*Leukemia: neoplastic disease → ↑WBCs

Neutropenia (agranulocytosis)

- The absolute neutrophil count is less than (1200-1500 cells/uL).
- ↑bacterial & fungal infection.
- If neutrophil count drops below 500 cells/uL → spontaneous infections by the normal flora or by any bypassing bacteria.

Reactive leukocytosis

- Neutrophilia: in infection (liquefactive necrosis) & inflammation (coagulative necrosis due to ischemia).
- Lymphocytosis: in viral infections, chronic infections (TB, brucellosis) & infection by bordetella pertussis.
- Monocytosis: in acute & chronic infections, more predominant in chronic infection (rheumatologic diseases) & inflammatory bowel diseases.
- Eosinophilia: in asthma, allergic diseases, drug hyper-sensitivity, parasitic infections, hodgkin lymphoma.
- Basophilia: in myeloproliferative neoplasms.

Reactive lymphadenitis

- Benign inflammation of LN → lymphadenopathy (enlargment of LN).

Acute non-specific lymphadenitis	Chronic non-specific lymphadenitis
- Painfull LN	- Painless LN
- Overlying skin is red	1. Follicular hyperplasia: proliferation of B-lymph., seen in rhematologic diseases, toxoplasmosis & HIV infection.
- May develop a sinus tract	
- The germinal centers in LN are infiltrated by neutrophils.	2. Paracortical hyperplasia: proliferation of T-lymph., seen in viral infections, after vaccination & drug reaction.
- With severe infection → liquefactive necrosis & abscess	3. Sinus histiocytosis: proliferation of macrophages in LN sinuses, seen in adjacent cancer.

Cat-Scratch disease

- Caused by bartonella henselae, transmitted from cats → acute lymphadenitis in neck/axilla, liquefactive necrosis & necrotizing granulomas in LN. Self-limited in 2-4 months.

Hemophagocytic Lymphohistiocytosis (HLH)

- Defective genes related to cytotoxic T-cells & NKCs → ↑interferon-γ → severe activation of macrophages (histiocytes) to engulf normal blood cells
↑TNF & IL-6 → systemic inflammatory response syndrome (SIRS)
- Symptoms: fever, splenomegaly & pancytopenia.
↑ferritin, ↑triglyceridemia, ↑serum IL-2,
↓blood cytotoxic T-cells & NKCs

Type-1	Type-2
-Infants & young children -Homozygous defects in gene PRF1 "encodes perforin" (essential in cytotoxic T-cells & NKCs)	-Adolescents & adults -X-linked (males) -Defective SLAM associated protein → inefficient killing of EBV infected B-lymphocyte.
Type-3	**Type-4**
-Heterozygous genetic defects in genes required for cytotoxic T-cells. -Associated with systemic inflammatory disorders (rhematologic diseases)	-T-cell lymphomas -Malignant T-cells → abnormal cytokines → dysregulation of normal cytotoxic T-cells.