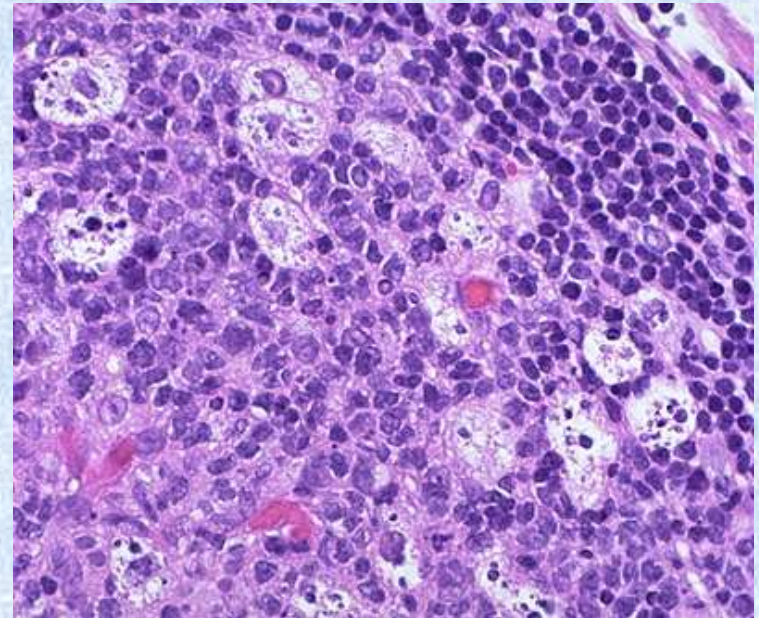
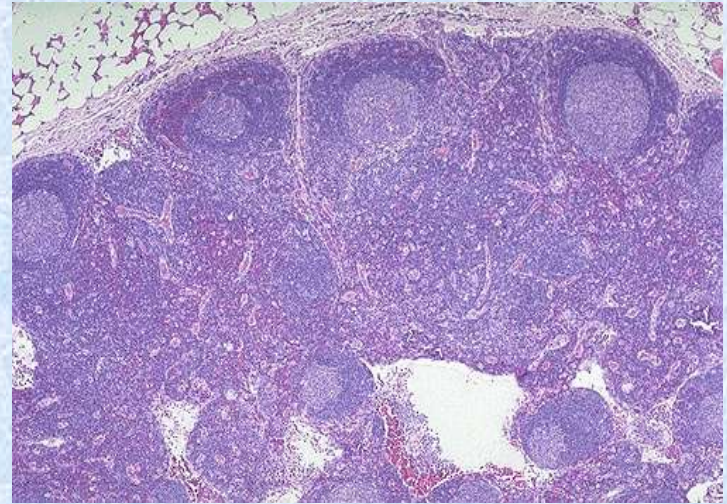
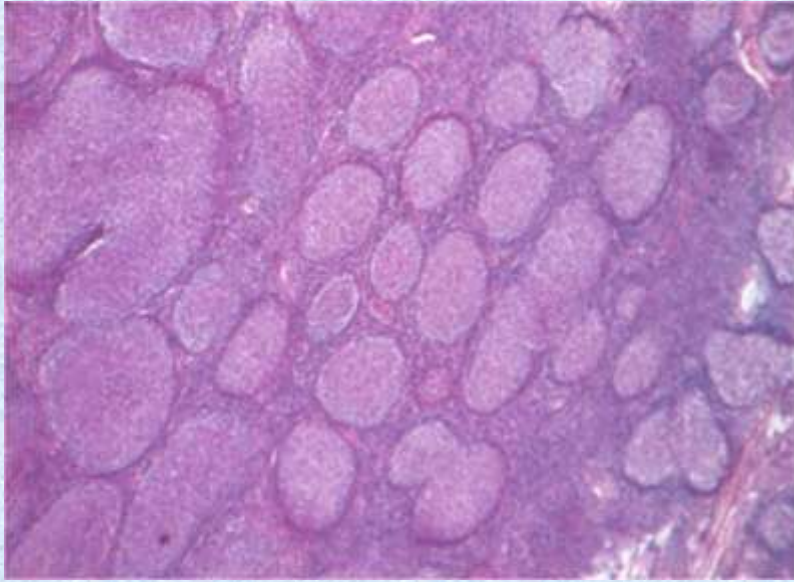
Non-Hodgkin`s Lymphoma

Follicular lymphoma (FL)

	F. Hyperplasia	F. Lymphoma
L. power	<ul style="list-style-type: none">•Loosely packed follicles•Polymorphic follicles•Prominent mantle zone•Polarized follicles•Prominent germinal center•Preserved open sinuses•No capsular invasion	<ul style="list-style-type: none">•Tightly packed follicles•Monomorphic follicles•Absent mantle zone•Non polarized follicles•No detected germinal center•Compressed or destructed sinuses•Extension to peri-nodal tissue
H. power	<ul style="list-style-type: none">•High mitotic rate in germ center•Tingible body macrophages•Paracortical lymphoid cells between follicles	<ul style="list-style-type: none">•Lower mitotic rate•No tingible body macrophages•Atypical cleaved cells between follicles
IHC	<ul style="list-style-type: none">•Polyclonal light chain expression•No reactivity to bcl-2 protein	<ul style="list-style-type: none">•Monoclonal light chain expression•85% reactivity to bcl-2 protein

Non-Hodgkin`s Lymphoma

Follicular lymphoma (FL)



Comment??

Non-Hodgkin`s Lymphoma

Intermediate grade NHL



Follicular predominantly large cell lymphoma

Diffuse small cleaved cell lymphoma

Diffuse mixed small and large cell lymphoma

Diffuse large cell lymphoma

Non-Hodgkin`s Lymphoma

Intermediate grade NHL

→ Follicular predominantly large cell lymphoma

- A rare type of FL.
- Most of neoplastic cells of the follicles are large with:
 - cleaved or
 - non-cleaved nuclei.
- Mitotic figures are more numerous

→ Diffuse small cleaved cell lymphoma

- Small cleaved cells arranged diffusely

Non-Hodgkin's Lymphoma

Intermediate grade NHL

→ Diffuse mixed small and large cell lymphoma

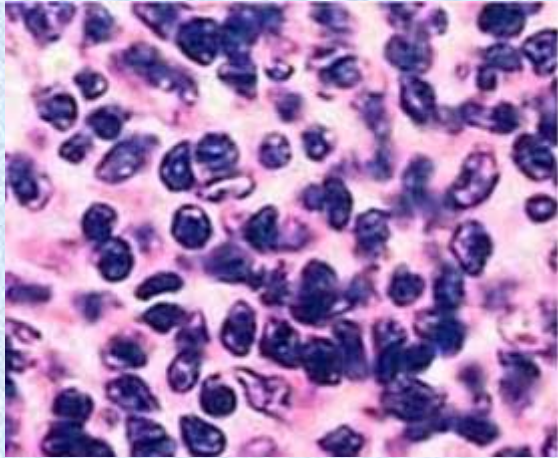
- A mixture of small cleaved cells and large cells.
 - Small cleaved cells:
 - Nucleus with irregular contour and indentation
 - Scanty cytoplasm.
 - Large cell
 - Up to four times the size of normal lymphocyte.
 - Round or oval nucleus with one or two nucleoli.
 - Moderate pale cytoplasm
 - Frequent mitosis.

→ Diffuse large cell lymphoma

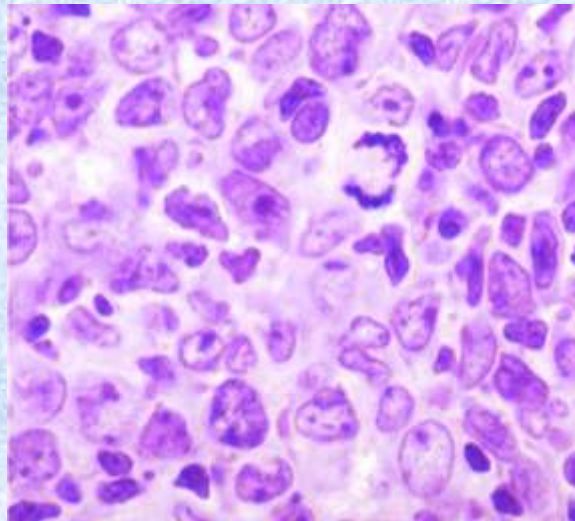
- Predominantly large cells (as described above).

Non-Hodgkin's Lymphoma

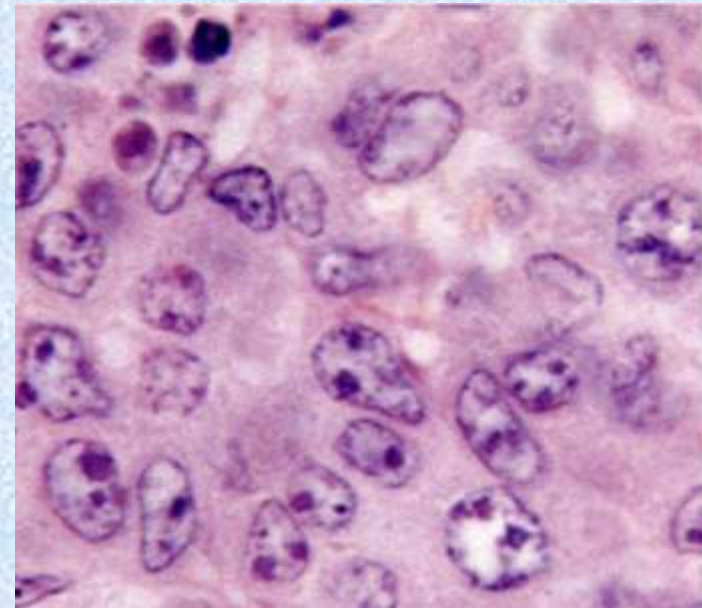
Intermediate grade NHL



**Diffuse small
cleaved NHL**



**Diffuse mixed
small & large**



Diffuse large NHL

Non-Hodgkin's Lymphoma

High-grade NHL



Immunoblastic lymphoma

Lymphoblastic lymphoma

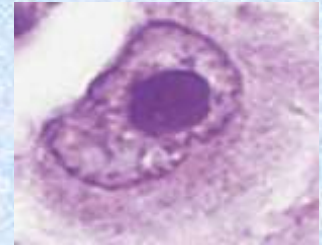
Small non-cleaved cell lymphoma (Burkitt's)

Non-Hodgkin's Lymphoma

High-grade NHL

Immunoblastic lymphoma

- Diffuse B or T cell in origin
- Composed of large atypical cells with large nuclei
- The nucleoli are large and typically single and central
- Mitoses are numerous



Lymphoblastic lymphoma

- Diffuse B or T cell lymphoma
- Composed of large lymphoblasts
- With irregular convoluted nuclei
- Nucleoli are small
- Cytoplasm is moderate and cell borders are indistinct



Non-Hodgkin`s Lymphoma

High-grade NHL



Burkitt`s Lymphoma (BL)

- Only B cell lymphoma
- Types:
 - ◆ Endemic BL:
 - Endemic in Africa
 - Affects mainly children
 - EBV infection plays important role in pathogenesis
 - ◆ Sporadic BL: occurs throughout the world
 - ◆ Immunodeficiency-associated BL (HIV-associated)

Non-Hodgkin`s Lymphoma

High-grade NHL

Burkitt`s Lymphoma (BL)

C/P: masses in the jaws or abdominal masses

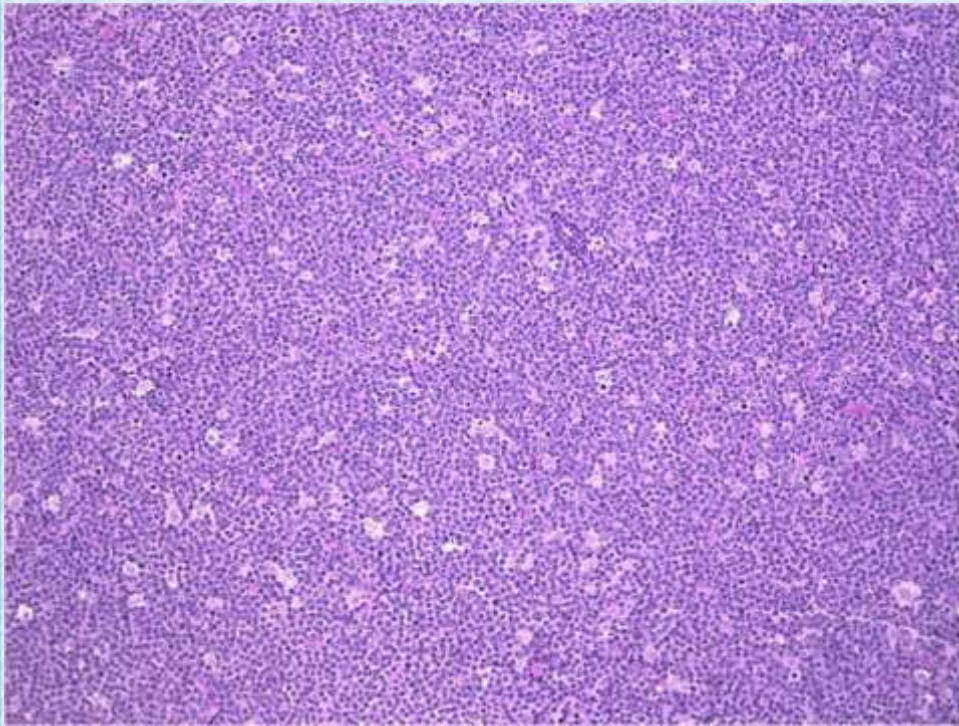
Microscopic picture:

- ◆ neoplastic small lymphocytes having:
 - round nuclei with two or more nucleoli
 - scanty basophilic cytoplasm
 - very high mitotic activity
- ◆ There are scattered macrophages with
 - abundant pale cytoplasm,
 - containing nuclear debris → Starry-Sky appearance

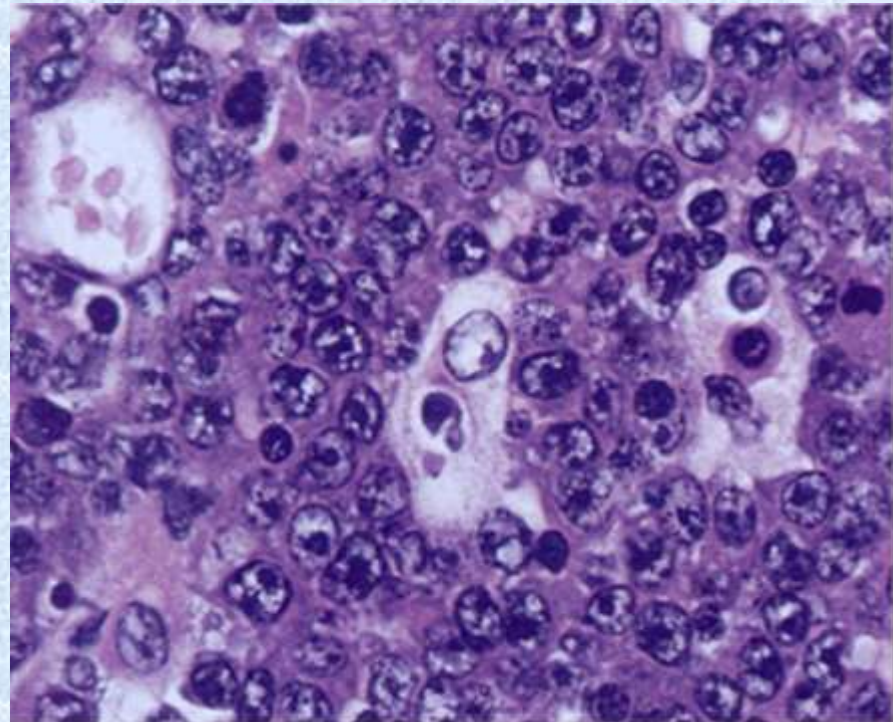
Non-Hodgkin`s Lymphoma

High-grade NHL

→ Burkitt`s Lymphoma (BL)



Starry-sky



Hodgkin`s Lymphoma

Definition:

Malignant tumour of lymphoid tissue characterised by presence of:

- Large neoplastic cells (Reed-Sternberg cells)
- Polymorphic cellular background: reactive inflammatory cells (lymphocytes, plasma cells and eosinophiles)

Incidence

Common disease representing ~30% of all lymphomas.

Clinically:

- Biphasic age incidence:
 - in early adult life (15-40 yrs)
 - in old age

Hodgkin`s Lymphoma

Clinically:

■ Usually presents by:

1. Enlarged LNs: commonly cervical & supra-clavicular LNs ± splenomegaly.
2. Systemic manifestation:
 - Occurs in about 25% of cases
 - Include non-specific symptoms as:
 - intermittent fever (Pel-Ebstein fever)
 - night sweats
 - weight loss
3. Clinical staging (Ann-Arbor staging)

Hodgkin`s Lymphoma

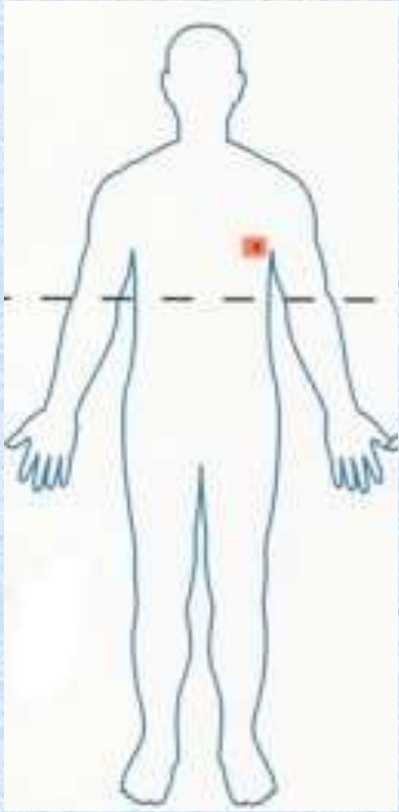
Clinically:

- Clinical staging (Ann-Arbor staging)

Hodgkin's Lymphoma

Clinically:

- Clinical staging (Ann-Arbor staging)

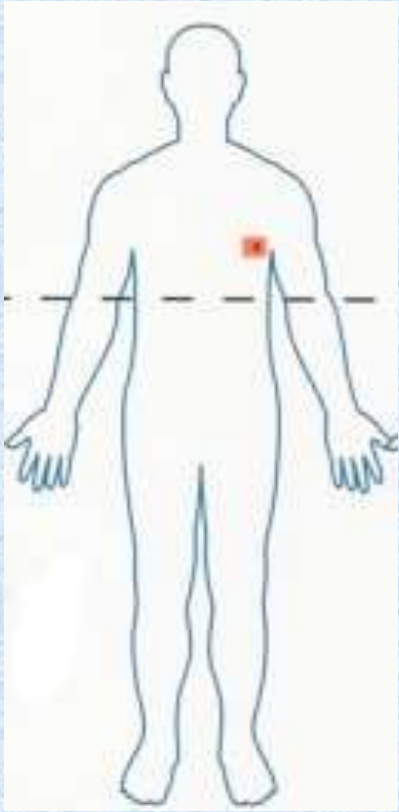


Stage I
Single LN
group

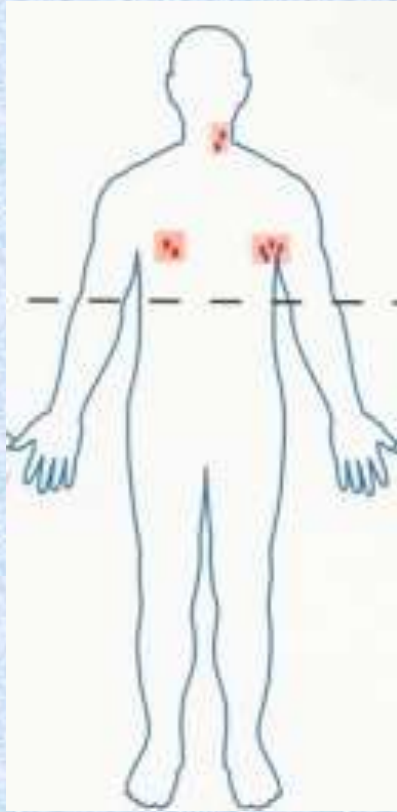
Hodgkin's Lymphoma

Clinically:

■ Clinical staging (Ann-Arbor staging)



Stage I
Single LN
group

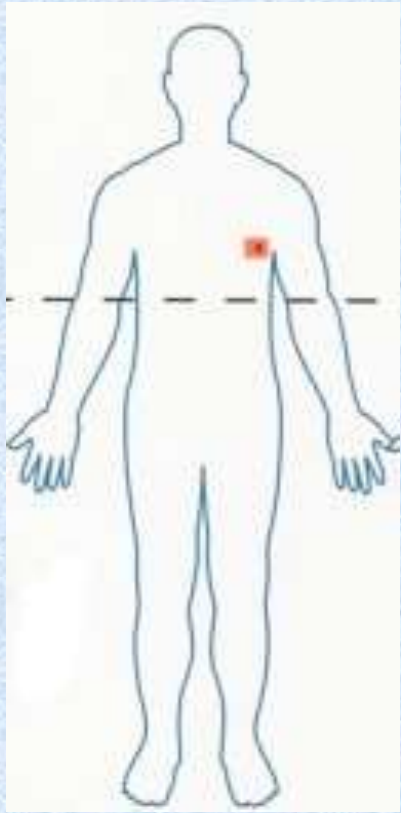


Stage II
Two groups on one
side of diaphragm

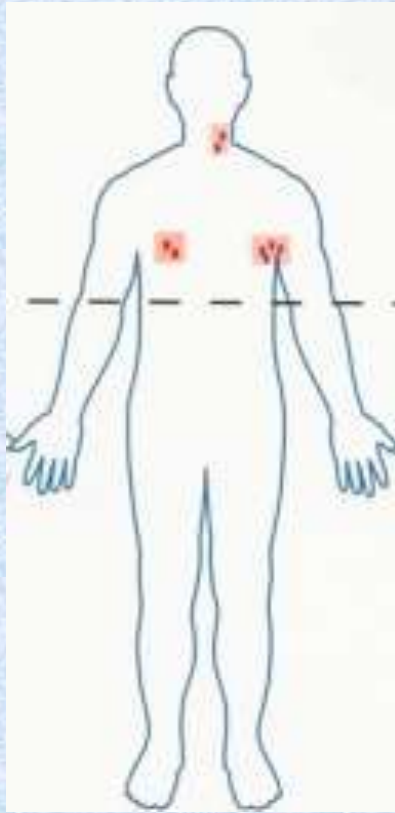
Hodgkin's Lymphoma

Clinically:

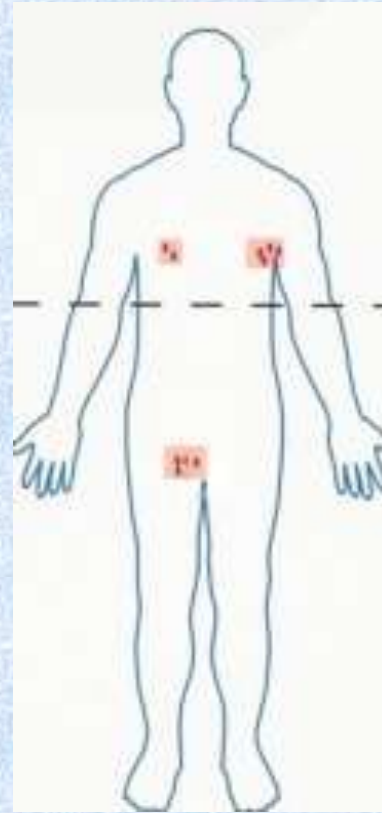
■ Clinical staging (Ann-Arbor staging)



Stage I
Single LN
group



Stage II
Two groups on one
side of diaphragm

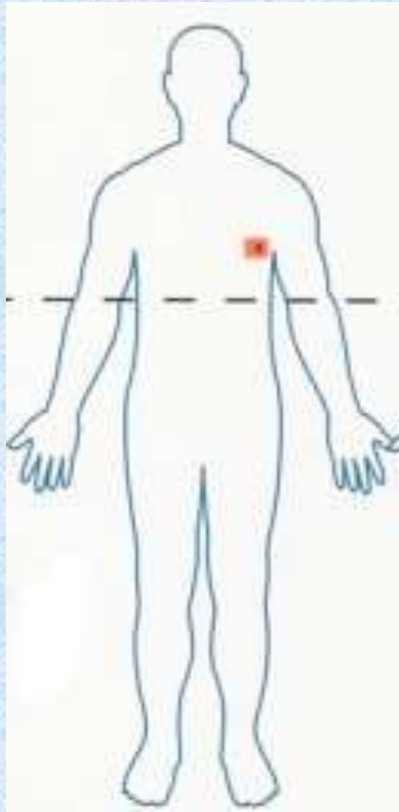


Stage III
LN groups on both
sides of diaphragm

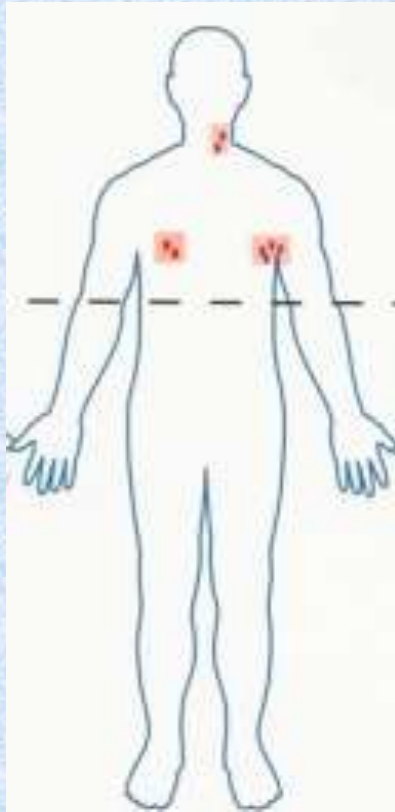
Hodgkin's Lymphoma

Clinically:

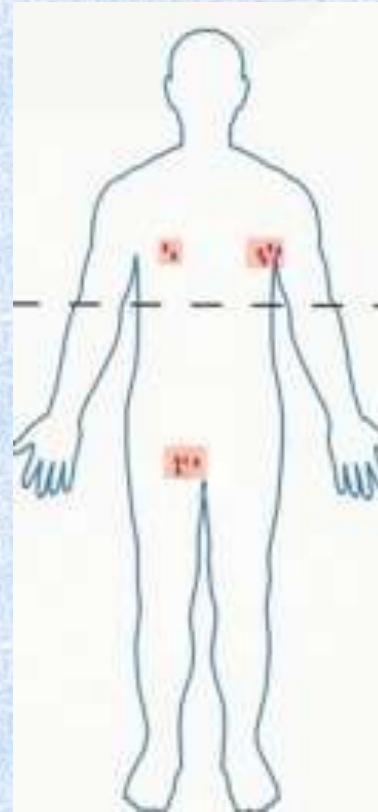
■ Clinical staging (Ann-Arbor staging)



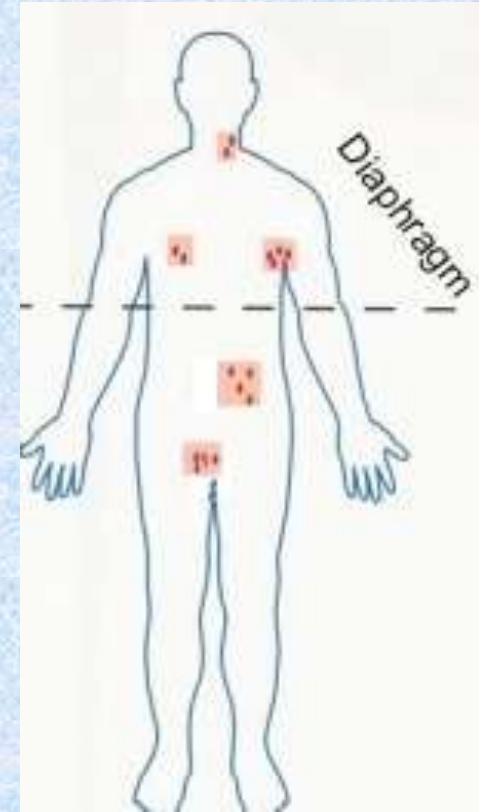
Stage I
Single LN
group



Stage II
Two groups on one
side of diaphragm



Stage III
LN groups on both
sides of diaphragm



Stage IV
Extranodal
extension

Hodgkin`s Lymphoma

Gross picture:

◆ Lymph Nodes:

- Early: the affected LNs are enlarged, firm, & discrete
- Later: infiltration of the capsule & perinodal CT → fusion of the LNs → an irregular fixed mass
- Cut surface is homogenous grayish pink

◆ Spleen:

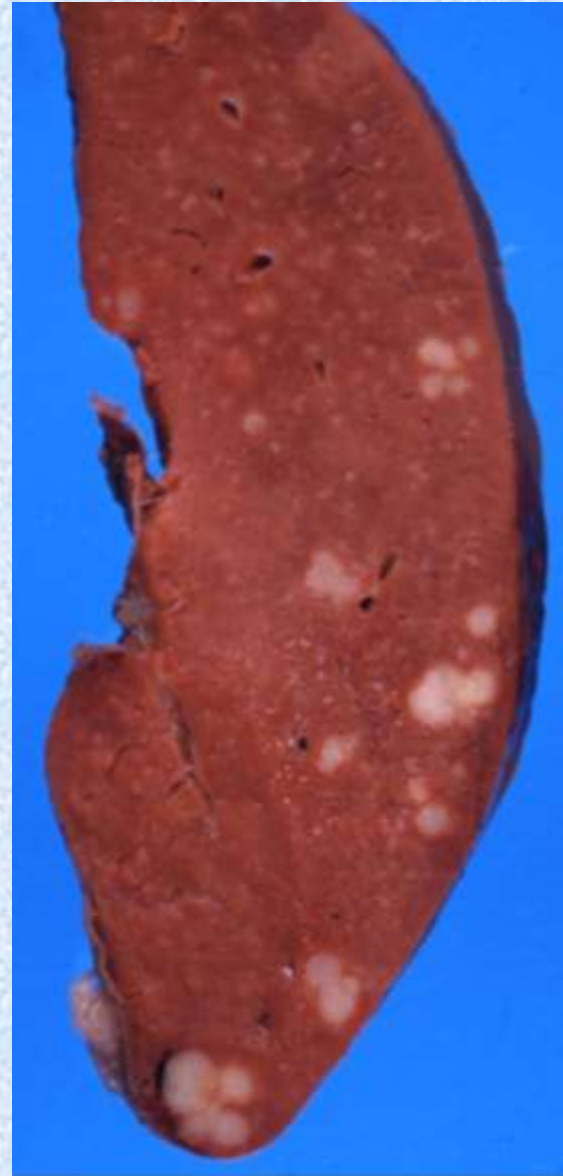
- Enlarged & firm, with grayish nodules on cut section

◆ Extra-nodal sites:

- As spleen, liver bon marrow may be seen (Stage IV)

Hodgkin's Lymphoma

Gross picture:



Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture

Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture
- ◆ Infiltration of the LN by:

Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture
- ◆ Infiltration of the LN by:
 - Reed-Sternberg cells (RS cells) or one of its variants

Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture
- ◆ Infiltration of the LN by:
 - Reed-Sternberg cells (RS cells) or one of its variants

Surrounded by

Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture
- ◆ Infiltration of the LN by:
 - Reed-Sternberg cells (RS cells) or one of its variants
 - Surrounded by
 - Reactive inflammatory cells:

Hodgkin`s Lymphoma

Microscopic picture:

- ◆ Partial or complete loss of normal nodal architecture
- ◆ Infiltration of the LN by:
 - Reed-Sternberg cells (RS cells) or one of its variants
 - Surrounded by
 - Reactive inflammatory cells:
 - lymphocytes,
 - plasma cells,
 - eosinophils,
 - macrophages

Hodgkin`s Lymphoma

Microscopic picture:

■ **Reed-Sternberg cells:**

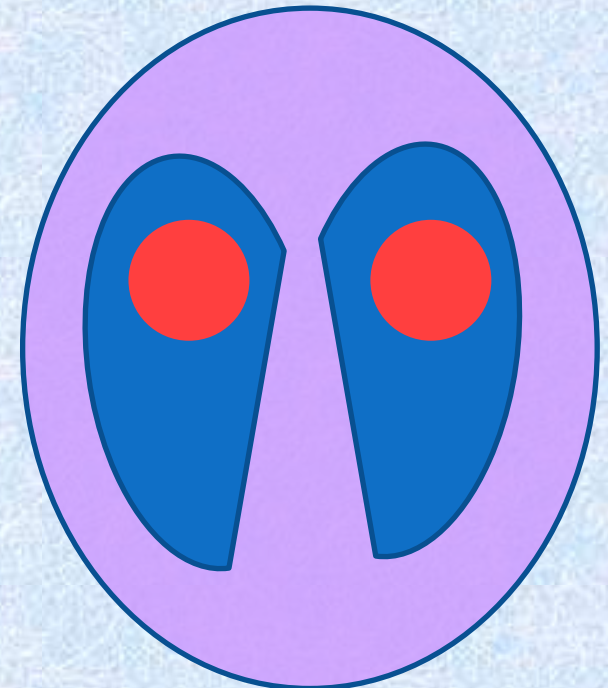
- Also called RS cells, Hodgkin`s cell, or Dorothy Reed cells
- It is the malignant cells in cases of Hodgkin`s Lymphoma
- Features:
 - Size: giant cell (30-60 μm in diameter)
 - Cytoplasm: abundant amphophilic
 - Nucleus:
 - has two nuclei
 - with prominent eosinophilic nucleolus reaching size of RBC
 - Arranged in mirror image or Owl eye appearance

Hodgkin`s Lymphoma

Microscopic picture:

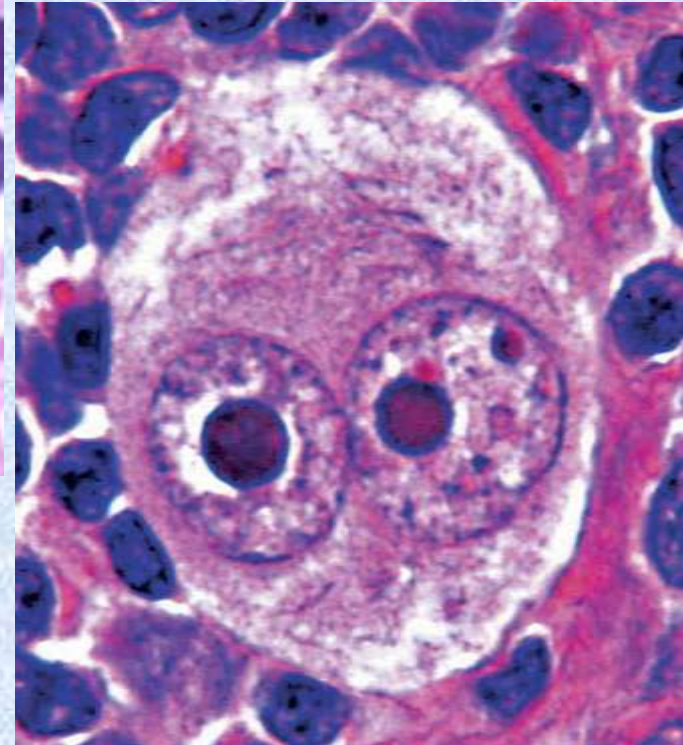
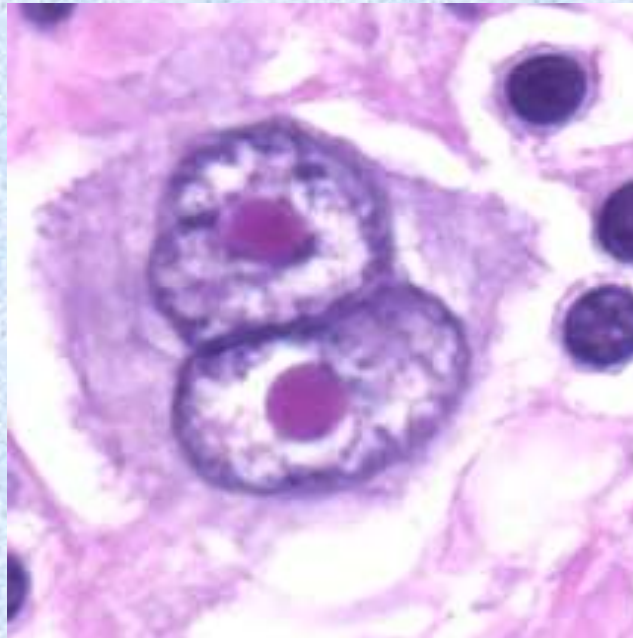
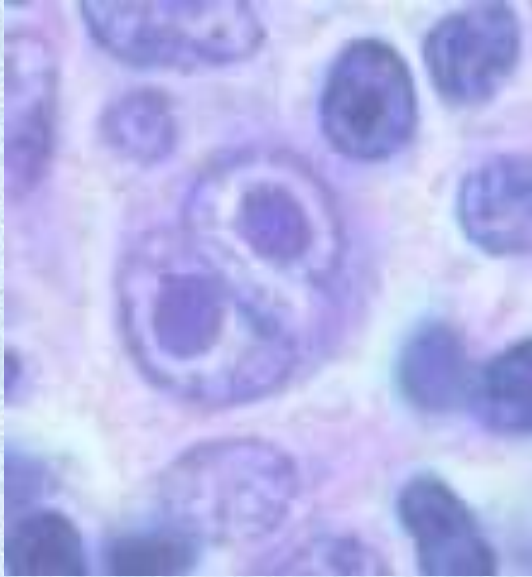
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Hodgkin's Lymphoma

Microscopic picture:

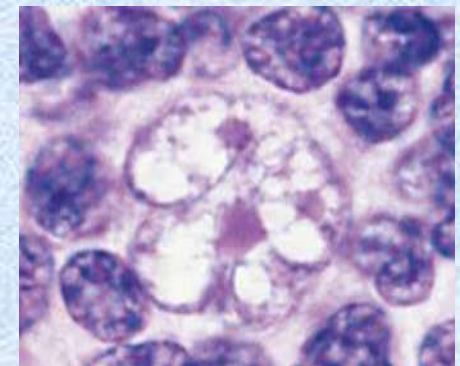
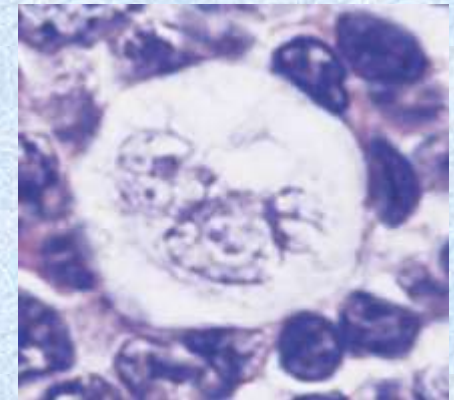
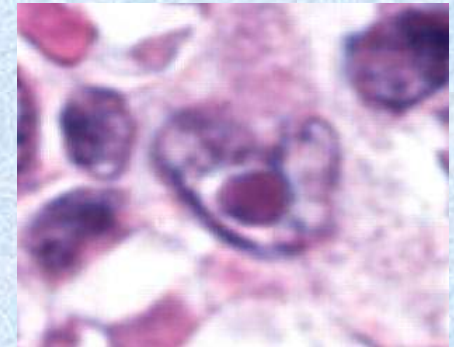


Hodgkin`s Lymphoma

Microscopic picture:

■ Variants of Reed-Sternberg cells:

1. Mononuclear variant: similar to typical RS-cell, but with a single nucleus
2. Lacunar cell: similar to typical RS-cell, but with shrunken cytoplasm (clear space between shrunken cytoplasm & cell wall)
3. Lymphocytic & Histiocytic (L&H) variant: mononuclear cells with lobed nuclei and small nucleoli (**popcorn nuclei**).

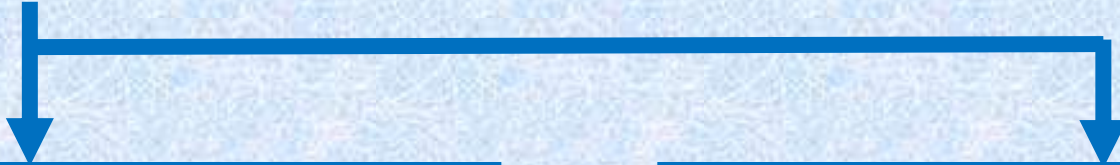


Hodgkin`s Lymphoma

Classification:

Hodgkin`s Lymphoma

Classification:



Classical HL (95%)

**Nodular lymphocyte
predominant HL (5%)**

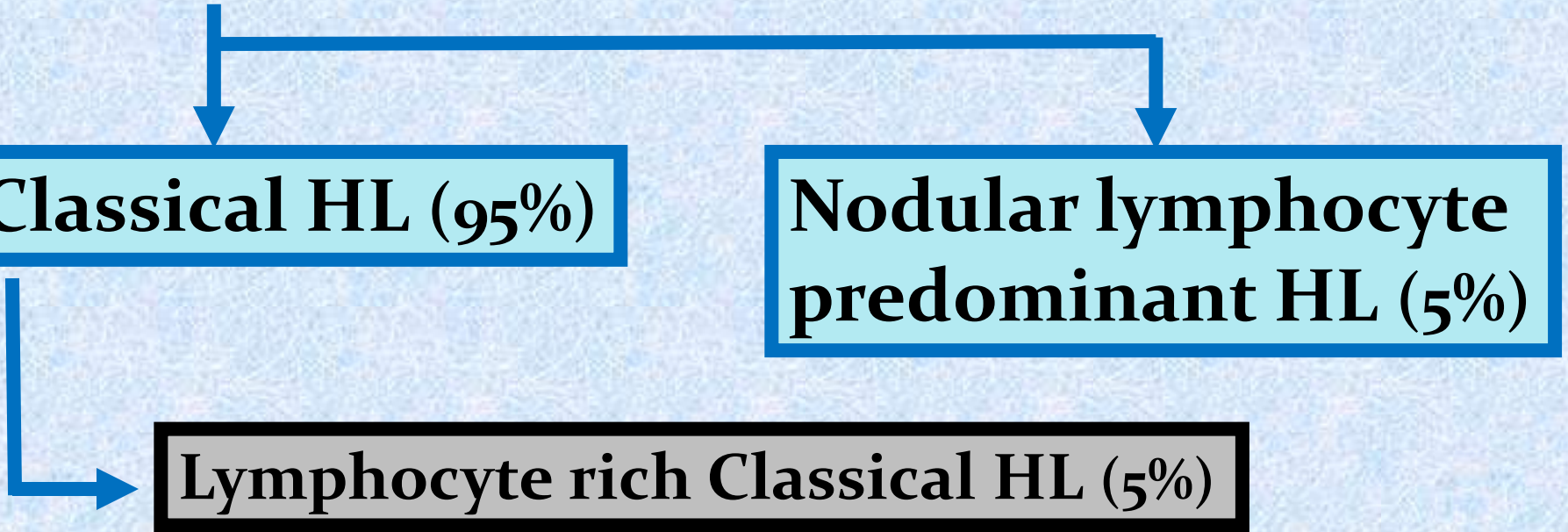
Hodgkin`s Lymphoma

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Lymphocyte rich Classical HL (5%)



Hodgkin's Lymphoma

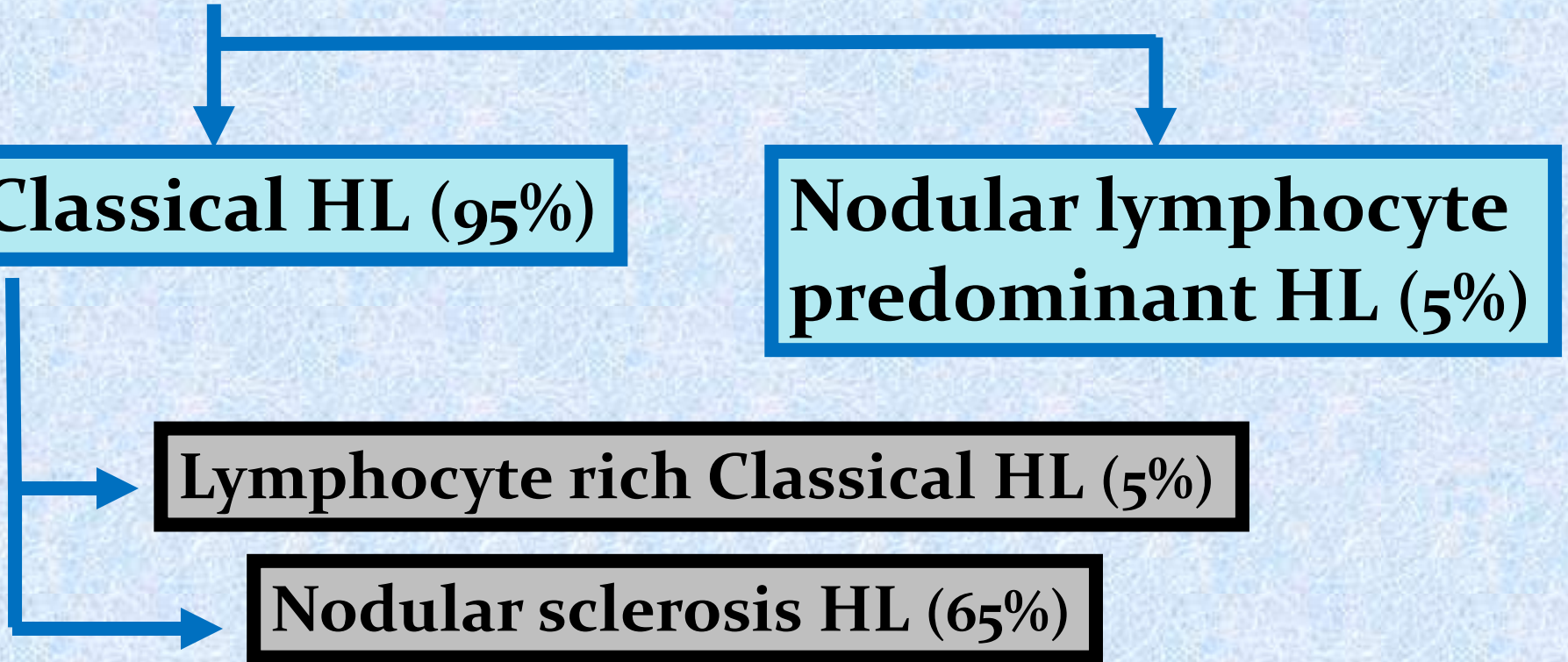
Classification:

Classical HL (95%)

**Nodular lymphocyte
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Lymphocyte rich Classical HL (5%)

Nodular sclerosis HL (65%)



Hodgkin's Lymphoma

Classification:

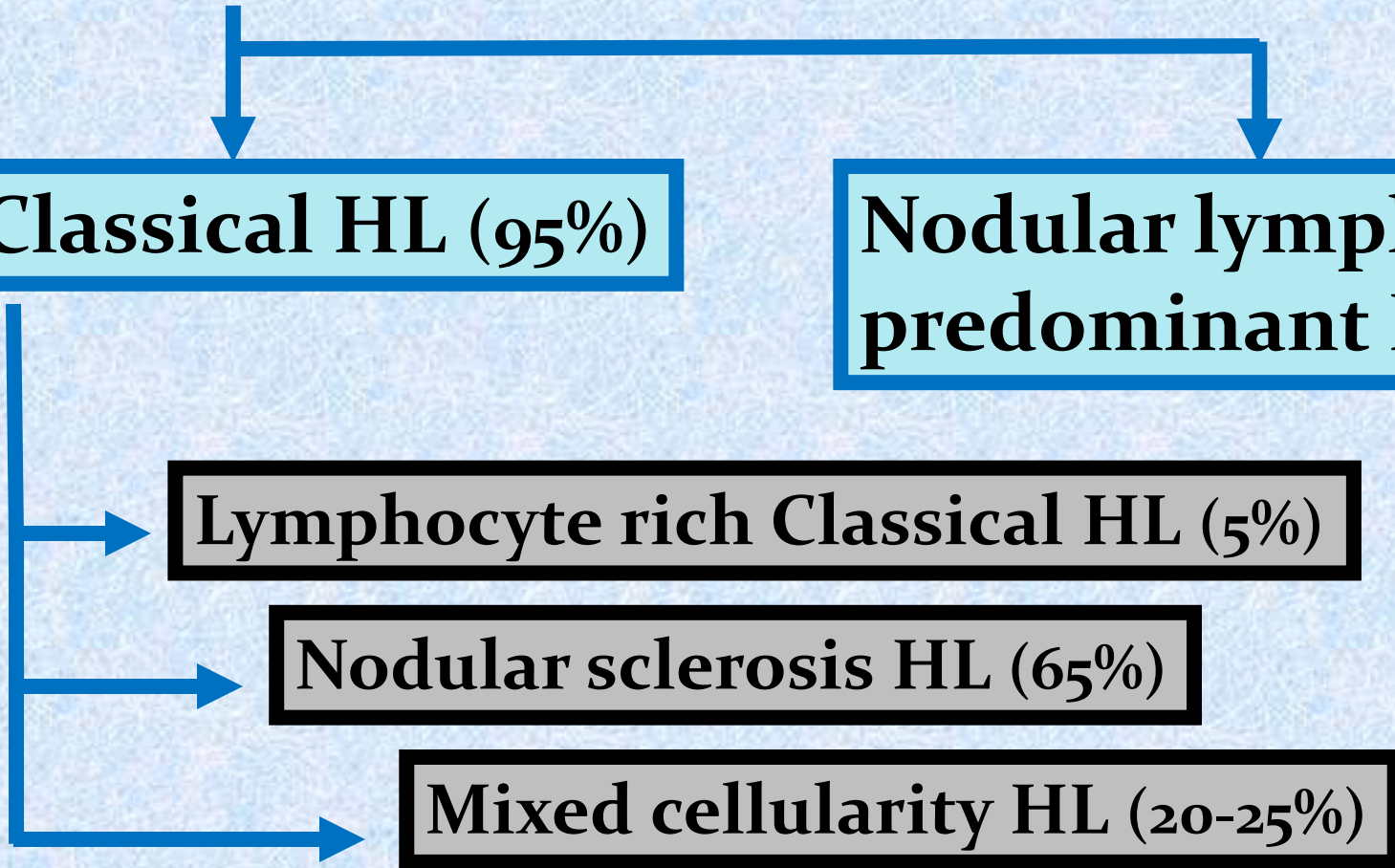
Classical HL (95%)

**Nodular lymphocyte
predominant HL (5%)**

Lymphocyte rich Classical HL (5%)

Nodular sclerosis HL (65%)

Mixed cellularity HL (20-25%)



Hodgkin's Lymphoma

Classification:

Classical HL (95%)

Nodular lymphocyte predominant HL (5%)

Lymphocyte rich Classical HL (5%)

Nodular sclerosis HL (65%)

Mixed cellularity HL (20-25%)

Lymphocyte depletion HL (<5%)

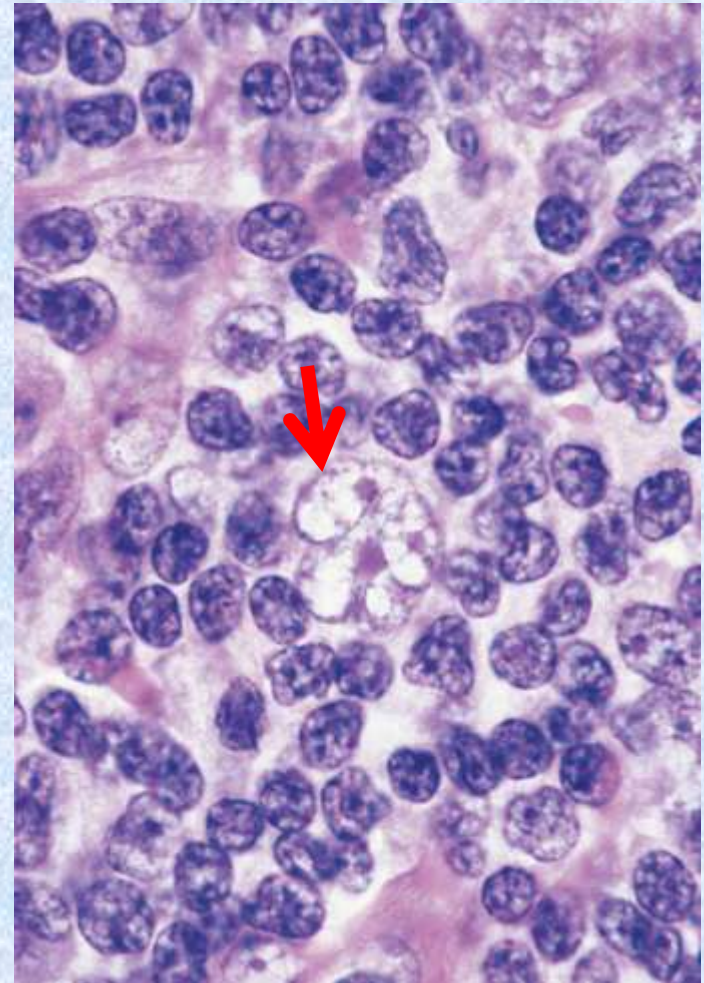
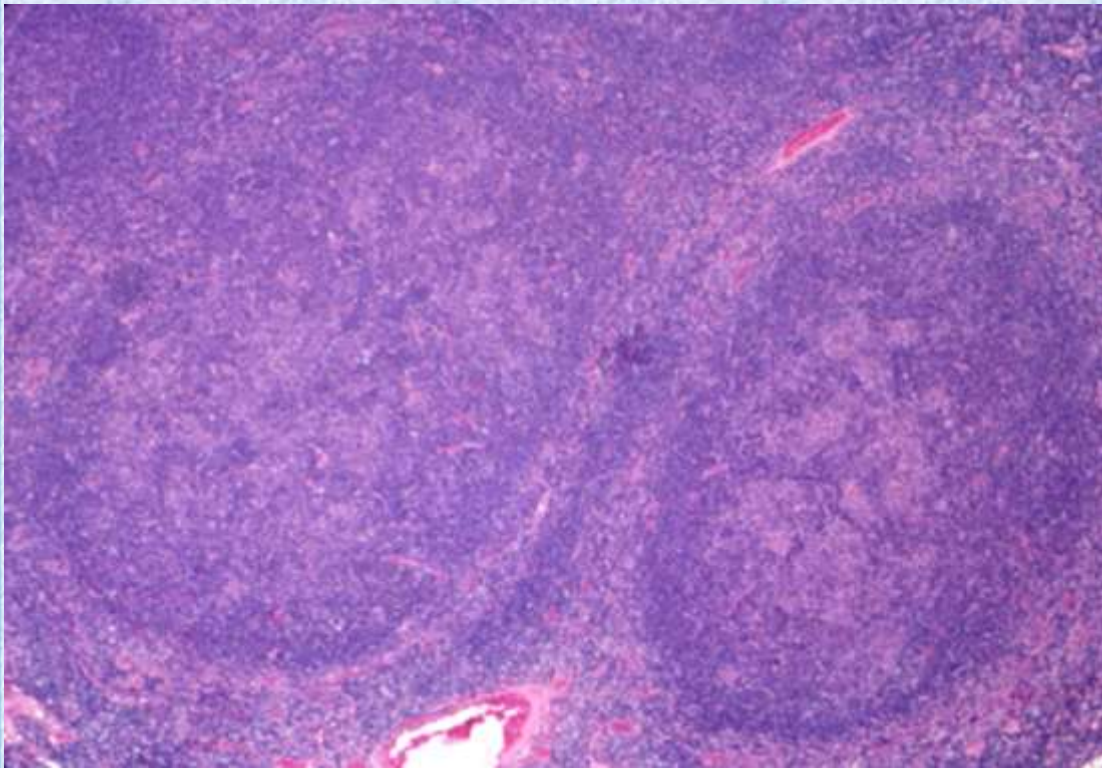
Hodgkin`s Lymphoma

Nodular lymphocyte predominant HL

- Represents about 5% of all HL cases
- Has the best prognosis
- Characterised by
 - Loss of normal nodal architecture
 - Nodular infiltrate of the lymph node consists of reactive cells (predominantly lymphocytes)
 - **Pop-Corn** type Hodgkin`s cells
 - No typical RS cells.

Hodgkin's Lymphoma

Nodular lymphocyte predominant HL



Hodgkin`s Lymphoma

Lymphocyte-rich classical HL

- Represents about 5% of cases
- Has good prognosis
- Characterised by
 - Loss of normal nodal architecture
 - The infiltrate consists of reactive cells (predominantly lymphocytes with eosinophiles, plasma cells and histocytes)
 - **Mononuclear** type Hodgkin`s cells
 - Typical RS cells may be seen.

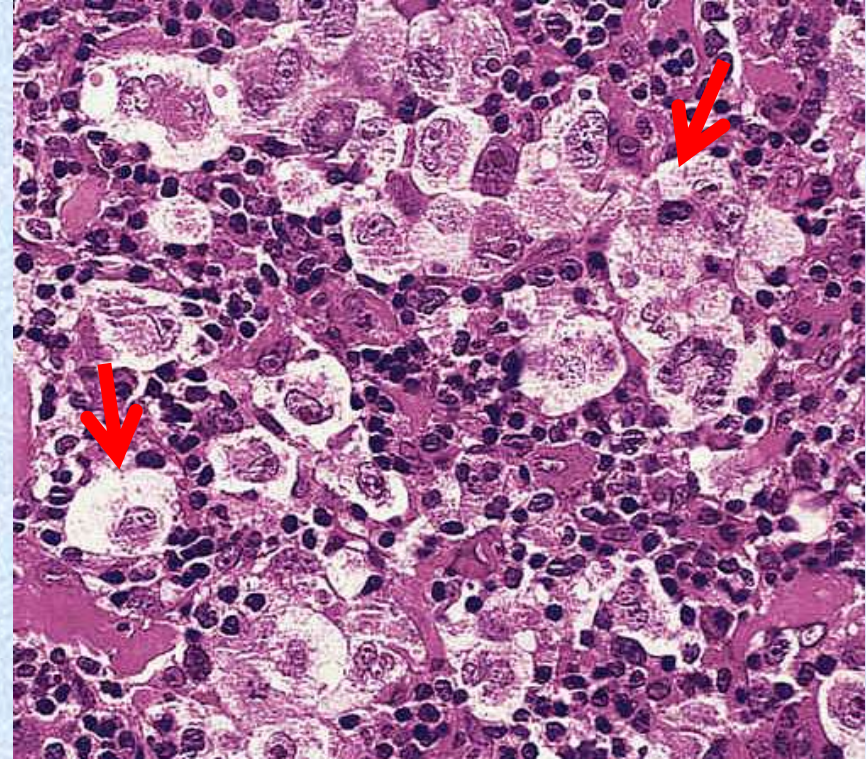
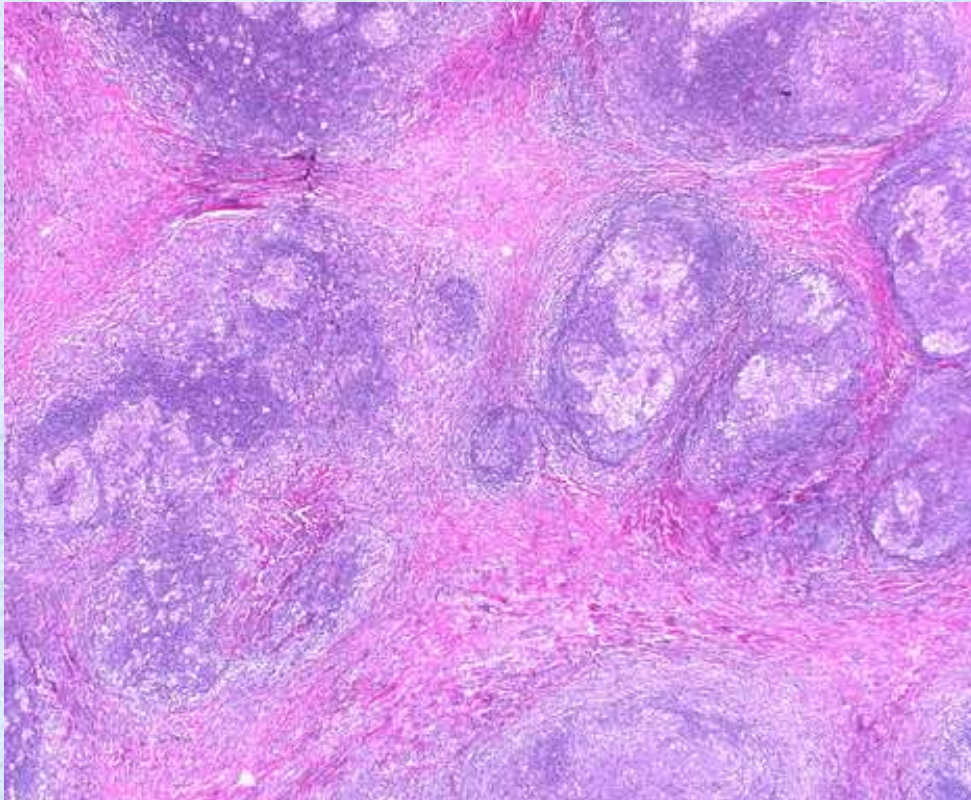
Hodgkin`s Lymphoma

Nodular sclerosing HL

- Represents about 65% of HL cases
- Has good prognosis
- Characterised by
 - Loss of normal nodal architecture
 - Lymph nodal tissue is divided into nodules by thick collagen bands.
 - The reactive infiltrate consists of a cellular mixture of lymphocytes, esinophiles, plasma cells and histocytes
 - Lacunar type Hodgkin`s cells
 - No or scanty typical RS cells.

Hodgkin's Lymphoma

Nodular sclerosing HL



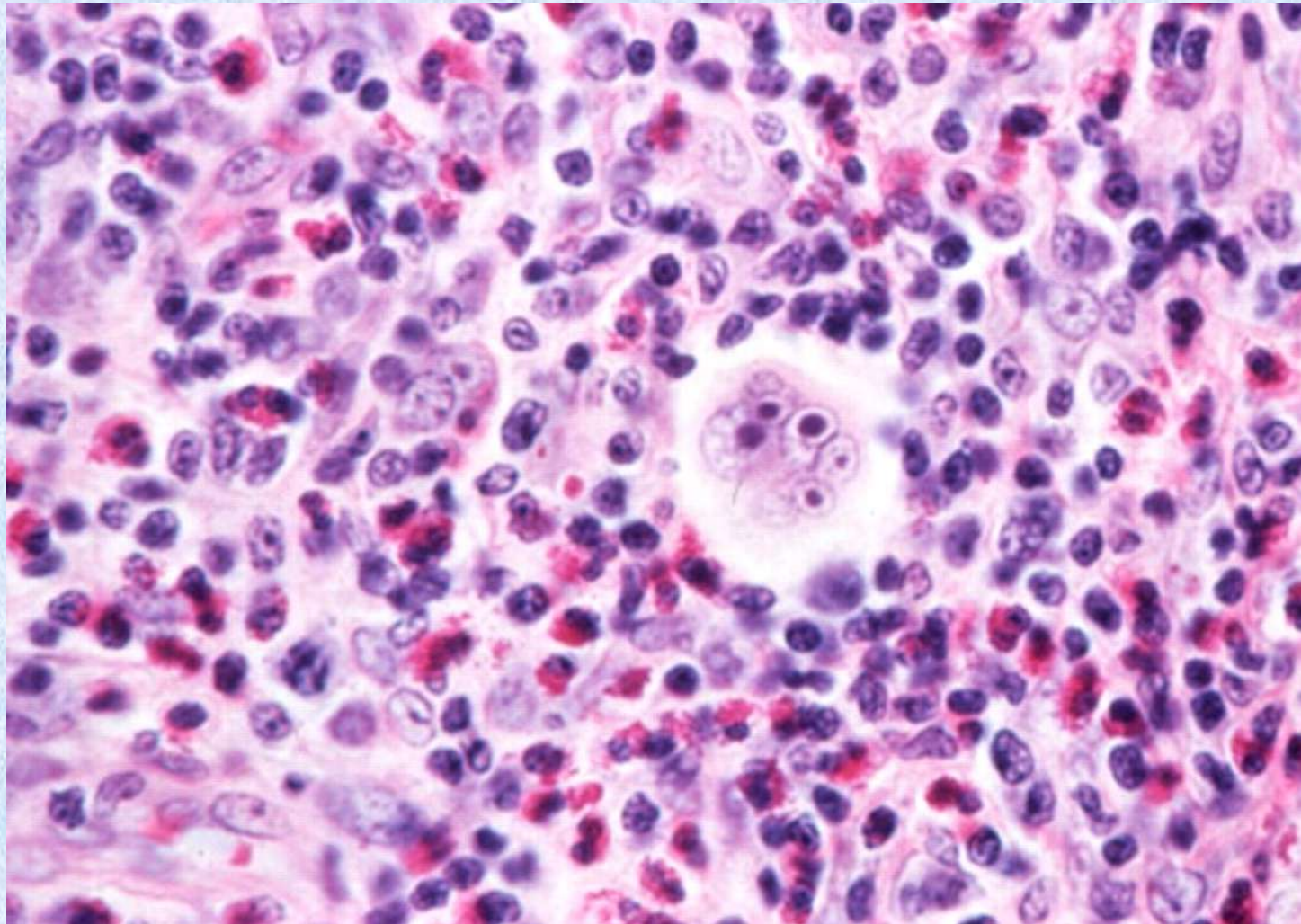
Hodgkin`s Lymphoma

Mixed cellularity HL

- Represents about 20-25% of cases
- Has poor prognosis
- Characterised by
 - Loss of normal nodal architecture
 - The reactive infiltrate consists of a cellular mixture of lymphocytes, numerous eosinophiles, plasma cells and histiocytes
 - Numerous **Typical RS** cells
 - **Mononuclear cells** are commonly seen.

Hodgkin's Lymphoma

Mixed cellularity HL



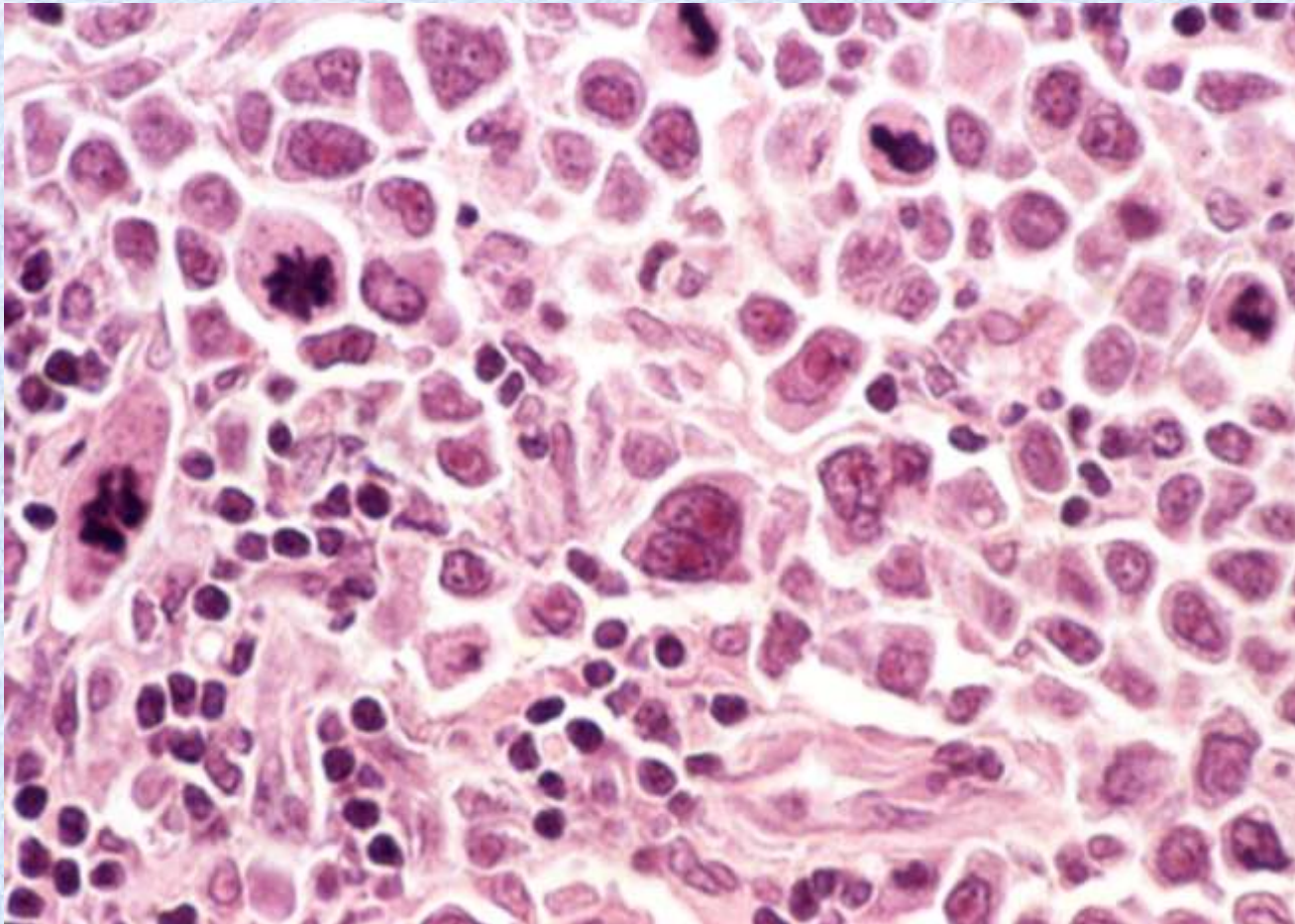
Hodgkin`s Lymphoma

Lymphocyte depletion HL

- Represents 1-5% of cases
- Has the worst prognosis
- Characterised by
 - Loss of normal nodal architecture
 - Infiltration of the LN by numerous **Typical RS cells** and **Mononuclear** Hodgkin`s cells with frequent mitosis
 - Few reactive cells and few lymphocytes.

Hodgkin's Lymphoma

Lymphocyte depletion HL



Hodgkin`s Lymphoma

Prognosis:

- Based on histological types:
 - Nodular lymphocyte predominant and Lymphocyte rich Classical HL have good prognosis
 - Nodular sclerosis HL has relatively good prognosis
 - Mixed cellularity HL has poor prognosis
 - Lymphocyte depletion HL has worse prognosis
- Clinical stage and presence of systemic infiltration are more important than histological features in determining prognosis of HL.

NHL and HL

NHL	HL
Tend to involve more than one group of LNs	often localized to a single group of LNs
More frequent involve peripheral LN groups	More frequently involve axial LN groups
Cervical, mediastinal, para-aortic can be involved	Cervical, mediastinal, para-aortic are commonly involved
Mesenteric nodes and Waldeyer ring are commonly involved.	Mesenteric nodes and Waldeyer ring are rarely involved.
Frequent peri-nodal extension	Less frequent perinodal extension
Usually non-contiguous spread.	Spread is usually by contiguity.
Involvement of extra-nodal sites is common.	Involvement of extra-nodal sites is uncommon.

LYMPHOMA

Tissue tumour markers for diagnosis of lymphoma

- Identification of lymphoma subtype is very essential from the therapeutic and prognostic points of view
- Histological features of lymphoma subtypes can be similar, so not conclusive to separate different types
- Immunohistochemistry is mandatory to differentiate
- Examples:
 - All B cell lymphomas are CD19, CD20 and CD79 positive
 - T cell lymphomas are CD3 and CD5 positive
 - Burkitt's lymphoma and follicular lymphomas are CD10.
 - Follicular lymphoma is bcl-2 positive
 - Hodgkin's cells are CD15 and CD30 positive

DISEASES OF SPLEEN

Causes of splenomegaly

❑ Inflammatory:

- Acute splenic swelling in septicemia and typhoid fever.
- Viral infections as infectious mononucleosis.
- Bacterial infections as tuberculosis.
- Parasitic infections as bilharziasis, malaria and hydatid cyst.

❑ Circulatory disturbances

- Chronic general venous congestion in RSHF.
- Portal hypertension in liver cirrhosis and bilharzial hepatic fibrosis.
- Splenic infarctions.

❑ Hematologic:

- | | |
|--------------------------|-------------------------------|
| (a) Haemolytic anaemias. | (c) Leukemias. |
| (b) Polycythaemia vera | (d) Thrombocytopenia purpura. |

DISEASES OF SPLEEN

Causes of splenomegaly

❑ Metabolic:

- Amyloidosis, hemochromatosis and lipid storage diseases

❑ Neoplastic:

- Benign tumors as fibroma, hemangioma and lymphangioma.
- Malignant tumors as malignant lymphomas, angiosarcoma and fibrosarcoma.

❑ Hypersplenism

Thank you

Good luck

Dr Ahmed Roshdi