



IRON DEFICIENCY ANEMIA



Presented by

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WHAT IS ANEMIA?

Reduction of hemoglobin per unit volume of blood below the normal level as per age and sex is called anemia

WHAT IS IRON DEFICIENCY ANEMIA?

Anemia results from deficiency of iron is called iron deficiency anemia



- **Iron Compartment:**
- Total body iron amount 4-5 gm [In 70kg adult]

Iron distributed in a number of different compartment; including

- Hemoglobin-2.5 gm approximately
- Tissue iron -8 mg approximately
- Myoglobin-130 mg approximately
- Labile pool-80 mg approximately



Iron Absorbtion

- Site of absorption: Duodenum, Jejunum
- Form of absorption: Ferrous(Fe^{++})
- Food iron remain: Ferric[Fe^{+++}]
- Storage form- Ferritin and hemosidarin



- **Storage site**
 - Reticuloendothelial cells
 - Hepatocyte
 - Skeletal muscle cells
 - Plasma
 - Some in myoglobin and enzymes
- **Daily Requirements of Iron**
 - Male: 0.5-1.0 mg
 - Menstruating women: 1.5-2 mg
 - Pregnant women: 1.5-2.5 mg



- **Causes of iron deficiency anemia?**
 - Increased physiological demand of iron
 - Inadequate iron intake
 - pathological blood loss
- **Increased physiological demand of iron**
 - Increased iron demand during growth period of child
 - increased iron demand during reproductive life in female



Increased iron demand during growth period of child due to-

- Progressive increase of number of RBC
- Increase in myoglobin
- Increase in cytochrome enzyme

Increased iron demand during reproductive life due to-

- Menstruation
- Pregnancy
- parturition
- Lactation



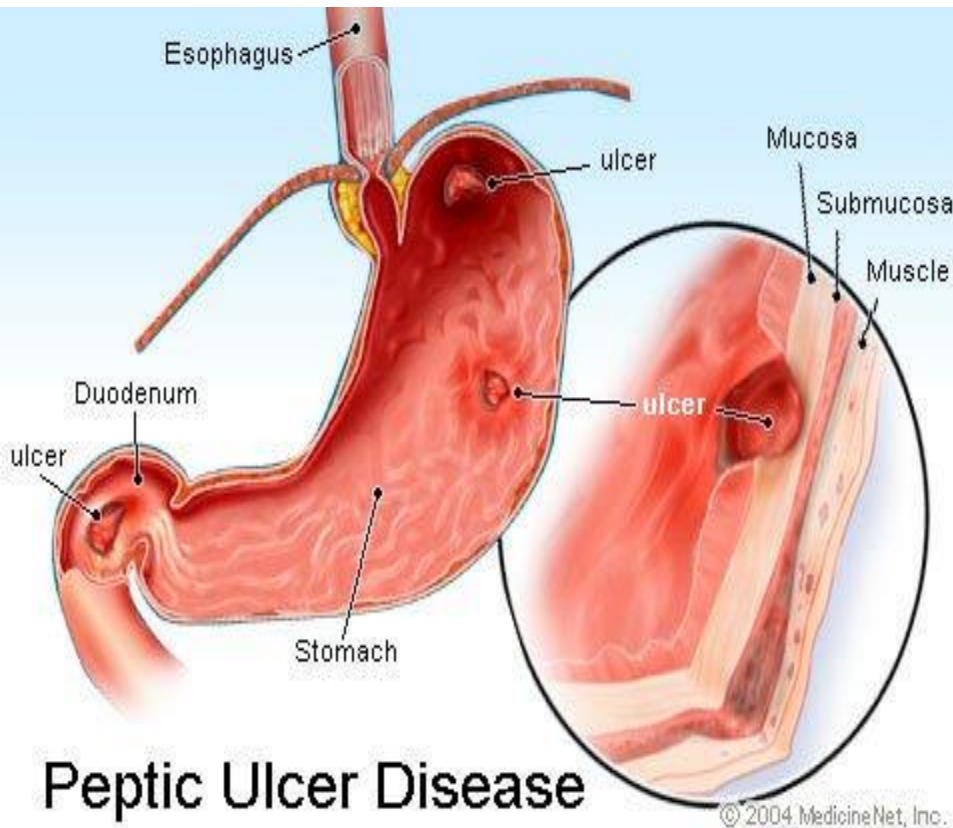
Causes of inadequate iron intake

- Nutritional deficiency
- Impaired iron absorption
 - due to-
 - Gastrectomy(HCL deficiency ,ferric to ferrous conversion impaired)
 - Gastrojejunostomy
 - Tropical sprue



Pathological blood loss due to-

- Bleeding peptic ulcer diseases
- Hook worm infestation
- Carcinoma of stomach and colon
- Menorrhagia etc.

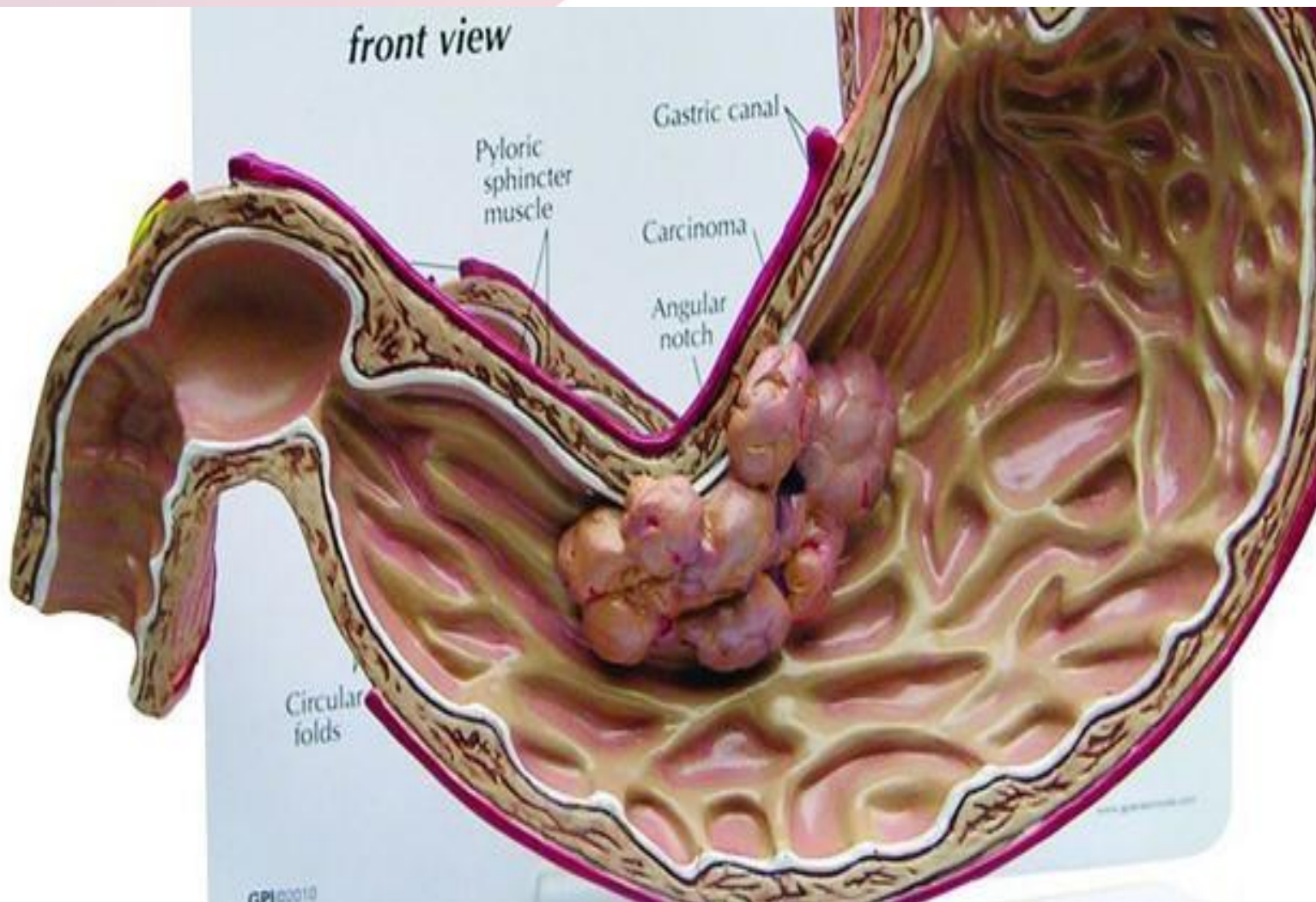


Peptic Ulcer Disease

Hook worm infestation



Carcinoma of stomach and colon





Clinical presentation of iron deficiency anemia-

- Sign and symptoms of anemia
- Changes in epithelium leading to
 - Thin finger nail
 - Brittle finger nail
 - Longitudinal ridging and flattening of nail
- Plummer vinson syndrome

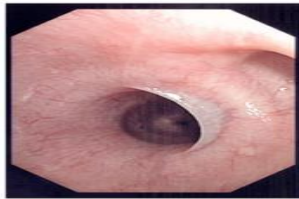


Koilonychia



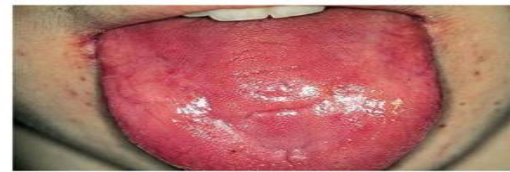


Plummer-Vinson Syndrome (Paterson-Kelly syndrome)



1. Dysphagia is said to occur because of the presence of a post-cricoid web.

2. Glossitis



3. Koilonychia.

The term sideropenic dysphagia has also been used, because the syndrome can occur with iron deficiency (sideropenia).



Lab Diagnosis of Iron Deficiency Anemia

- Blood examination
- Biochemical test
- Bone marrow examination



BLOOD EXAMINATION

- **Red cell indices**
 - MCV
 - MCH
 - MCHC
 - all are reduced
- **Hb%**
 - Hb is reduced
- **TLC**
 - Total leukocyte count normal
- **DLC**
 - Differential leucocyte count normal
- **Peripharaal blood film**



Peripheral Blood Film

RBC series

Cells are microcytic and hypochromic. Pencil form red cell present

WBC series

Cells are mature with normal count and distribution

Platelets

Adequate in number



Peripheral blood film with changes attributed to iron

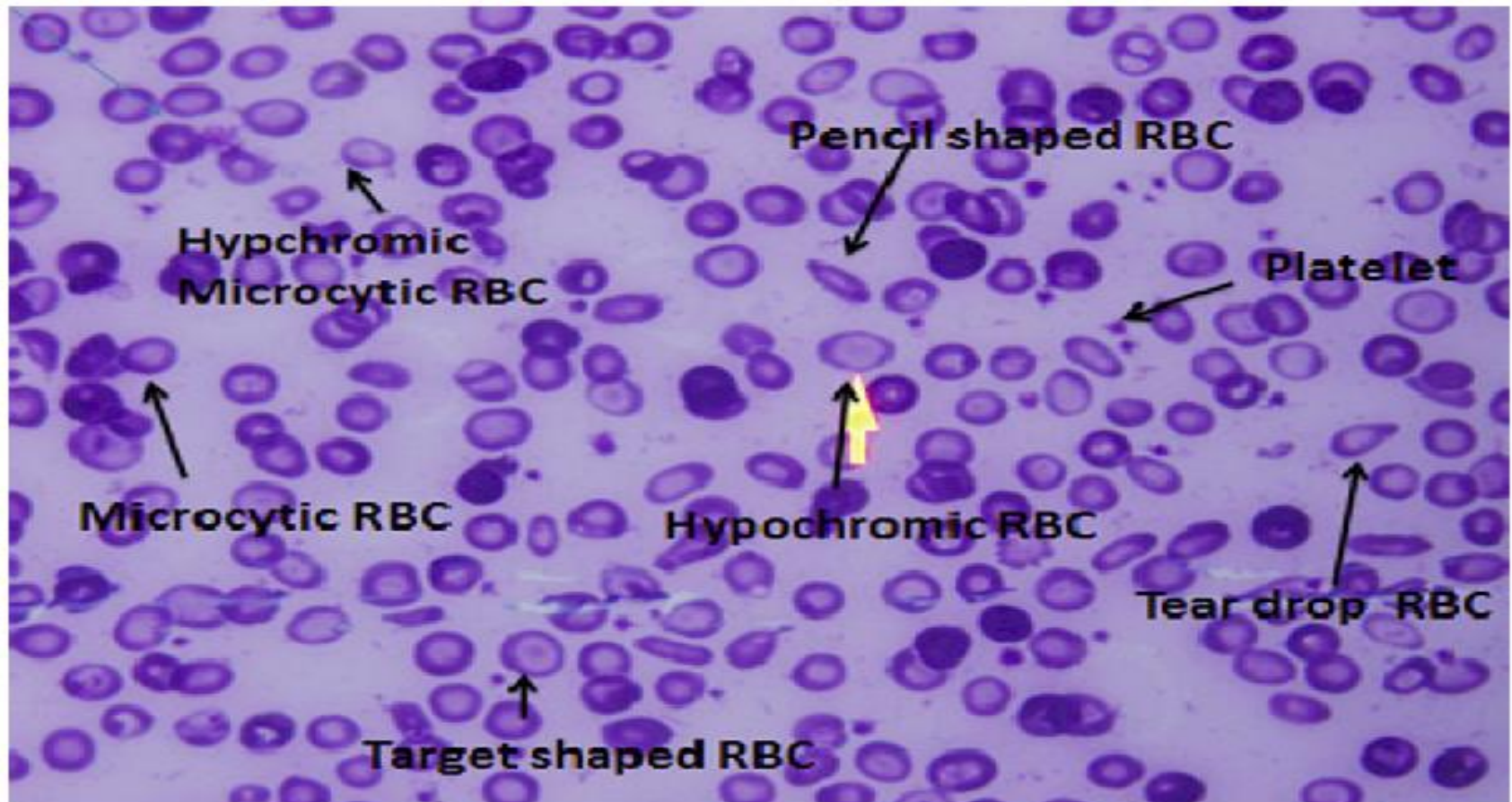


Figure 1 Peripheral blood film with changes attributed to iron



Biochemical Tests

Serum iron

It is reduced [normal 2.5 -10 mol/L]

Total iron binding capacity

It is increased upto 100 mol/L

Percentage saturation of the iron binding protein

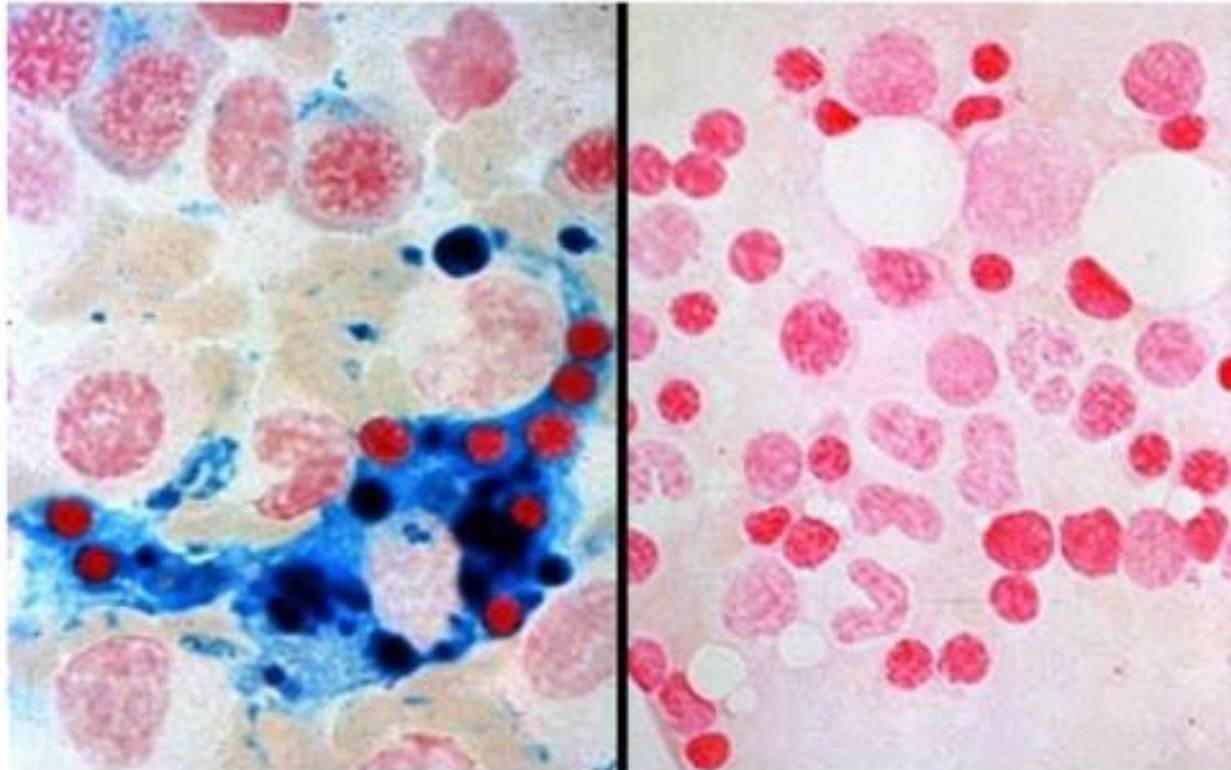
It is decreased and it is below 16%

Serum ferritin

It is reduced and it is below 12 microgram/L

Bone Marrow Examination

Stainable iron is decreased and Prussian blue reaction is negative



Prussian blue stains of bone marrow aspirates in normal (left) and iron-deficiency states (right)



Differential Diagnosis

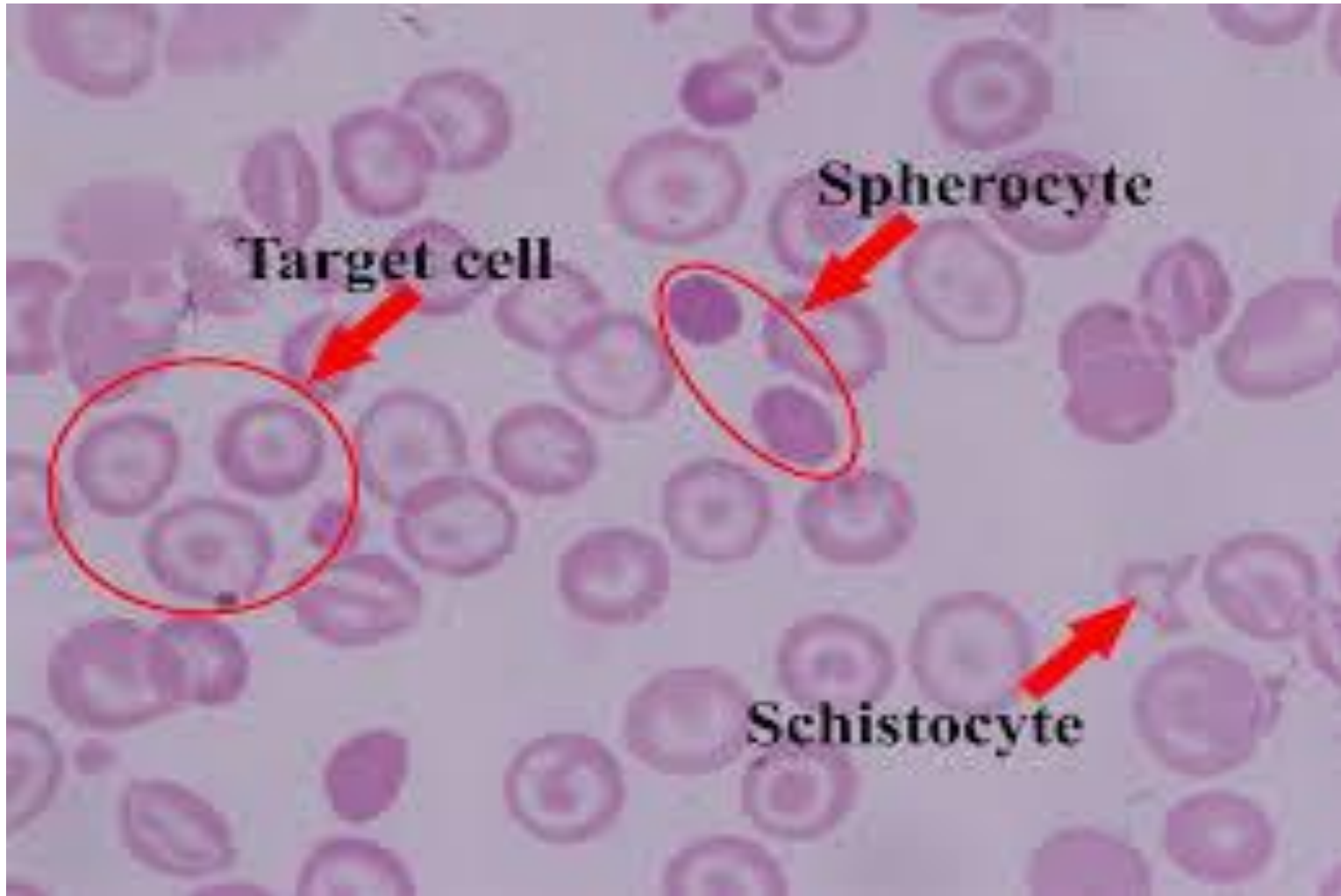
- Thalassemia
- Sideroblastic anemia

Difference Between

Thalassemia and Iron Deficiency Anemia



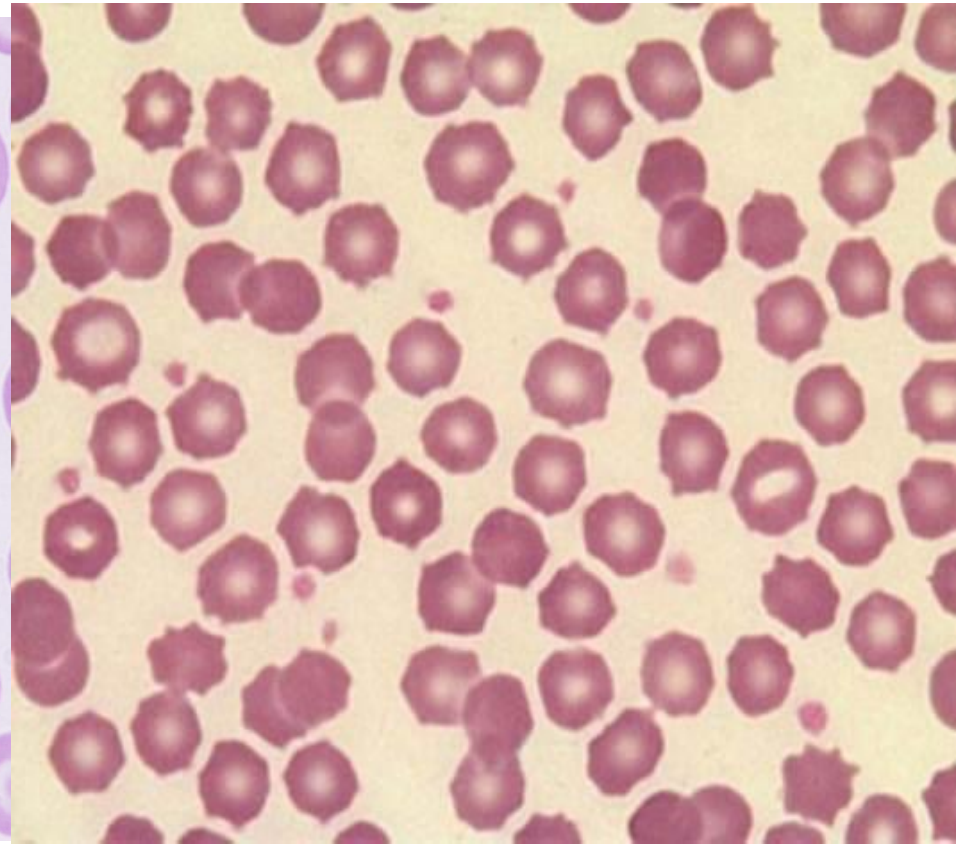
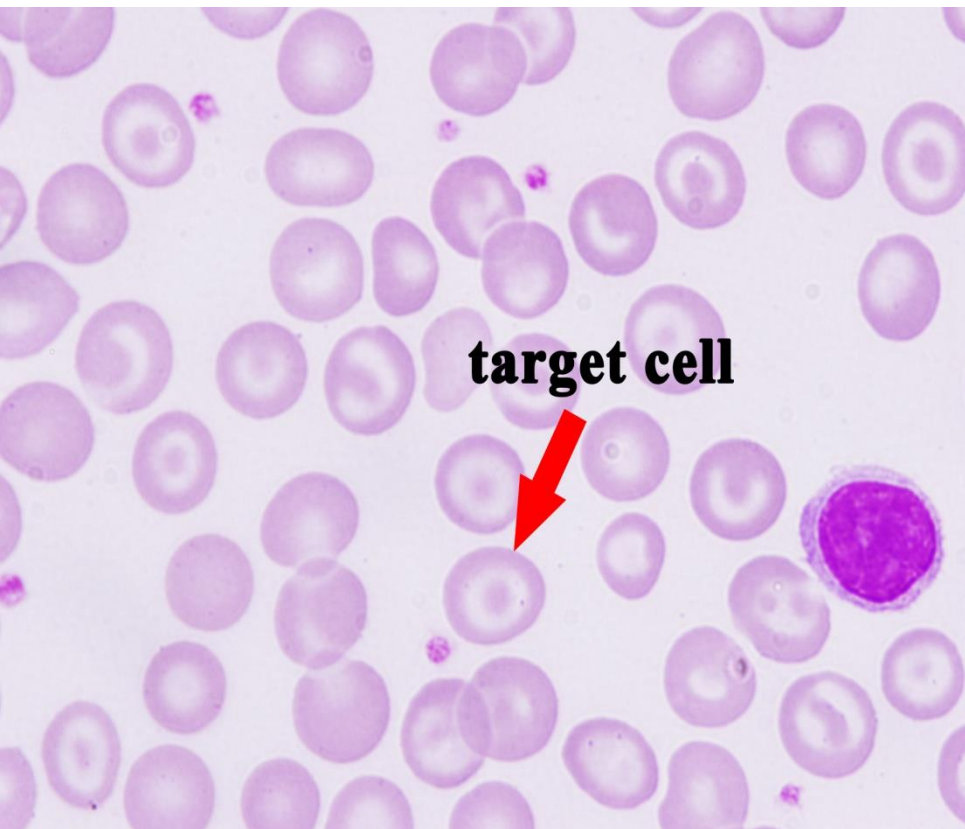
POINT	IRON DEFICIENCY ANEMIA	THALASSEMIA
Peripheral blood film	RBC series Pencil form of cells present	RBC series Evidences of hemolysis like -Schistocytes, tear drop cells, thin target cells and nucleated red cells found a fair number





TERGET CELL

NORMAL RBC





DEPARTMENT OF PATHOLOGY

*Thank
you!*