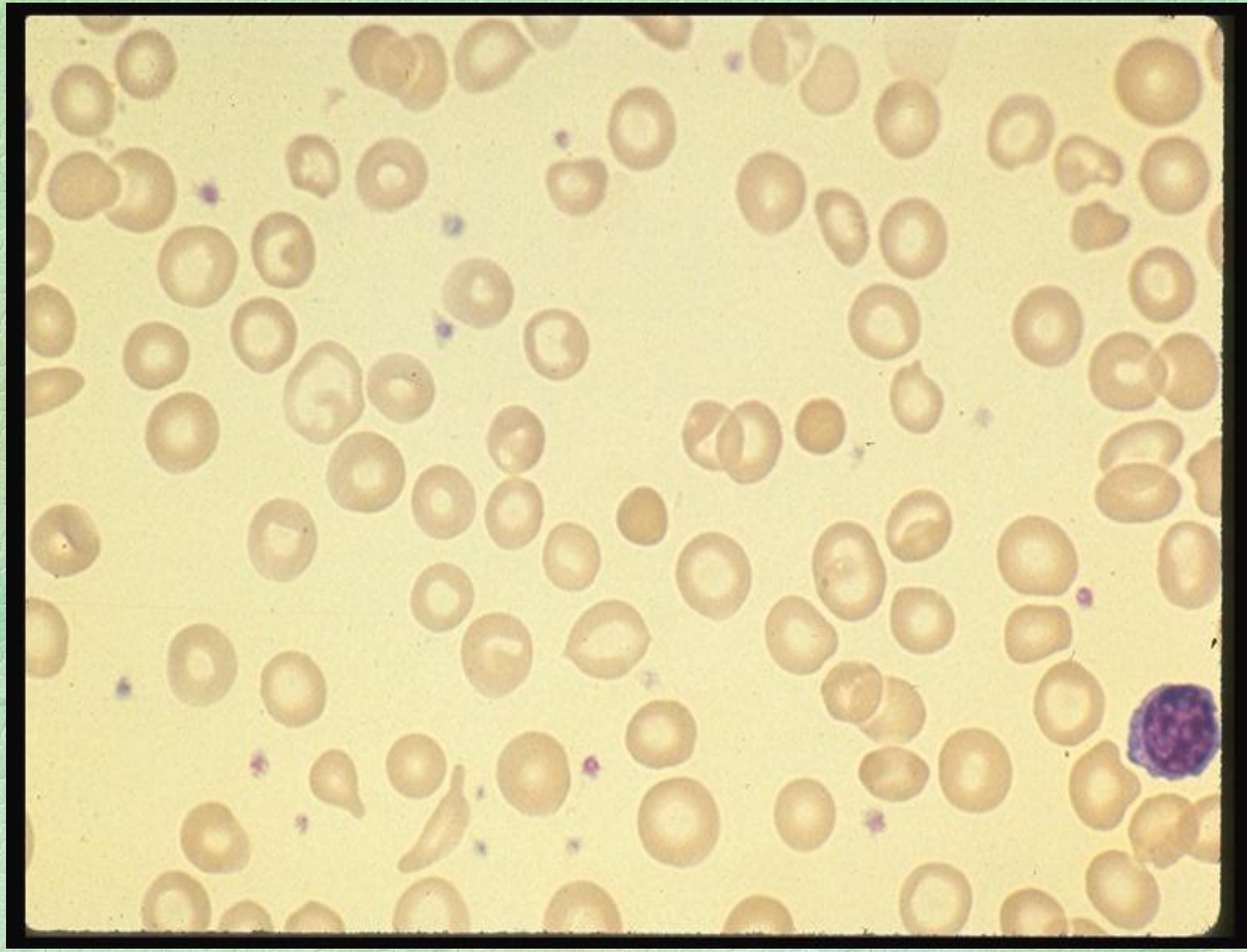
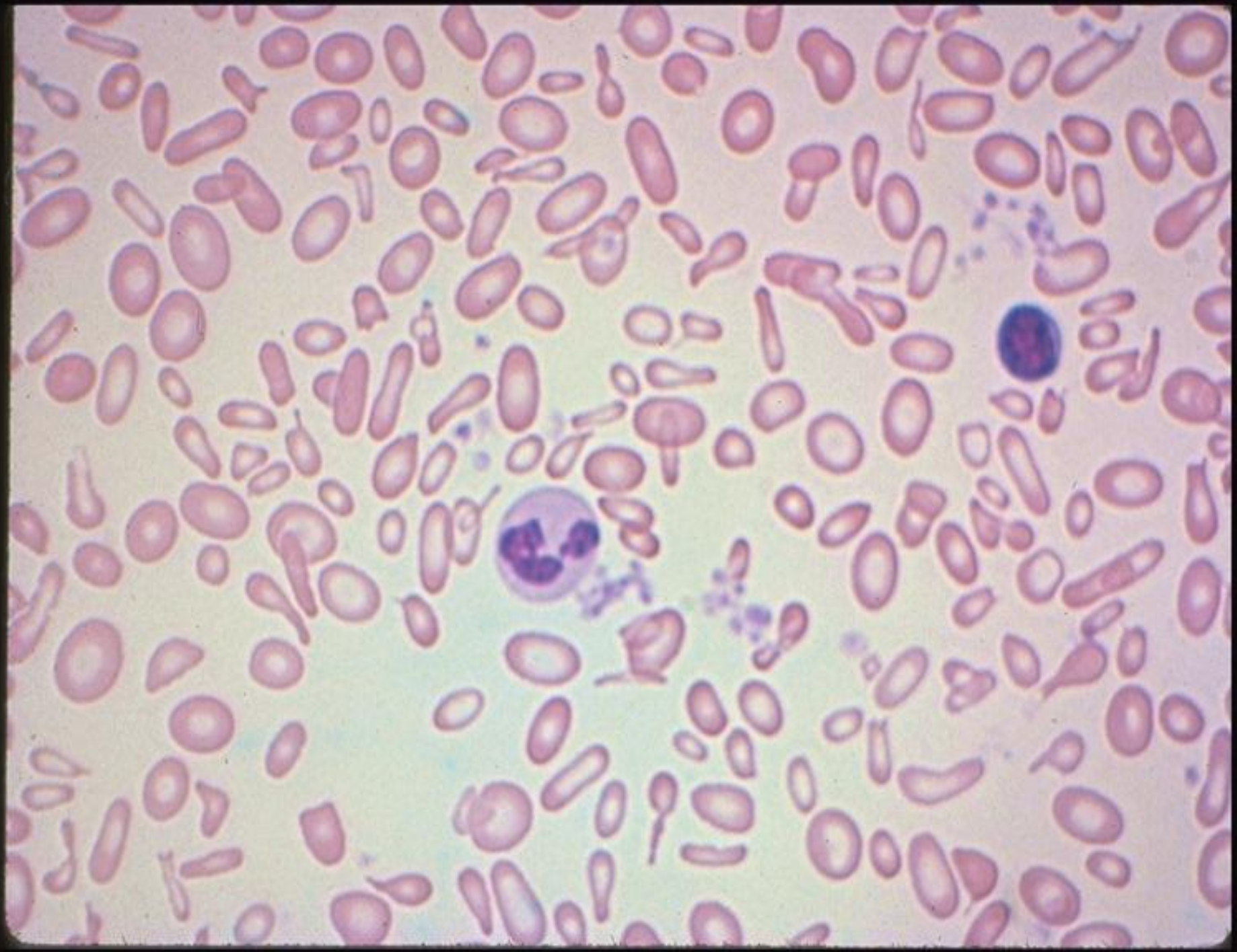
Microcytic Anemias

Clinical changes in iron deficiency anemia

Koilonychia

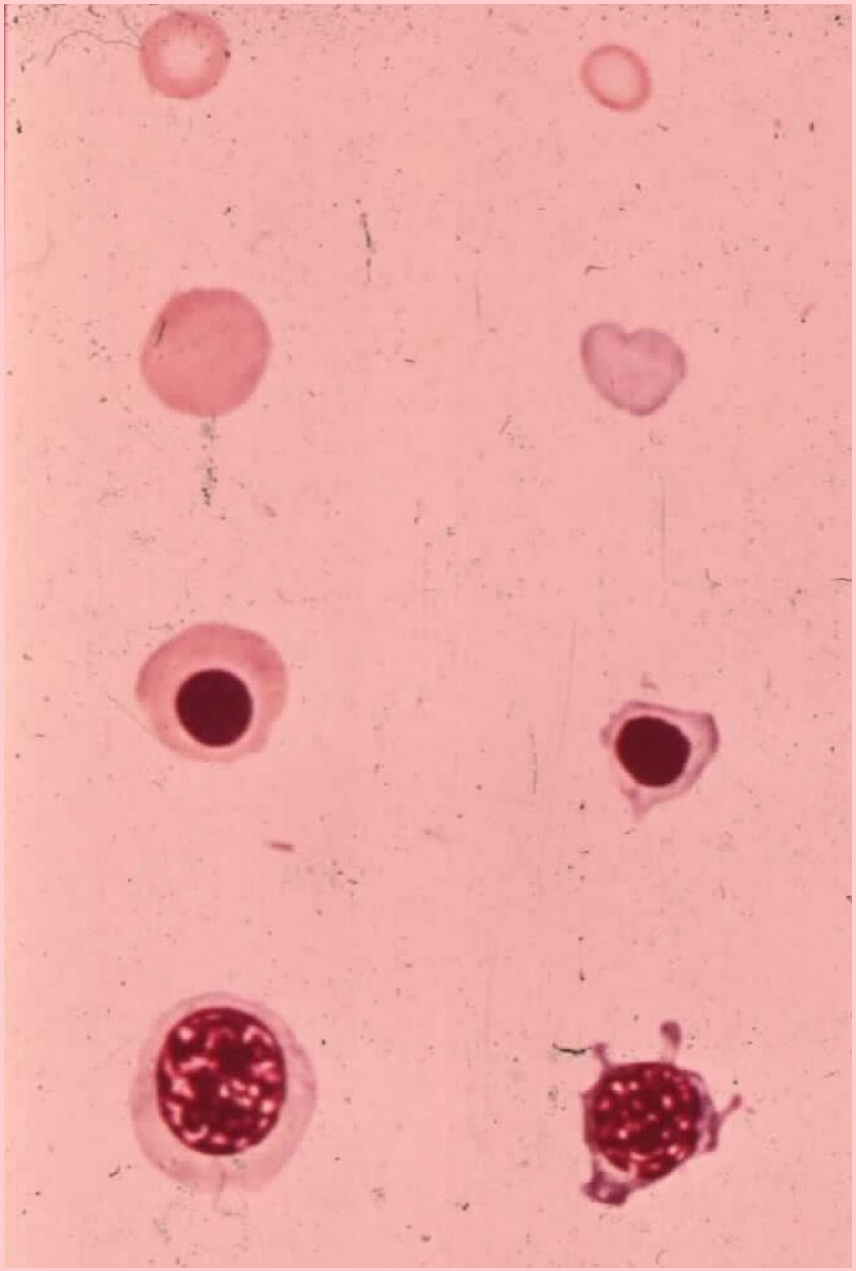
Glositis due to iron deficiency





Subsequent stages of maturation show a marked difference in the production of hemoglobin and the amount of cytoplasm

The maturation of the nucleus appears similar for both maturation sequences



Microcytic Anemia

MCV <80 and/or MCH <27

Microcytic and /or Hypochromic anemia

Causes

iron deficiency

thalassemia

anemia of chronic disease

lead toxicity

some sideroblastic anemias

IRON

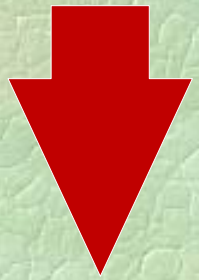
- Must be in ferrous (Fe^{+2}) state for activity
- Ferric (Fe^{+3}) ions cannot transport electrons or O_2

Iron evaluation

- Serum iron - (80-150)
- TIBC - (250-400)
- % Saturation - (20-45%)
- Evaluate storage iron
  - Hemosiderin - BM stain for iron
  - Ferritin - Serum storage (10-250)

INFLAMMATION ELEVATES SERUM FERRITIN

IRON DEFICIENCY ***versus anemia of chronic disease***

	Serum Iron	Transferrin	Ferritin
Iron Deficiency			
Anemia of chronic disease			

Iron Deficiency Anemia- caused by decreased iron stores

Causes of Iron Deficiency

- Blood Loss
  - Gastrointestinal Tract
  - Menstrual Blood Loss
  - Parasitic infections which cause bleeding
  - Urinary Blood Loss (Rare)
- Increased Iron Utilization
  - Pregnancy
  - Infancy
  - Adolescence
  - Polycythemia Vera
- Malabsorption
  - Tropical Sprue
  - Gastrectomy
  - Chronic atrophic gastritis
- Dietary inadequacy .
- Combinations of above

IRON DEFICIENCY ANEMIA

Progression of Findings

- Stainable Iron- Bone Marrow Aspirate
- Serum Ferritin - Low in Iron Deficiency
- Desaturation of transferrin
- Transferrin (Iron Binding Capacity) Increases
- Blood Smear - Microcytic, Hypochromic
- Anemia

IRON DEFICIENCY

Symptoms

- Fatigue - Sometimes out of proportion to anemia
- Atrophic glossitis (smooth tongue)
- Koilonychia (Nail spooning)

Iron Deficiency Anemia

- **<u>Laboratory</u>**
  - Microcytic and/or hypochromic anemia
  - anisocytosis and poikylocytosis
  - no Bone Marrow iron stores
  - decreased serum iron
  - decreased ferritin
  - Increased TIBC - decreased % saturation

IRON THERAPY

Response

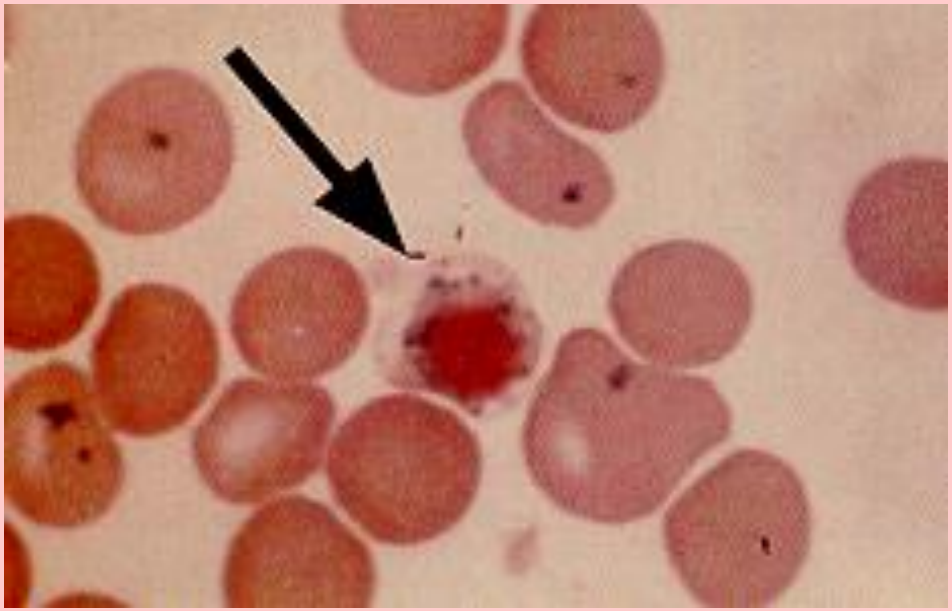
- Initial response takes 7-14 days
- Modest reticulocytosis (7-10%)
- Correction of anemia requires 2-3 months
- 6 months of therapy beyond correction of anemia needed to replete stores,
- Parenteral iron possible, but problematic

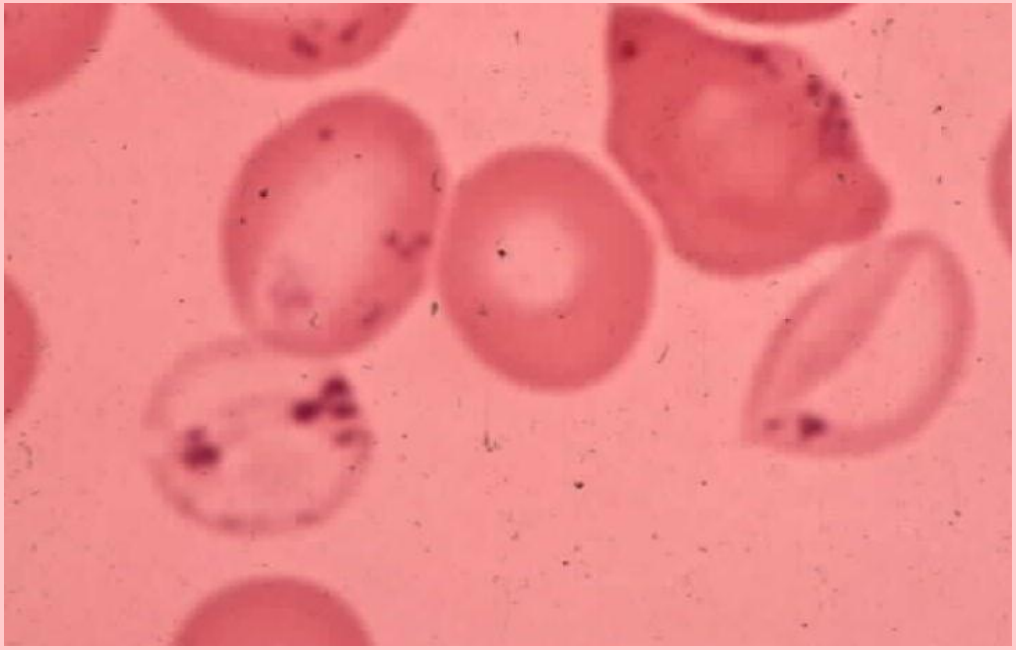
HYPOCHROMIC ANAEMIAS (1)
IRON DEFICIENCY ANAEMIA

- Is the commonest cause of A. in every country of the world
- It is the most important cause of a microcytic, hypochromic anaemia
- All three red cell indices are reduced:
  MCV - mean corpuscular volume
  MCH - mean corpuscular haemoglobin
  MCHC - mean corpuscular haemoglobin concentration
- The blood film shows microcytic, hypochromic red cells
- This appearance is due to a defect in Hb synthesis

Sideroblastic Anemia

- Impaired erythropoeisis
  - B_6, iron, porphyrin
- Diagnosed with ringed sideroblasts





Sideroblastic Anemia

- Primary
  - pyridoxin resistant (refractory anemia)
  - pyridoxin responsive
- Secondary
  - Many causes -

Sideroblastic Anemia

- Primary
  - pyridoxin resistant (refractory anemia)
    - Acquired
    - Hereditary
      - abnormal chromosome - MCV increased
      - over 65 year old female, diabetis, myelodysplastic
      - sex linked - male
  - pyridoxin responsive
    - Acquired
    - Hereditary
      - predominately males

Sideroblastic Anemia

- Clinically
  - Mild to severe anemia
  - Pyridoxin resistant -MCV - N
  - Lead poisoning
  - Serum iron - increased
  - TIBC - normal or decreased
  - % saturation - increased
  - Storage iron/ferritin - increased