

◆ 1. Basics

- Leukopenia = ↓ WBCs
- Leukocytosis = ↑ WBCs
- Can be:
- Reactive (non-neoplastic)
- Neoplastic (malignancy)

🧬 5 WBC types:

- Neutrophils
- Lymphocytes
- Monocytes
- Eosinophils
- Basophils

● **Neutropenia / Agranulocytosis**

- Definition: Neutrophils ↓ (<500 = severe agranulocytosis)
- ⚠️ Most common leukopenia

🌿 Causes

1) ↓ Production

- Chemotherapy / radiation
- Marrow infiltration (leukemia, tumors)
- Drugs
- Lymphoid malignancies

2) ↑ Destruction / Consumption

- Autoimmune
- Severe infections (bacterial, fungal)
- Splenomegaly (sequestration)

الخلايا موجودة لكن محبوسة في الطحال

🏠 Clinical

- Severe infections
- Fever, chills
- Necrotizing ulcers
- ⚠️ Sepsis risk

💊 Treatment

- Broad-spectrum antibiotics
- G-CSF granulocyte colony-stimulating factor

● **Lymphopenia**

- Less common
- Causes:
- Congenital immunodeficiency
- HIV
- Corticosteroids

⚠️ Acute viral infections → redistribution, not true decrease

## ● Leukocytosis

- ↑ WBCs due to inflammation/infection
- Classified by cell type:

### ◆ Neutrophilia

- Acute bacterial infections
- Tissue necrosis / burns

### ✔ Morphology (IMPORTANT):

- Toxic granules
- Döhle bodies (blue cytoplasm patches)
- Cytoplasmic vacuoles

### ◆ Eosinophilia

- Allergies (asthma)
- Parasites
- Drugs

### ◆ Basophilia

- Rare
- ⚠ Suggests myeloproliferative disorders

### ◆ Monocytosis

- Chronic infections (TB)
- Autoimmune disease
- IBD

### ◆ Lymphocytosis

- Viral infections (EBV, CMV, HAV)
- Chronic immune stimulation

chronic immunologic stimulation (e.g., tuberculosis, brucellosis); viral infections (e.g., HAV, CMV, EBV)

## ⚠ Leukemoid Reaction (VERY IMPORTANT DIFFERENTIAL)

- Severe infection → ↑ immature granulocytes
- Mimics leukemia (esp. CML)

## 🧠 How to differentiate from CML:

- Younger patient
- No BCR-ABL gene
- Resolves after treating infection

## 🌿 Infectious Mononucleosis (EBV)

- Cause: Epstein-Barr virus
- Infects B cells → **CD8 T-cell response**

## 📄 Clinical triad:

- Fever
- Sore throat
- Lymphadenopathy

## ✔ Lab:

- Lymphocytosis (↑ CD8 T cells up to 18,000)
- Atypical lymphocytes

## ● . Reactive Lymphadenitis

### ◆ Acute

- Local or generalised
- Nodes: swollen, tender

#### 🦋 Histology:

- Large germinal centers
- Macrophages
- Sinus dilation
- ± neutrophils/pus

### ◆ Chronic Patterns (VERY HIGH YIELD)

#### 1) Follicular Hyperplasia (B-cells)

- Large germinal centers
- Causes:
  - Rheumatoid arthritis
  - Toxoplasmosis
  - Early HIV

#### 🧠 Distinguish from lymphoma:

- Preserved architecture
- Variable follicle size
- Tingible-body macrophages
- Light & dark zones present

#### 2) Paracortical Hyperplasia (T-cells)

- Seen in:
  - Viral infections
  - Vaccines
  - Drugs (phenytoin)
  - Immunoblast proliferation → effaces follicles

#### 3) Sinus Histiocytosis (Macrophages)

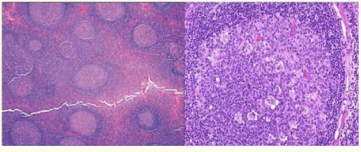
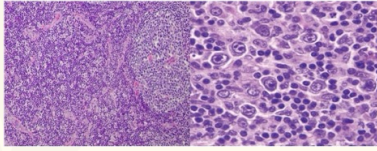
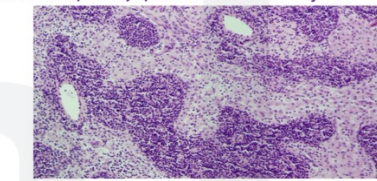
- Dilated sinuses + macrophages
- Seen in nodes draining cancers
- Represents immune response

### 🔥 Ultra-High Yield Exam Pearls

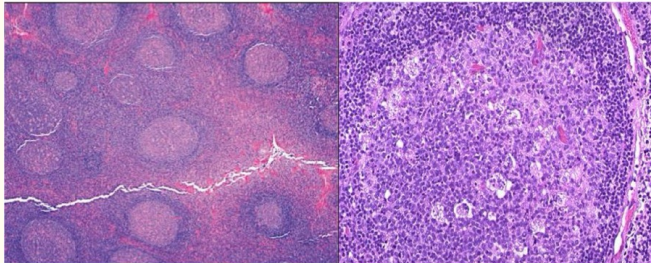
- Neutropenia <500 → life-threatening infections
- Toxic neutrophil changes = severe infection
- Leukemoid reaction ≠ leukemia (check BCR-ABL)
- EBV → atypical CD8 T cells (NOT B cells)
- Follicular hyperplasia vs lymphoma → architecture preserved
- Basophilia → think myeloproliferative disease

لَا حَوْلَ وَلَا قُوَّةَ إِلَّا بِاللَّهِ

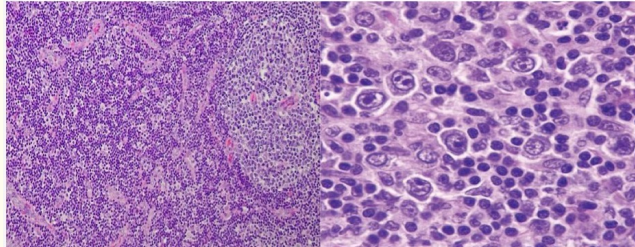
"من كنوز الجنة"

Causes / Associations	Key Features	Cells involved	Pattern
<ul style="list-style-type: none"> <li>Rheumatoid arthritis</li> <li>Toxoplasmosis</li> <li>Early HIV</li> </ul>	<ul style="list-style-type: none"> <li>Large germinal centers (secondary follicles)</li> <li>Tingible-body macrophages</li> <li>Frequent GC mitoses</li> </ul>	<p><b>B-cells</b></p>	<p><b>Follicular hyperplasia</b></p> <p>Chronic Nonspecific Lymphadenitis - Follicular hyperplasia.</p> 
<ul style="list-style-type: none"> <li>Viral infections</li> <li>Vaccination (smallpox)</li> <li>Drug reactions (phenytoin)</li> </ul>	<ul style="list-style-type: none"> <li>Expansion of T-cell regions</li> <li>Immunoblast proliferation</li> <li>Effacement of B-cell follicles</li> </ul>	<p><b>T-cells</b></p>	<p><b>Paracortical hyperplasia</b></p> <p>Chronic Nonspecific Lymphadenitis - Paracortical hyperplasia</p> 
<ul style="list-style-type: none"> <li>Lymph nodes draining cancers</li> <li>Immune response to tumor</li> </ul>	<ul style="list-style-type: none"> <li>Distended lymphatic sinusoids</li> <li>Hypertrophy of endothelial lining</li> <li>Infiltration by histiocytes</li> </ul>	<p><b>Macrophages</b></p>	<p><b>Sinus histiocytosis</b></p> <p>Chronic Nonspecific Lymphadenitis - Sinus Histiocytosis</p> 

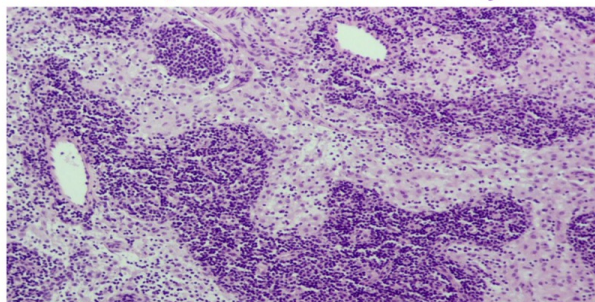
Chronic Nonspecific Lymphadenitis - Follicular hyperplasia.



Chronic Nonspecific Lymphadenitis - Paracortical hyperplasia



Chronic Nonspecific Lymphadenitis - Sinus Histiocytosis



«قال ابن الجوزي - رحمه الله - :

ومتى رأيت في نفسك عجزا فسل المنعم ، أو كسلا فسل الموفق ، فلن تنال خيرا إلا بطاعته ، ولا يفوتك خير إلا بمعصيته ، فمن الذي أقبل عليه فلم يرد كل مراد؟ ومن الذي أعرض عنه فمضى بفائدة ، أو حظي بغرض من أغراضه؟»

