

Pathology /1st course

Red Blood Cells Disorders



Sawa University

College of health and medical techniques

Department of Radiology Tech.

Third Stage

جامعة ساوة الاهلية

كلية التقنيات الصحية والطبية

قسم تقنيات الاشعة والسونار

.....المرحلة الثالثة

الجانب النظري محاضرة رقم 11

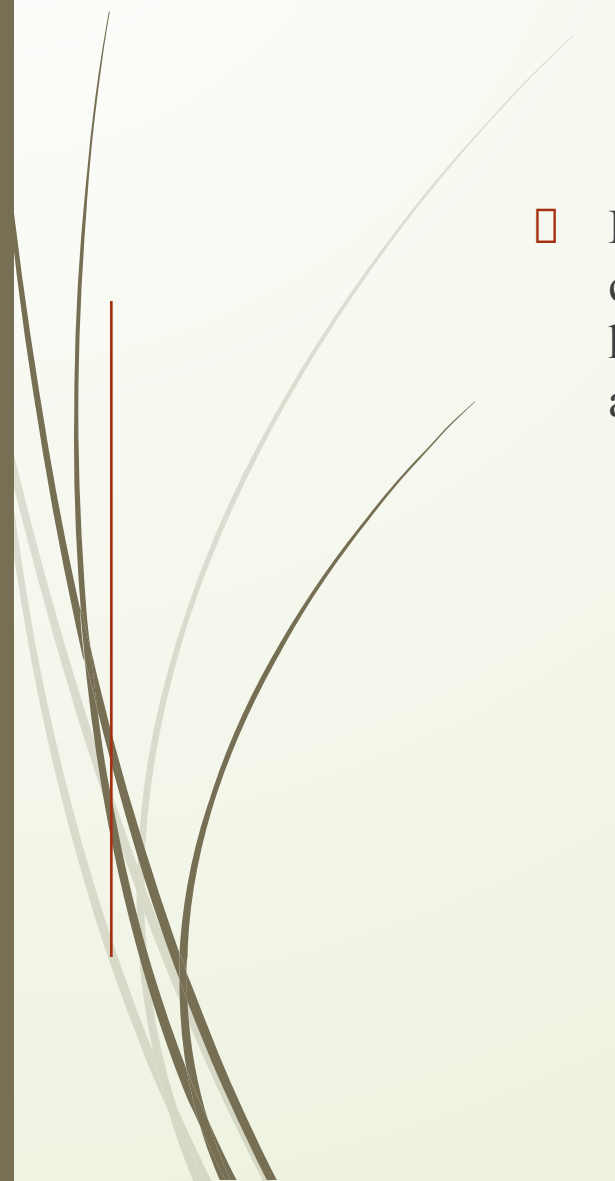
Lecture No.11 Theoretical

Sawa University

...تدريسي المادة : م.م فاضل عوفي عواد

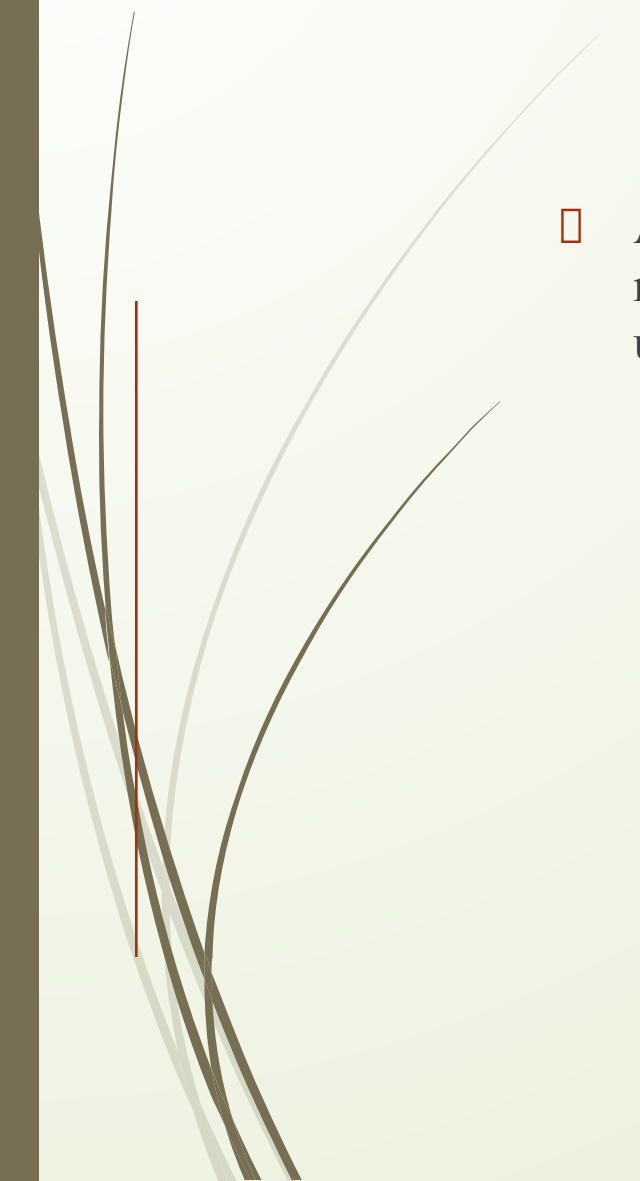


Red Blood Cells Disorders

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- RBC disorders include conditions that affect the number, size, or function of red blood cells. These disorders reduce the oxygen-carrying capacity of blood, leading to tissue hypoxia. This presentation covers anemia, microcytic anemia, iron deficiency anemia, and anemia of chronic disease.

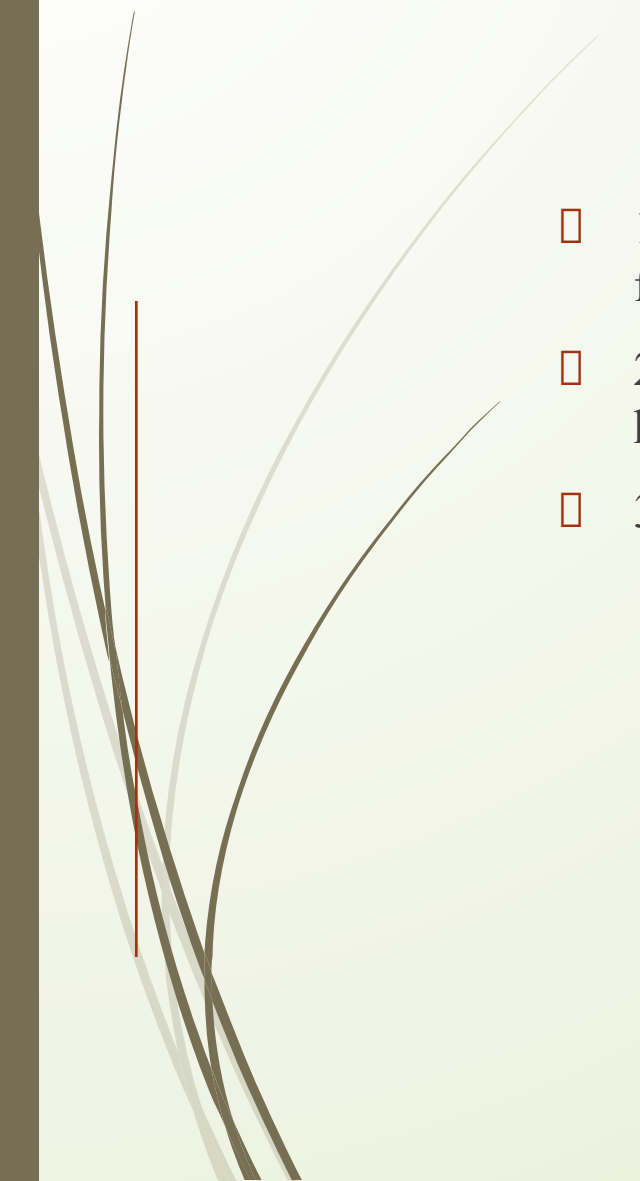


What is Anemia?

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- Anemia is defined as a decrease in RBC count, hemoglobin concentration, or hematocrit. It results in reduced oxygen delivery to tissues. Anemia is not a disease itself but a sign of an underlying disorder affecting production, destruction, or loss of RBCs.



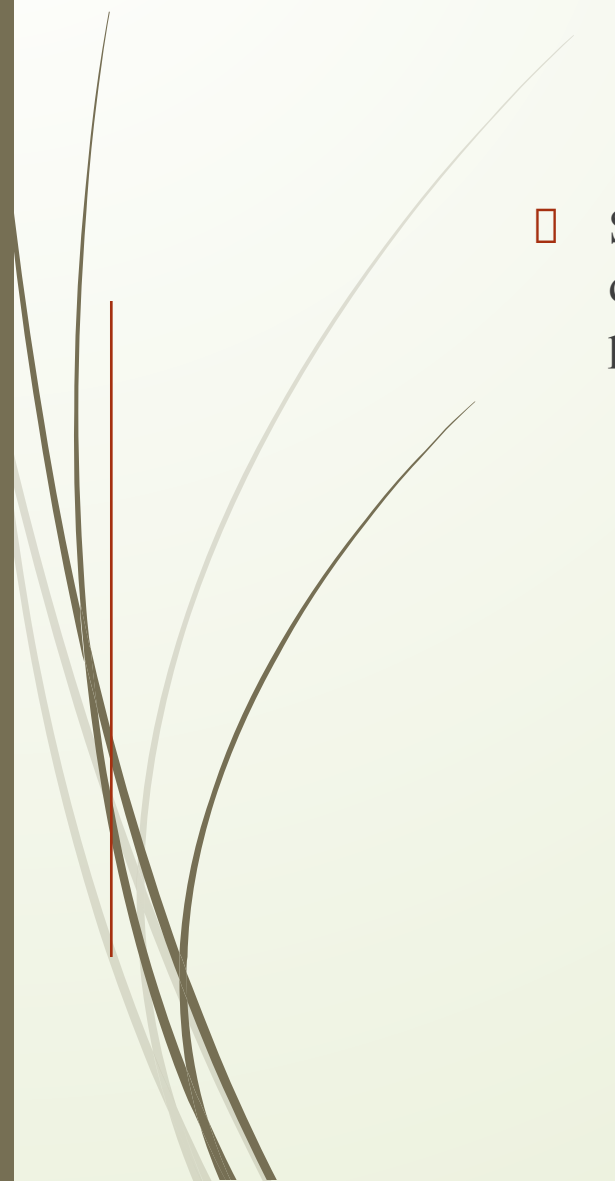
General Causes of Anemia



- 1. Decreased RBC production: bone marrow failure, nutritional deficiencies (iron, B12, folate), chronic diseases.
- 2. Increased RBC destruction (hemolysis): hereditary hemoglobin disorders, immune hemolysis, membrane defects.
- 3. Blood loss: acute bleeding (trauma) or chronic bleeding (GI loss, menstruation).



Symptoms of Anemia

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- Symptoms result from tissue hypoxia. Common symptoms include fatigue, pallor, dizziness, headache, cold intolerance, shortness of breath, tachycardia, and reduced physical endurance. Severe anemia may cause chest pain or syncope.

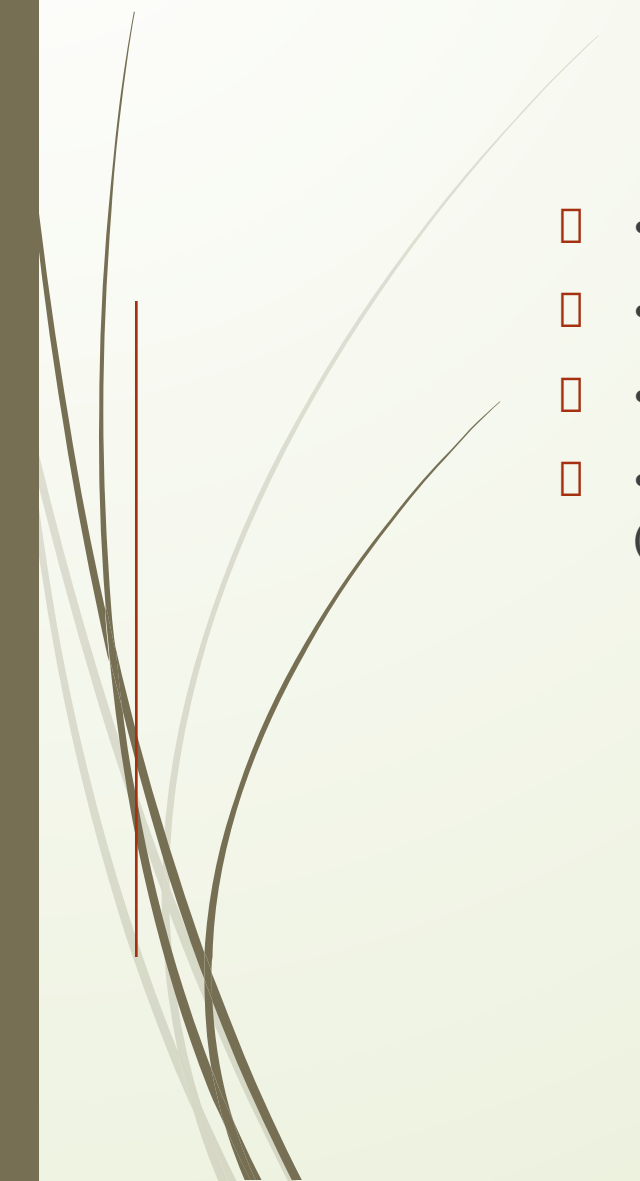


Microcytic Anemia

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- Microcytic anemia is characterized by small RBCs ($MCV < 80 \text{ fL}$). It is most commonly due to defective hemoglobin synthesis. The reduced hemoglobin causes RBCs to appear pale (hypochromic). Major causes include iron deficiency, thalassemia, chronic disease, and sideroblastic anemia.



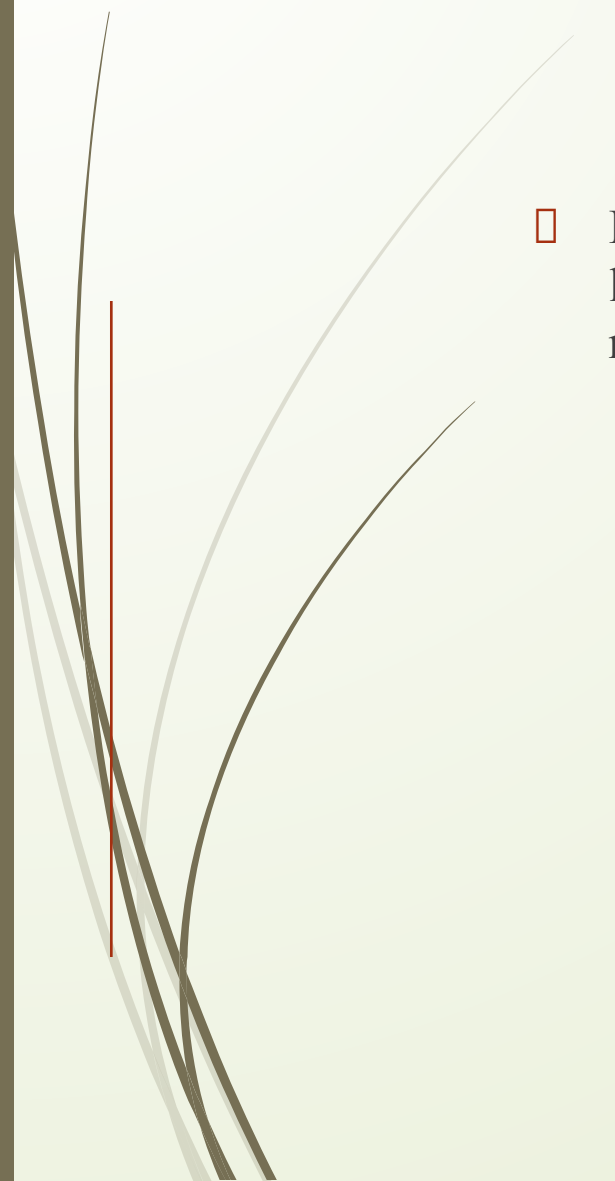
Causes of Microcytic Anemia



- ❑ • Iron Deficiency: inadequate iron for hemoglobin production.
- ❑ • Thalassemia: genetic defects in globin chain synthesis causing small but numerous RBCs.
- ❑ • Anemia of Chronic Disease: inflammation reduces iron availability.
- ❑ • Sideroblastic Anemia: defective heme synthesis leads to iron trapped in mitochondria (ring sideroblasts).



Iron Deficiency Anemia (IDA)

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- IDA is the most common anemia worldwide. It occurs when iron stores are depleted, limiting hemoglobin production. This leads to microcytic, hypochromic RBCs. Patients may develop pica, brittle nails, hair loss, and angular cheilitis.



IDA Causes & Laboratory Findings

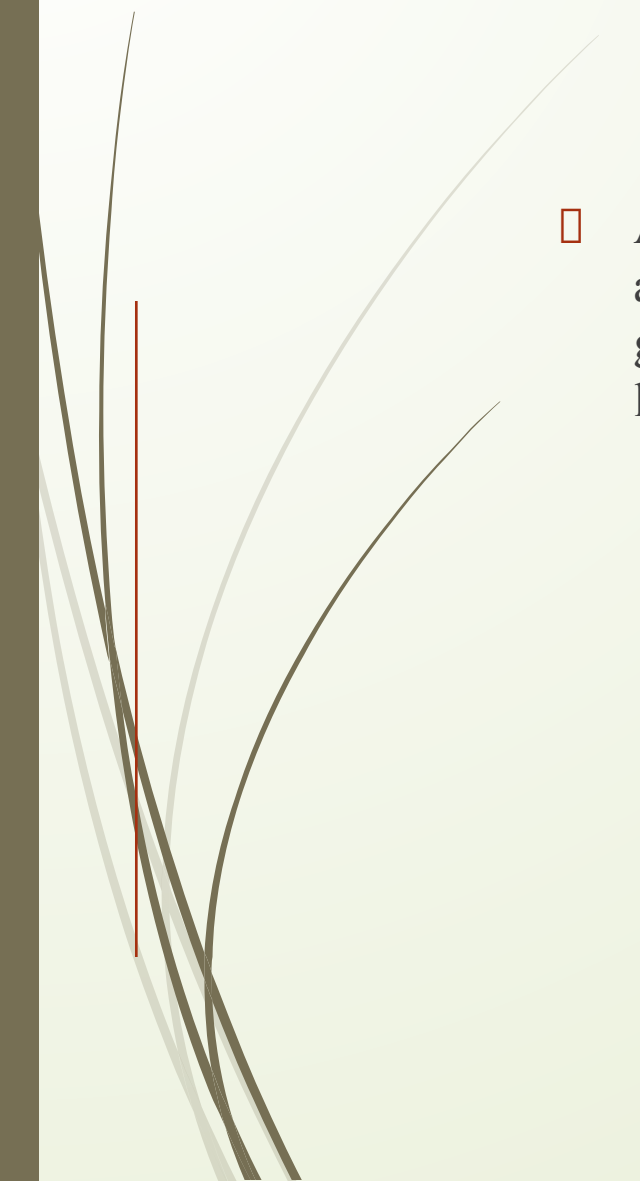


- Causes:
 - • Chronic blood loss (GI ulcers, hemorrhoids, malignancy)
 - • Heavy menstruation
 - • Poor dietary intake
 - • Malabsorption (celiac disease)

- Lab Findings:
 - • ↓ Serum Iron
 - • ↓ Ferritin (low stores)
 - • ↑ TIBC
 - • ↑ RDW
 - Blood smear shows small, pale RBCs.



Anemia of Chronic Disease (ACD)

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- ACD occurs in chronic inflammatory conditions such as infections, autoimmune diseases, and malignancy. Inflammation increases hepcidin, which blocks iron absorption from the gut and prevents release of iron from macrophages. This results in adequate iron stores but limited iron availability for RBC production.



ACD Labs & Management



❑ Lab Findings:

- ❑ • ↓ Serum Iron
- ❑ • Normal or ↑ Ferritin (iron trapped in storage)
- ❑ • ↓ TIBC
- ❑ RBCs are usually normocytic but may be microcytic.

❑ Management:

- ❑ • Treat the underlying disease
- ❑ • Erythropoietin may help in chronic kidney disease
- ❑ • Iron supplements are usually ineffective due to hepcidin elevation.

– Histopathology – Overview

- Study of tissues under microscope for diagnosis, prognosis, research.
- Examines cell structure, arrangement, changes.
- Detects inflammation, necrosis, neoplasia, infections.
- Essential for cancer diagnosis and therapy monitoring.

– Histopathology – Techniques & Applications

- Techniques: fixation, embedding, sectioning, staining (H&E), microscopy.
- Applications: cancer diagnosis, inflammatory diseases, organ pathology, research.
- Importance: confirms diagnosis, guides treatment, predicts prognosis.

Quiz

QUESTION:

EXPLAIN THE MAIN TYPES OF ANEMIA, INCLUDING THEIR CAUSES, LAB FINDINGS, AND CLINICAL FEATURES.

ALSO DESCRIBE THE ROLE OF HISTOPATHOLOGY IN DIAGNOSING TISSUE ABNORMALITIES AND GUIDING TREATMENT.

Any questions?

*Thank
You*