**Pathological Analysis Department Title of the lecture: WBC Disorders**

**Lec3-14**

**Hematology**

**Quantitative changes of the WBC**

1. **Leucocytosis - Quantitative changes**

Definition .. Is a raised white blood cell count (the leukocyte count) above the normal

1. **Leucopenia - Quantitative changes**

Definition.. Total WBC lower than the reference range for the age is defined as leucopenia

**Leukocytosis**

**The mechanism of leukocytosis can be of several forms**

-Increase bone marrow production

* Splenectomy (Increase cells)

**Classification of leukocytosis**

Leukocytosis(Neutrophilia-Lymphocytosis.-Monocytosis.-Eosinophilia)

**Leukocytosis may indicate**

1-Bacteria, viral or parasitic infection 2-Blood malignancy (Leukemia)

3-Drugs effects

**Laboratory Signs of infection (cytotoxic)**

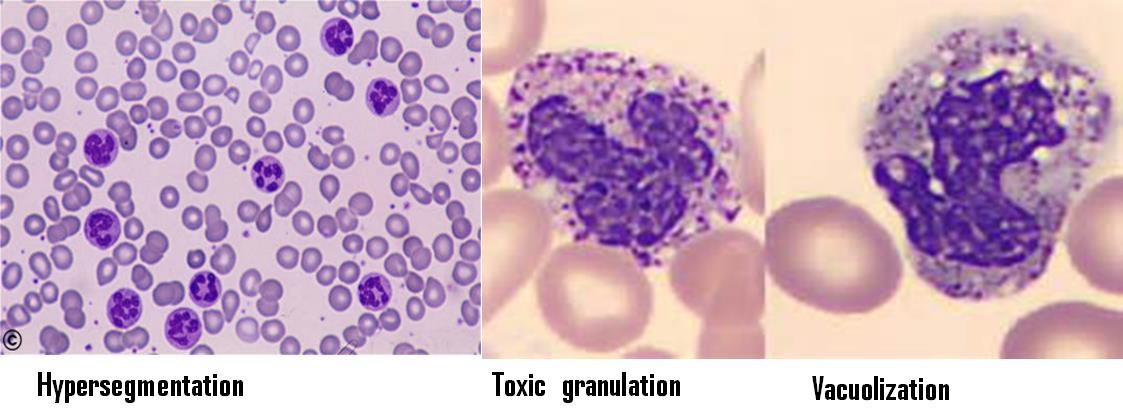
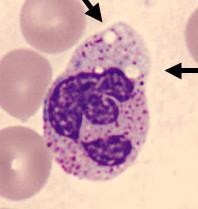
1. Presence of toxic granulation in neutrophils
2. Presence of toxic vacuolization in neutrophils 3-increase of band form over 5%

**1**

**Other tests**

1-Increase of ESR 2-Positive CRP test

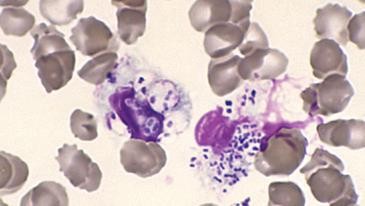
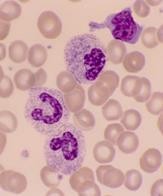
3- LAP( leukocyte alkaline phosphatase) test positive



granulation and toxic vacuolization in neutrophil

**Granulocytosis 1-Neutrophilia**

Definition.. Increase in the number of neutrophils Increase Production

***Toxic vacuolation: neutrophils showing phagocytosed bacteria in a case of severe septicaemia***

**2**

**Causes of Neutrophilia**

Infection, Bacterial,viral, fungal

Inflammatory conditions, Autoimmune disorders

Gout, Neoplasia, Metabolic conditions, Uraemia –Acidosis - Haemorhage Corticosteroids, Marrow infiltration/fibrosis Cigarette smoking, Post-splenectomy Myeloproliferative disorders -leukemia.

**Diagnosis of neutrophila**

CBC \ count of Neutrophils absolute count \Blood film study evaluation of band form presence over 5%

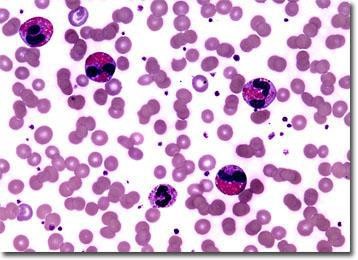
Toxic granulation in the cytoplasm and Toxic vacuolization Bone marrow study

Uses of some stain such as -- A leukocyte alkaline phosphatase (LAP)

1. **Eosinophilia**

**Causes of Eosinophilia**

1. Allergy:Atopic, - Drug sensitivity
2. pulmonary eosinophilia
3. Infection :Parasites, recovery from infections
4. Malignancy: Hodgkin’s disease
5. Skin disorders

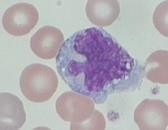


1. **Basophilia**
2. allerigic reactions
3. chronic myelocytic leukemia
4. polycythemia vera
5. Basophilia is also reported in hypothyroidism.

**3**

**Monocytosis**

1. myeloproliferative disorders.
2. Monocytosis may result from viral, fungal, and protozoal infections.



**Leukopenia**

Definition: Is a decrease in the number of circulating white blood cells (leukocytes) in the peripheral blood lower than 4000/cells/μL (for adult)

***Result of leukopenia? Increased risk for infection***

Causes of leukopenia

a) Chemotherapy, radiation therapy, leukemia (as malignant cells overwhelm the bone marrow), myelofibrosis, aplastic anemia ,Medications

**Neutropenia**

* Patients with neutropenia are more susceptible to bacterial infections
* Patients with fevers and frequent infections.

**Causes of Neutropenia**

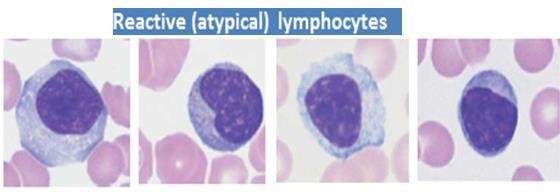
1-Aplastic anemia2-Viral infections

1. Radition4-Autoimmune 5-Medication

**4**

**Lymphocytosis**.

Is an increase in the number of lymphocytes in the blood according to the patient age



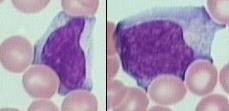
**Lymphocytopenia:**

Decrease of the absolute count of lymphocytes lower than normal

**May be seen with**

chemo Rx, irradiation,

Hodgkin's disease, HIV infection



**5**