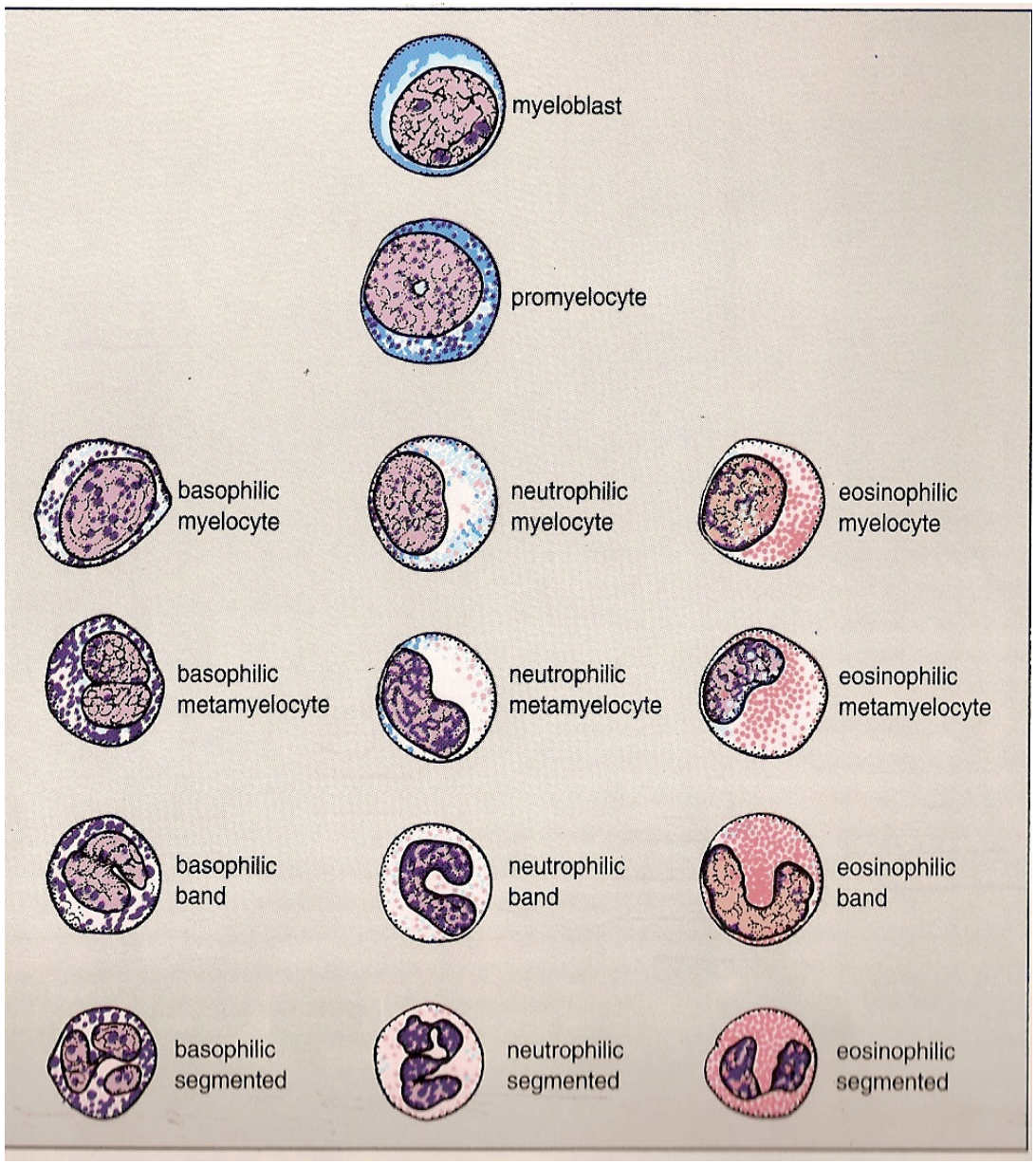
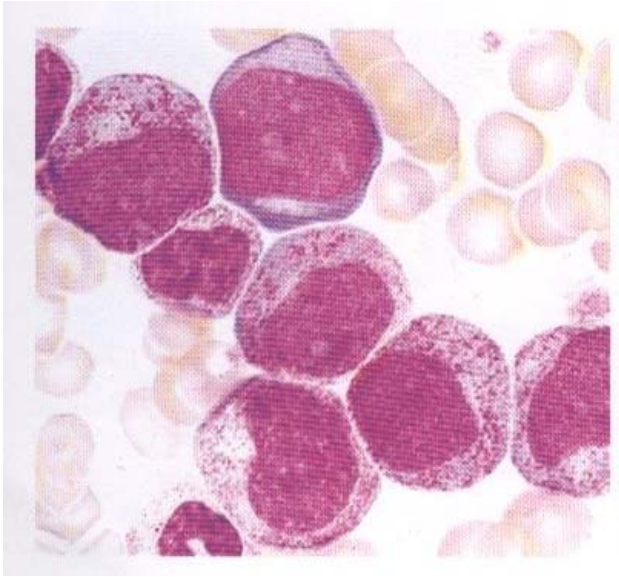
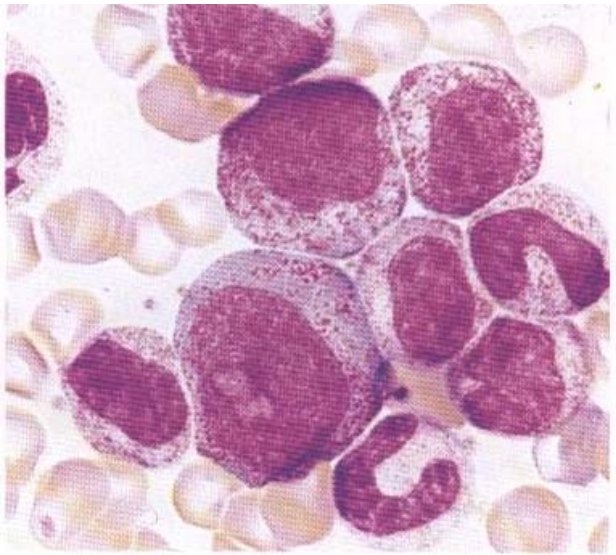
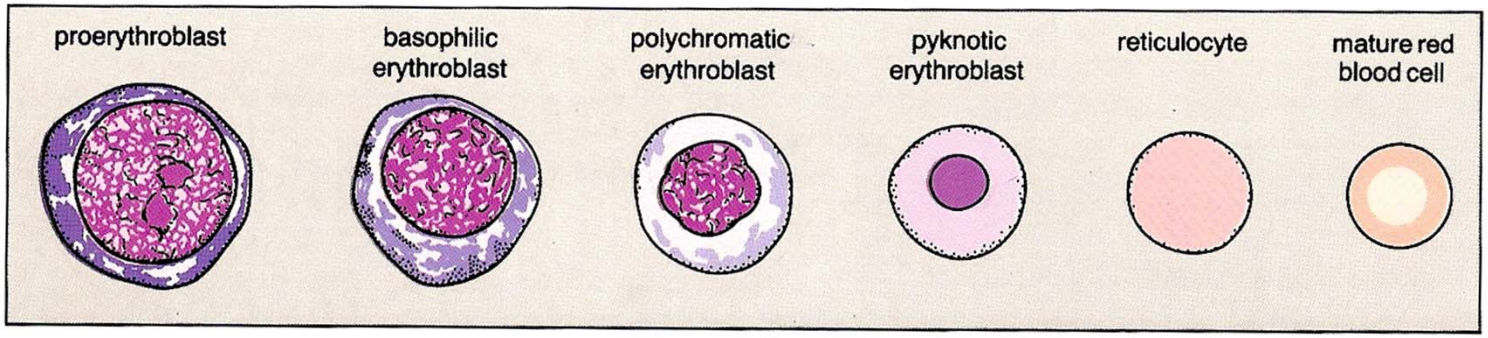
血液抹片判讀

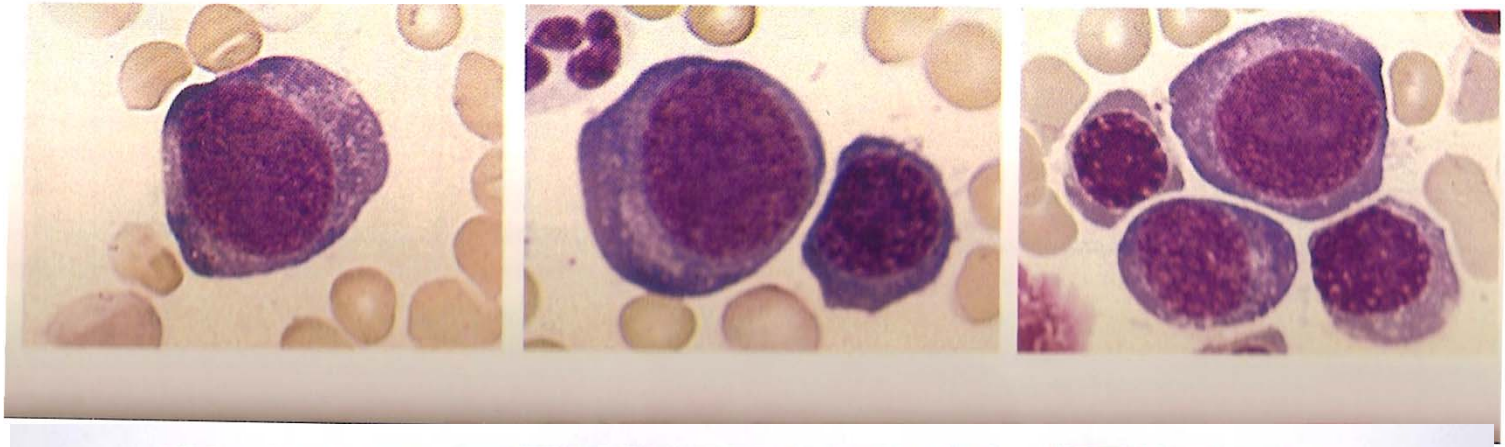
何景良
Division of Hematology/Oncology
Tri-Service General Hospital
National Defense Medical Center

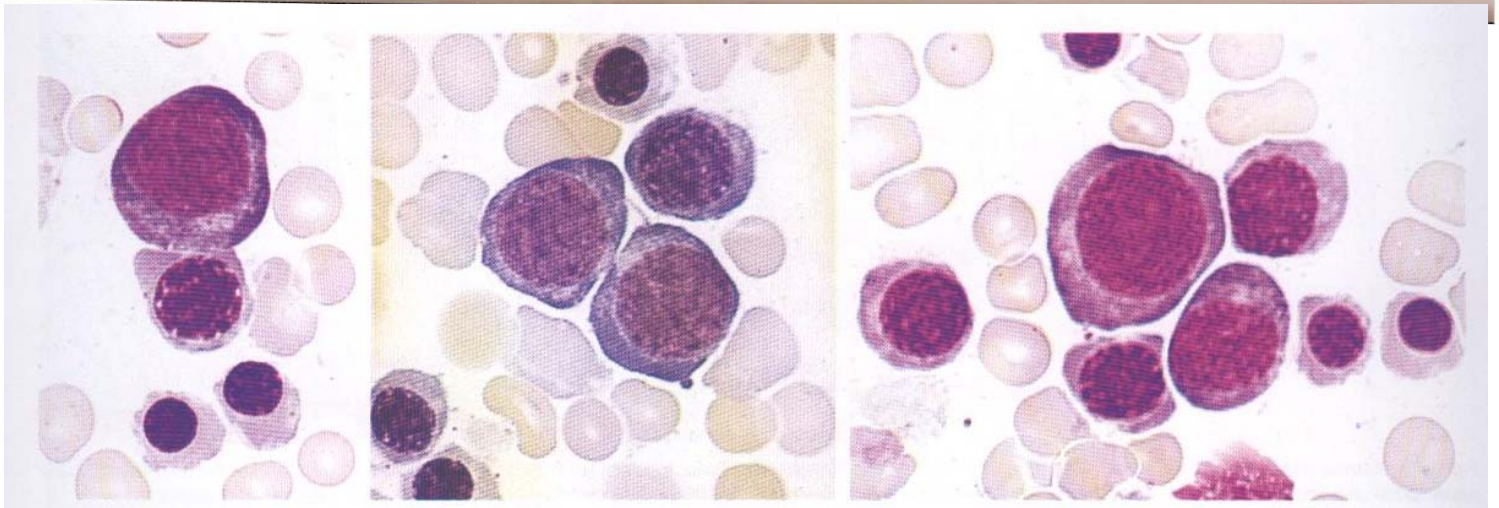

myeloblast
promyelocyte
basophilic myelocyte
neutrophilic myelocyte
eosinophilic myelocyte
basophilic metamyelocyte
neutrophilic metamyelocyte
eosinophilic metamyelocyte
basophilic band
neutrophilic band
eosinophilic band
basophilic segmented
neutrophilic segmented
eosinophilic segmented

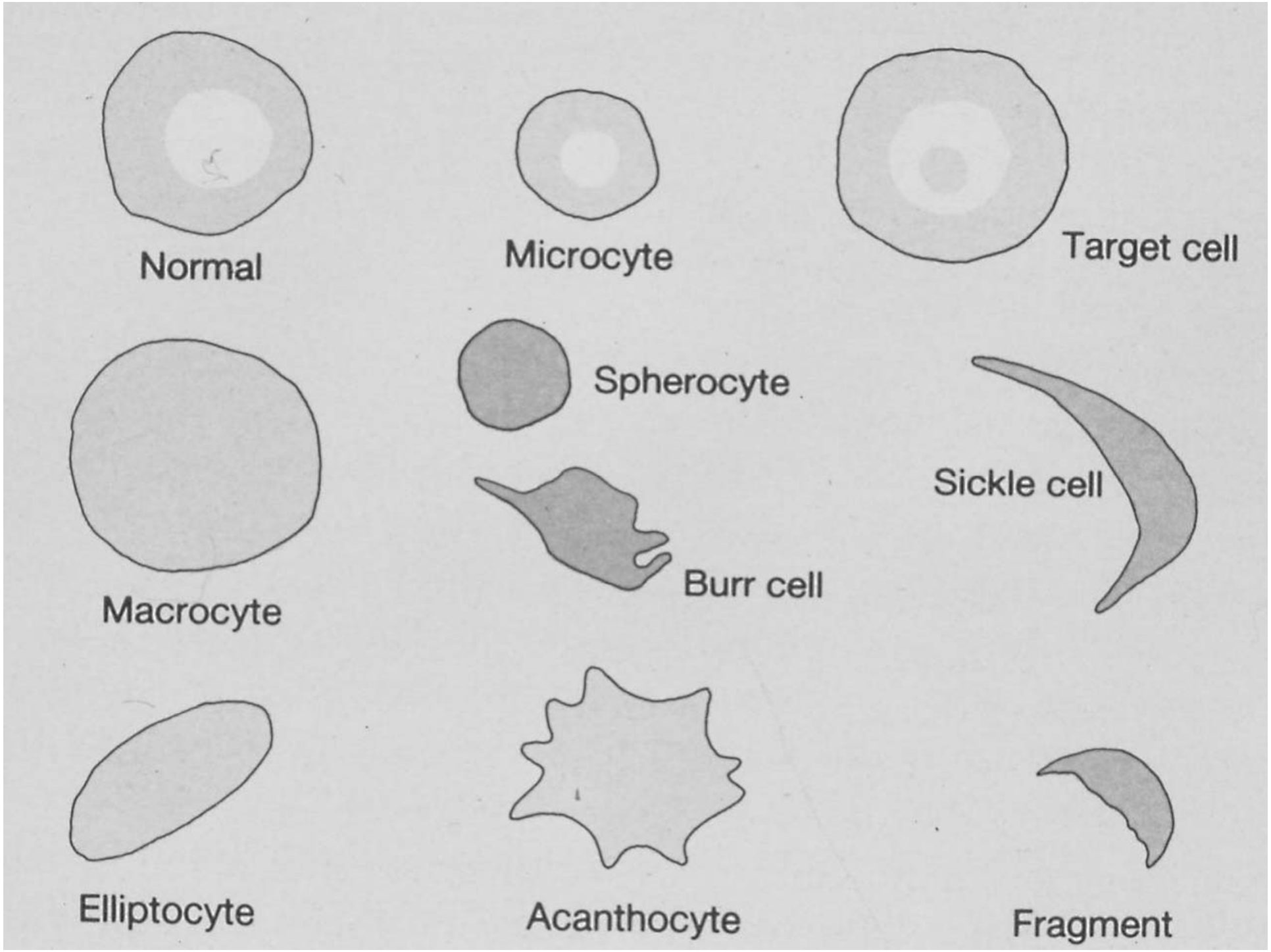




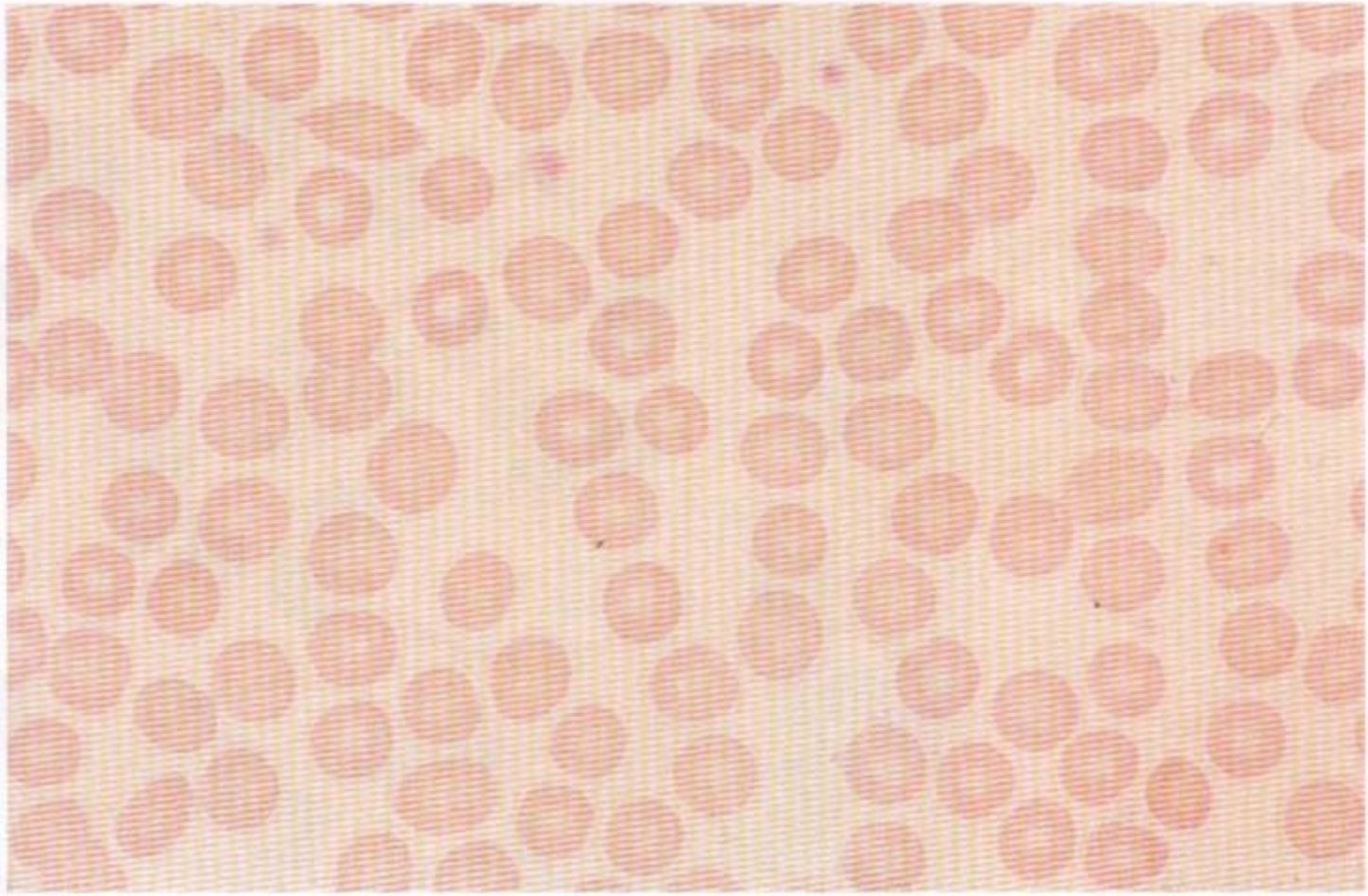

proerythroblast
basophilic erythroblast
polychromatic erythroblast
pyknotic erythroblast
reticulocyte
mature red blood cell

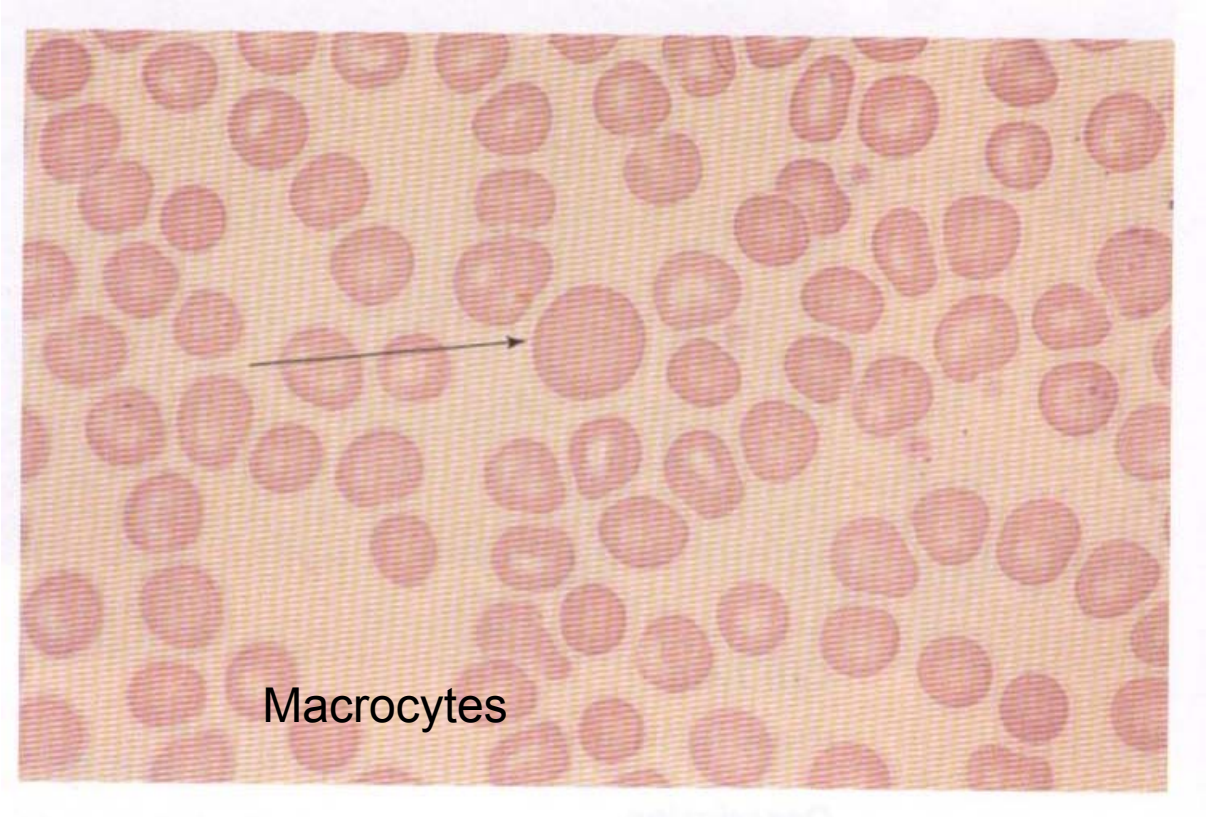





Normal
Microcyte
Target cell
Spherocyte
Macrocyte
Burr cell
Sickle cell
Elliptocyte
Acanthocyte
Fragment

Mature Red Blood Cell (Mature Erythrocyte)





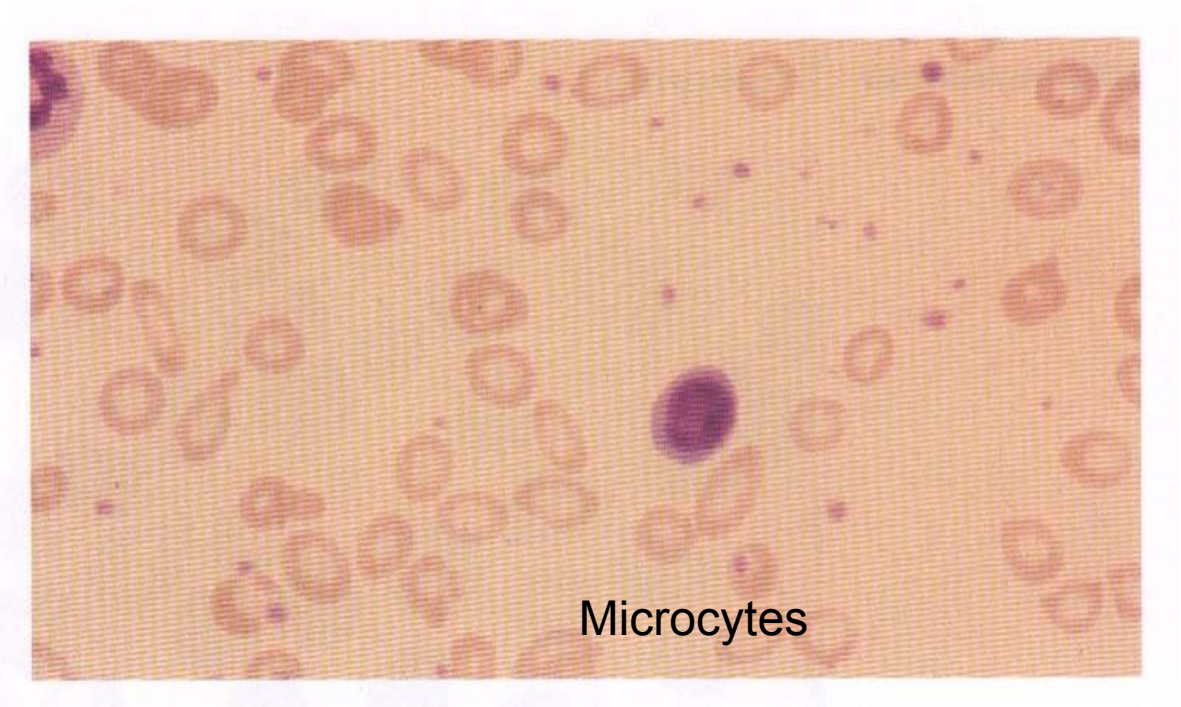
Liver disease (round macrocytes)

Megaloblastic anemia (oval macrocytes)

Myelodysplastic syndrome

Acute blood loss

Chemotherapy



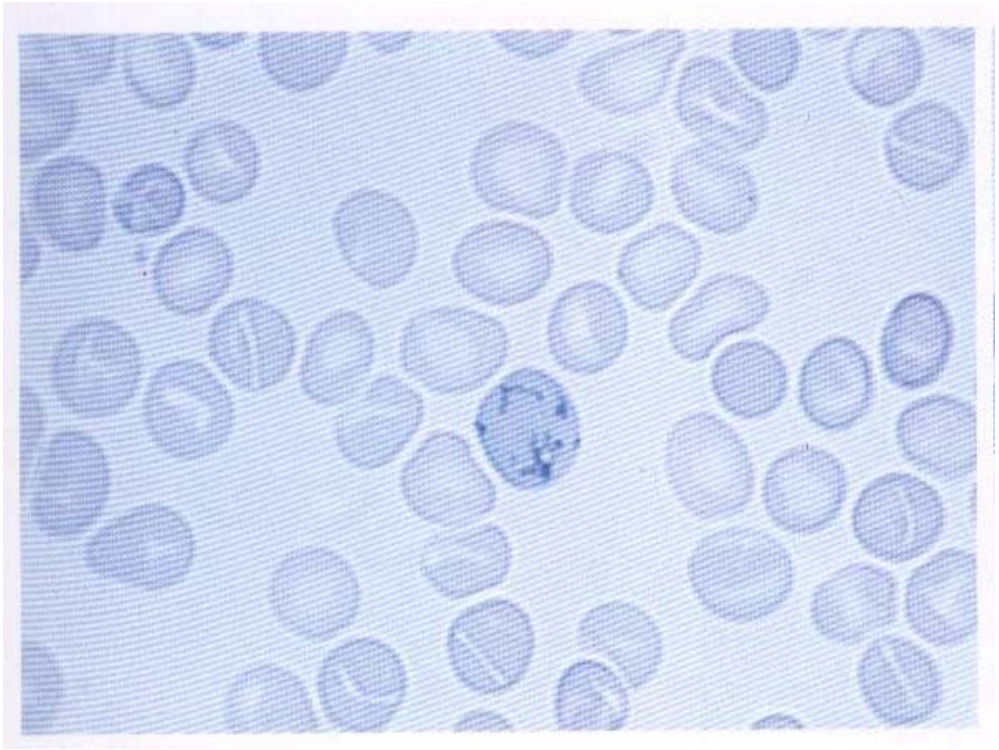
Iron deficiency anemia

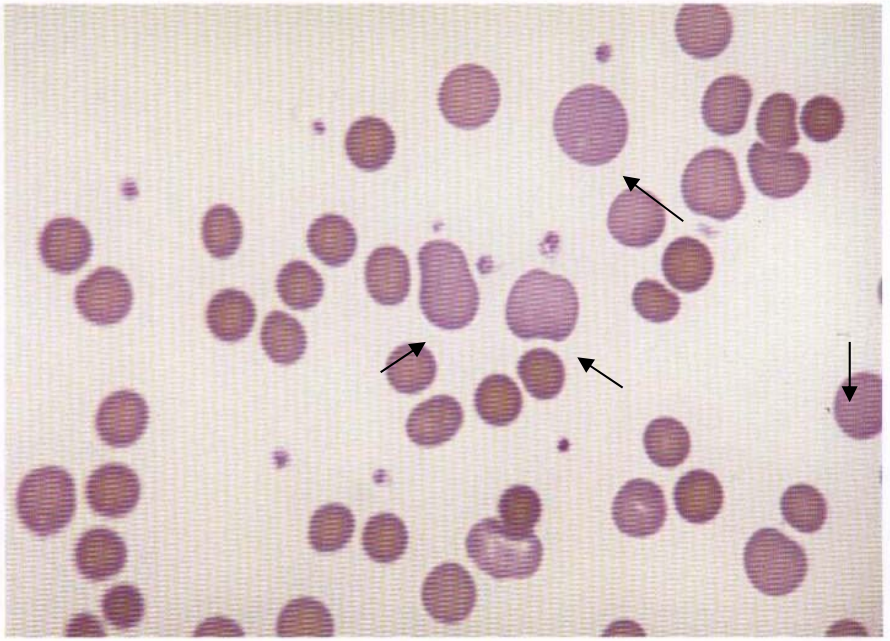
Thalassemia

Lead poisoning

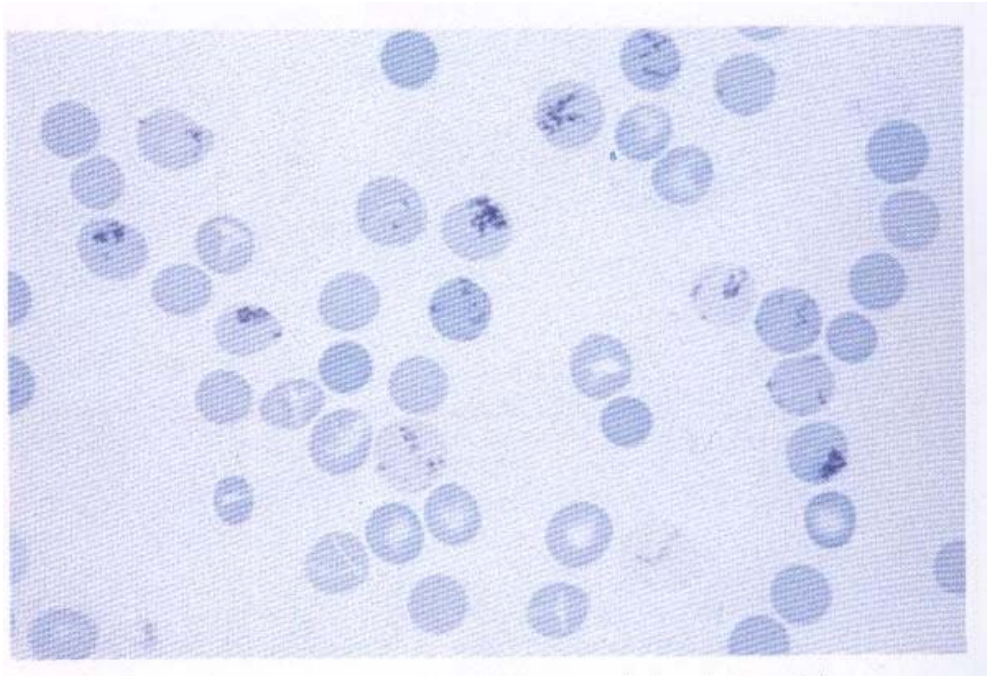
Anemia of chronic disease

Sideroblastic anemia





Polychromatophilic Erythrocyte (Reticulocyte)

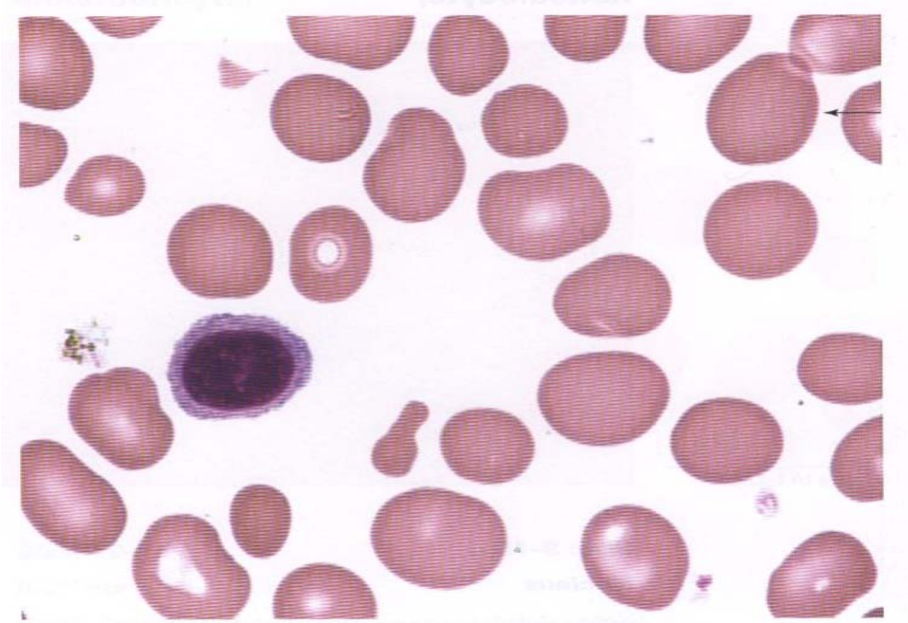


Increased erythrocyte production

Hemolytic anemia

Membrane disorders

Hemolytic disease of newborn



Ovalocytes

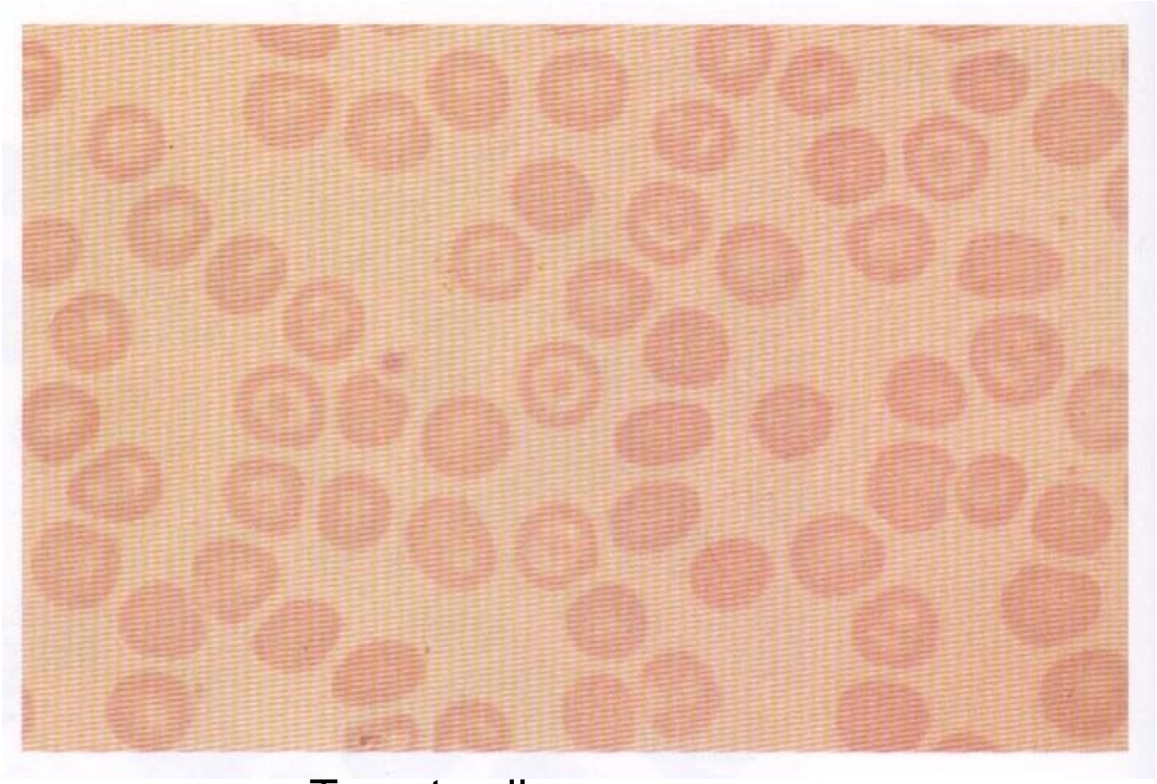
Vitamin B12 deficiency

Folic acid deficiency

Congenital dyserythropoietic anemia

Myelodysplastic syndomes

Newborn



Target cells

Hemoglobinopathies

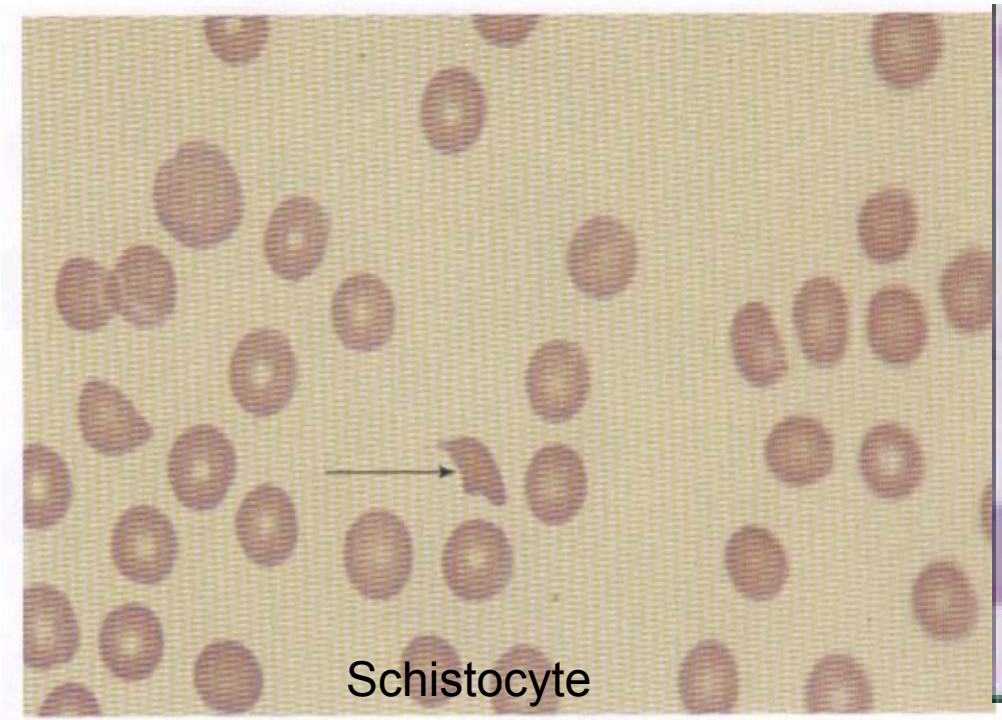
Thalassemia

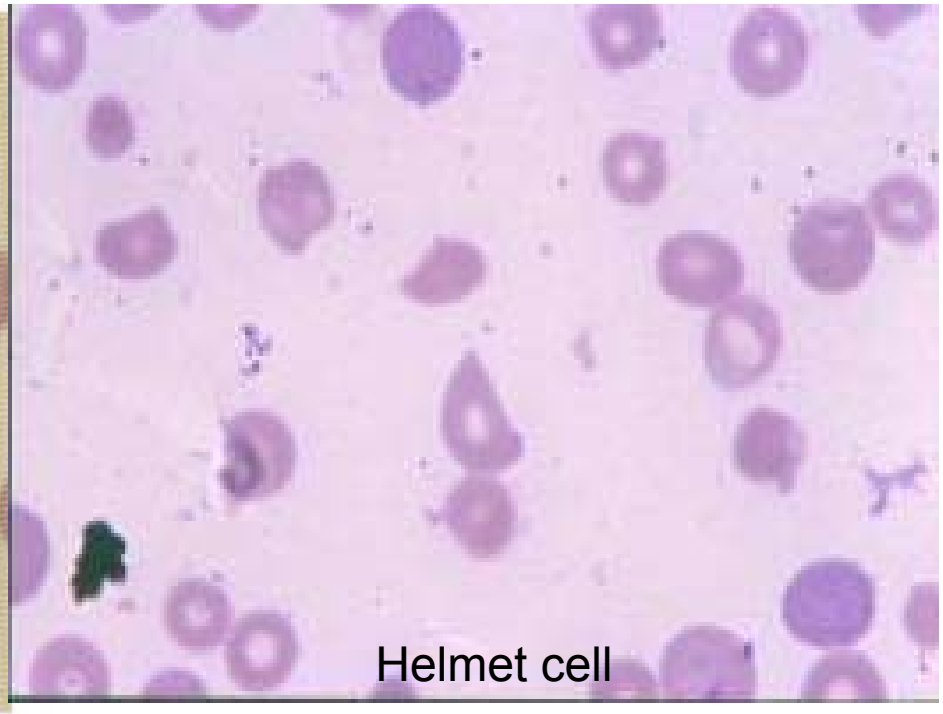
Obstructive liver disease

Iron deficiency anemia

Sickle cells

Hemoglobinopathies (SS, SC, SD, S-β thalassemia)





Microangiopathic hemolytic anemia

Traumatic hemolytic anemia

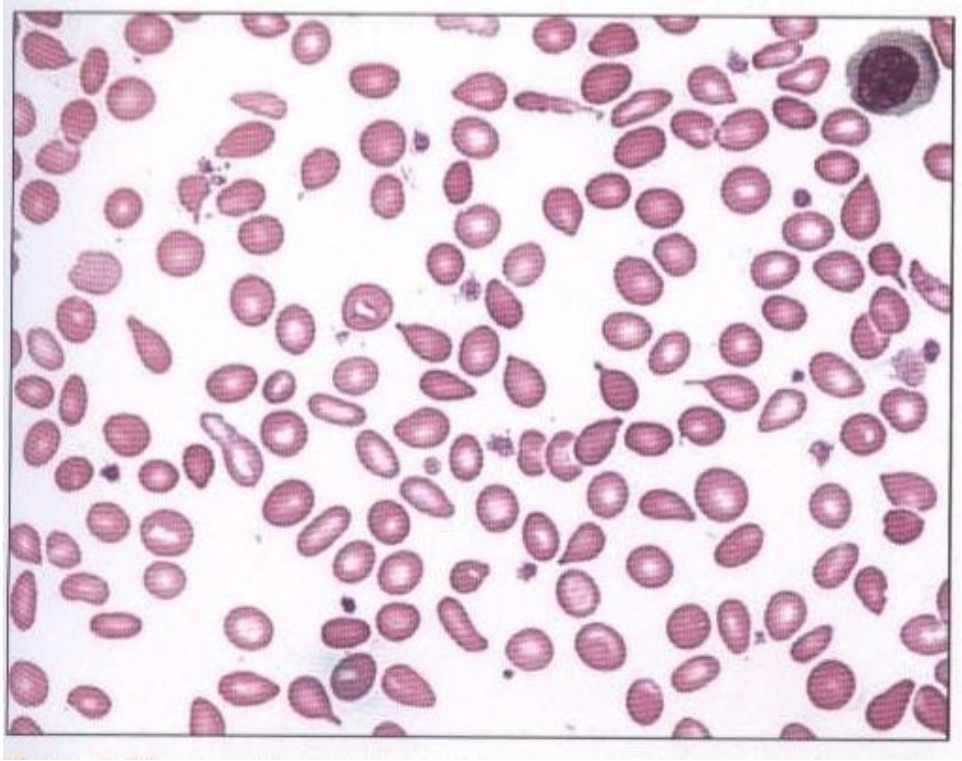
Fragmentation

With thrombocytopenia

- Disseminated intravascular coagulopathy (DIC)
- Thrombotic thrombocytopenic purpura (TTP)
- Hemolytic uremic syndrome (HUS)
- HELLP syndrome
- Preeclampsia/eclampsia
- Malignant hypertension
- Systemic lupus erythematosus (SLE)
- Vasculitis
- Scleroderma crisis
- Antiphospholipid antibody crisis
- Drugs (cyclosporine, tacrolimus, mitomycin C, gemcitabine)
- Sepsis
- Disseminated carcinoma (mucin secreting)
- Extracorporeal circulation devices
- Vascular malformations

Without thrombocytopenia

- Damaged native and prosthetic heart valves
- Malignant hypertension
- Acute glomerulonephritis
- Rejection of transplanted kidney
- Renal cortical necrosis
- Drugs (cyclosporine, tacrolimus)
- Vasculitis
- Systemic lupus erythematosus (SLE)



Teardrop cells

- Myelofibrosis
- Bone marrow infiltration
- Megaloblastic anemia
- Hemolytic anemia
- Thalassemia major

Spherocytes

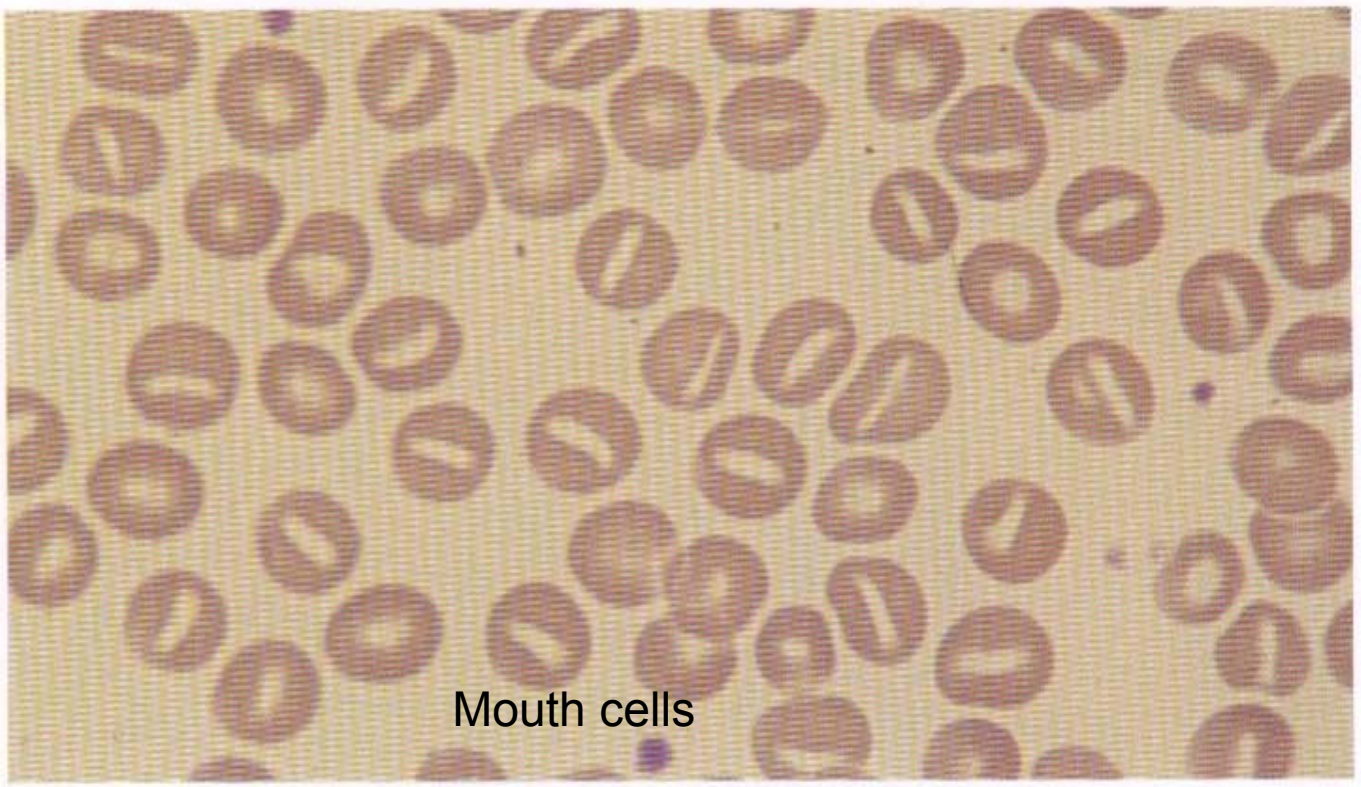
Hereditary spherocytosis

Immunohemolytic anemia

Heinz body hemolytic anemia

Severe burns

Hypersplenism



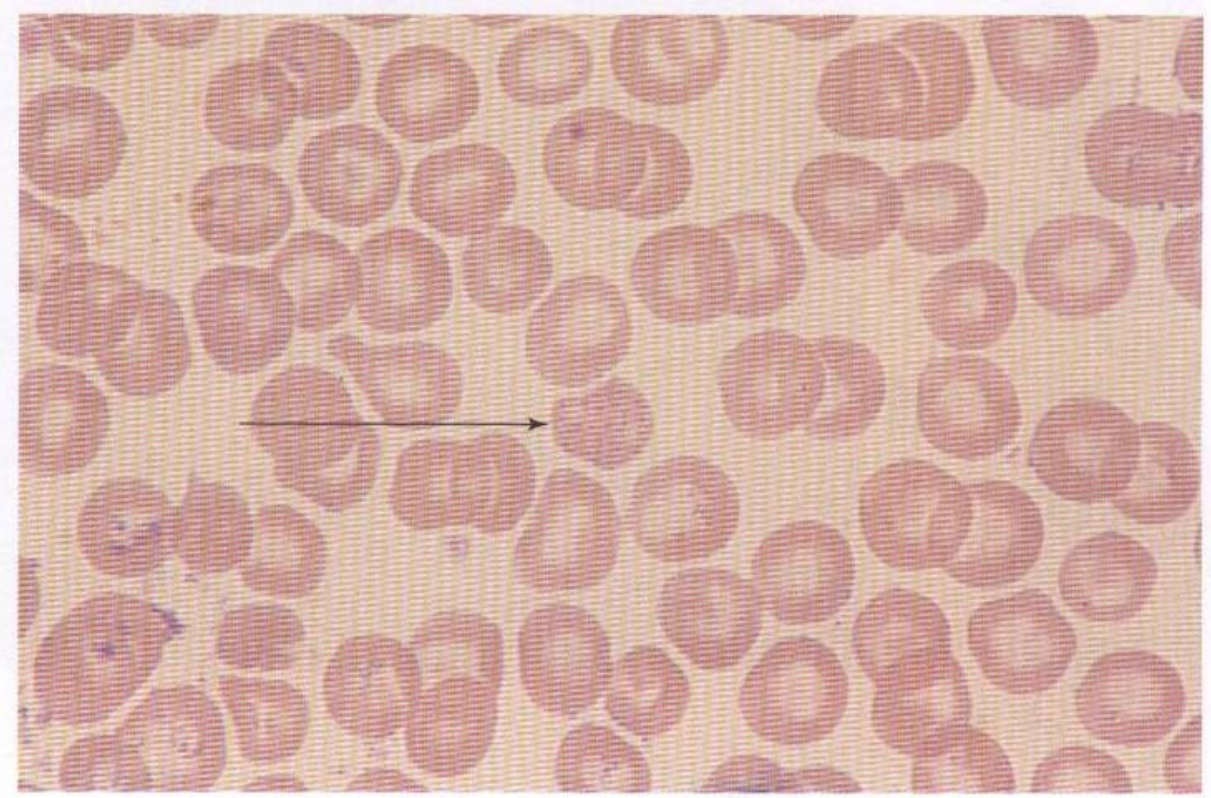
Mouth cells

Hereditary stomatocytosis

Alcoholism

Obstructive liver disease

Cirrhosis



Basophilic Stippling (Punctuate Basophilia)

Altered hemoglobin biosynthesis

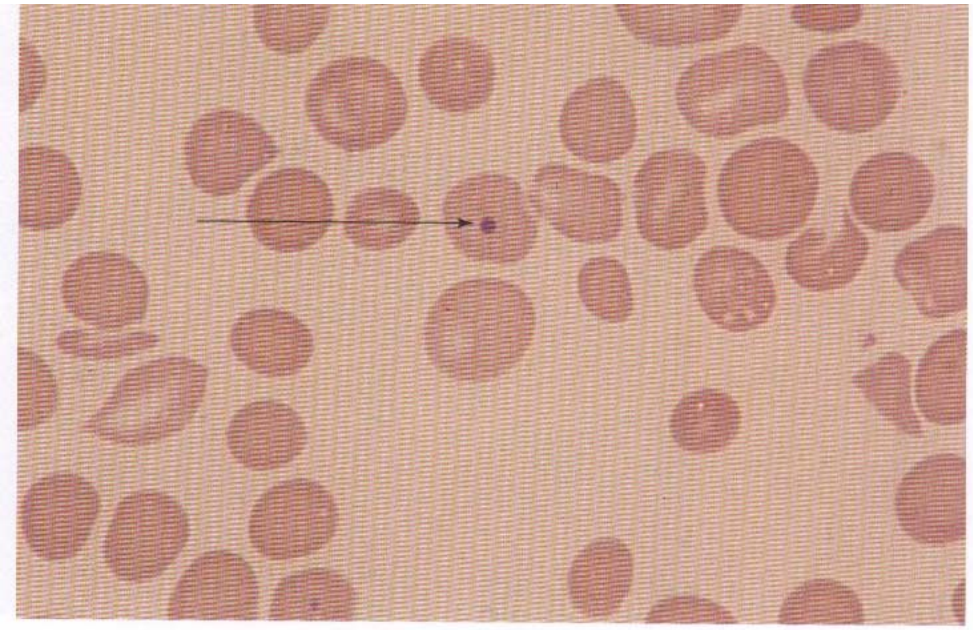
Lead intoxication

Thalassemia

Megaloblastic anemia

Alcoholism

Sideroblastic anemia



Howell-Jolly Body

Megaloblatic anemia

Hemolytic anemia

Hyposplenism

Splenectomized persons

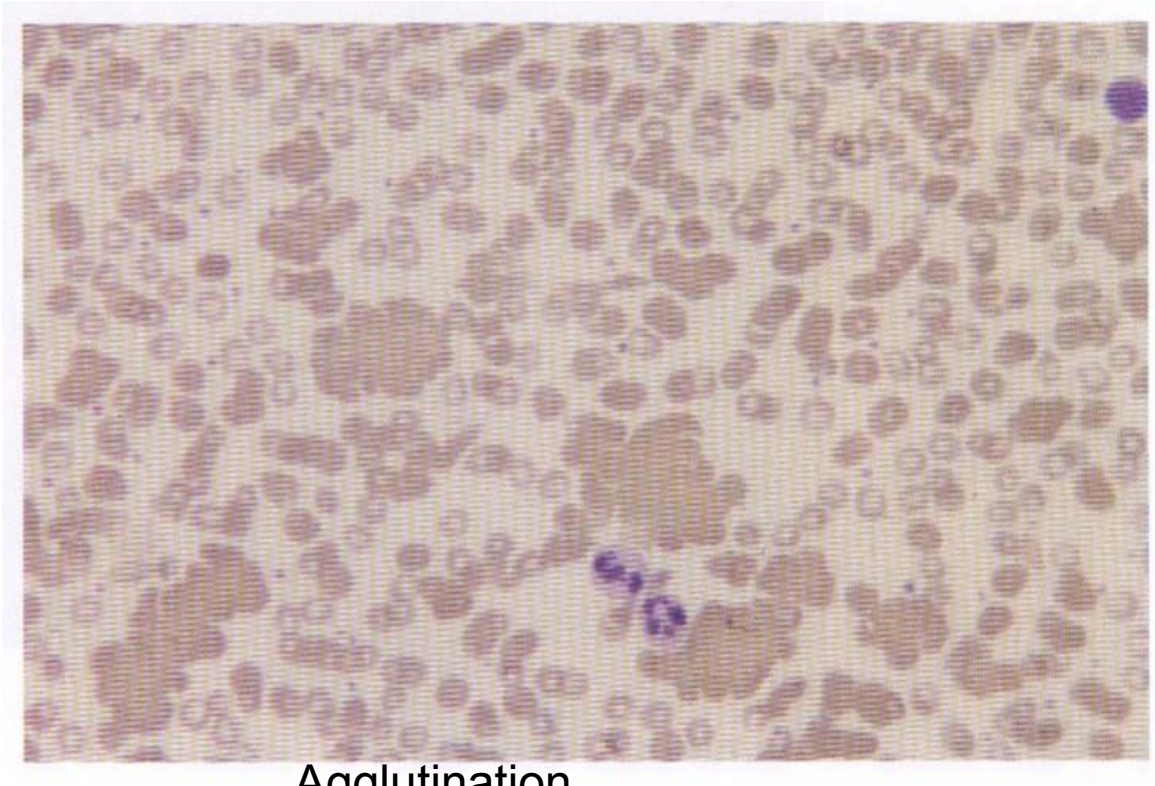
Alcoholism

Sickle cell anemia

Table 1.4

Red blood cell inclusions

Name of Inclusion	Content
• Howell-Jolly body	DNA
• Basophilic stippling	RNA
• Pappenheimer body	Iron
• HbH body (supravital only)	β-Globin tetramers (β^4)
• Heinz body (supravital only)	Denatured hemoglobin
• Fessus body (supravital only)	α-Globin tetramers (α^4)
• Crystals	Hemoglobin-C
• Cabot rings	Mitotic spindle remnants
• Nucleus	DNA



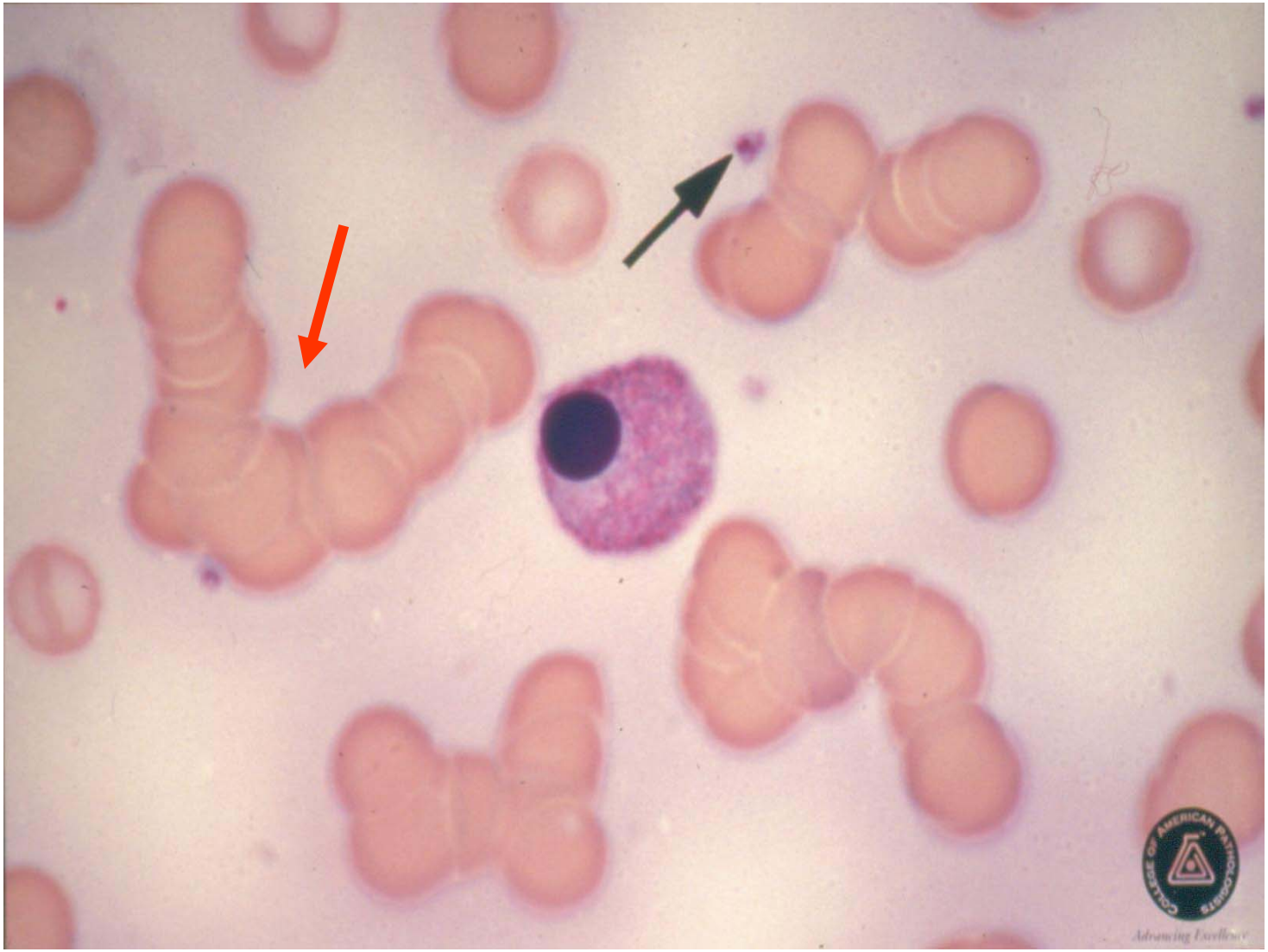
Agglutination

Cold agglutinin disease

Cold autoimmune hemolytic anemia

Atypical pneumonia

Staphylococcal infection

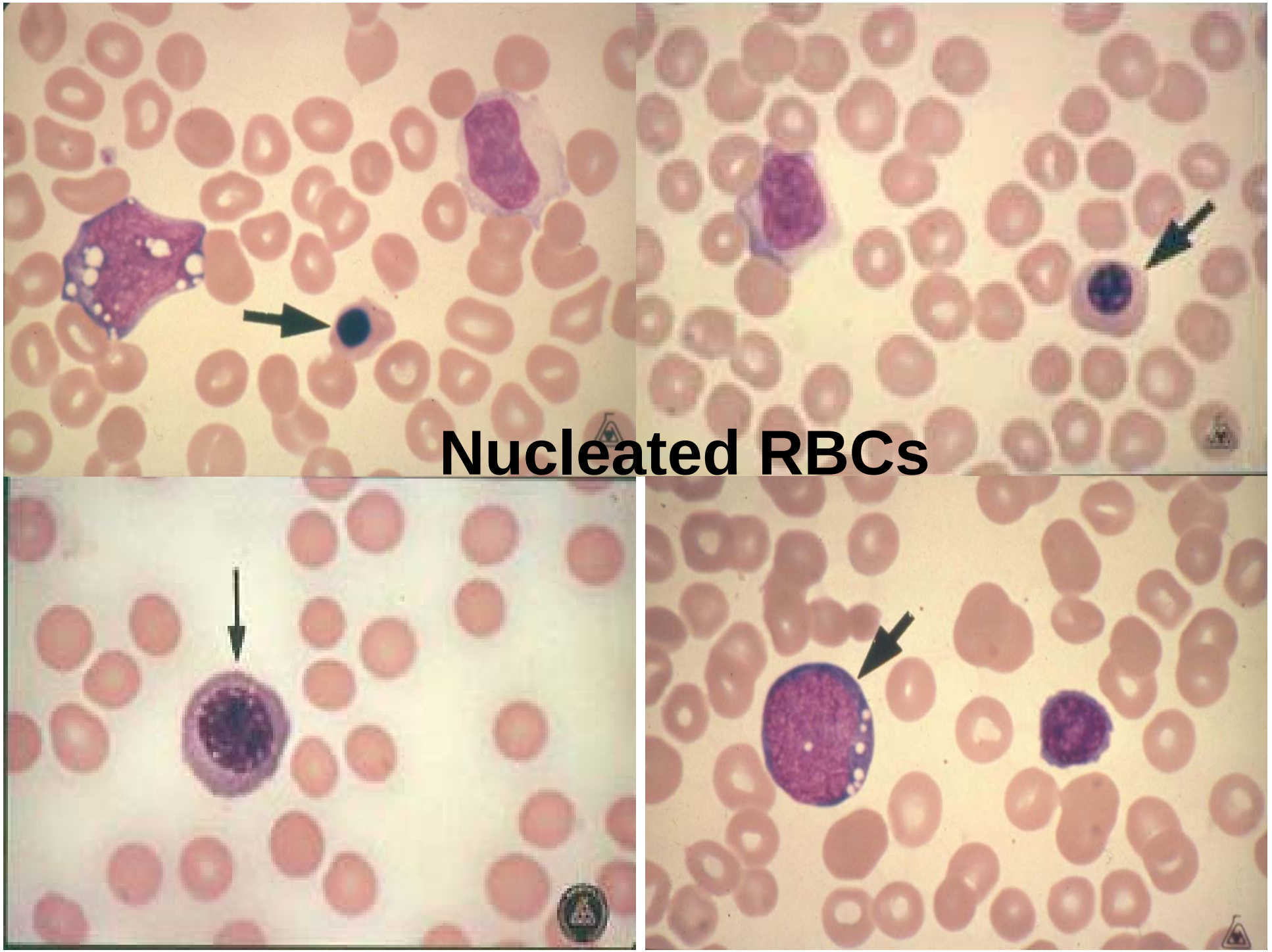


Rouleaux

Rouleaux

- Increased plasma proteins (polyclonal or other proteins)
  - Inflammatory state
  - Infection
- Increased plasma proteins (monoclonal)
  - MGUS (monoclonal gammopathy of unknown significance)
  - Myeloma
  - Amyloidosis
  - Lymphoma

Nucleated RBCs



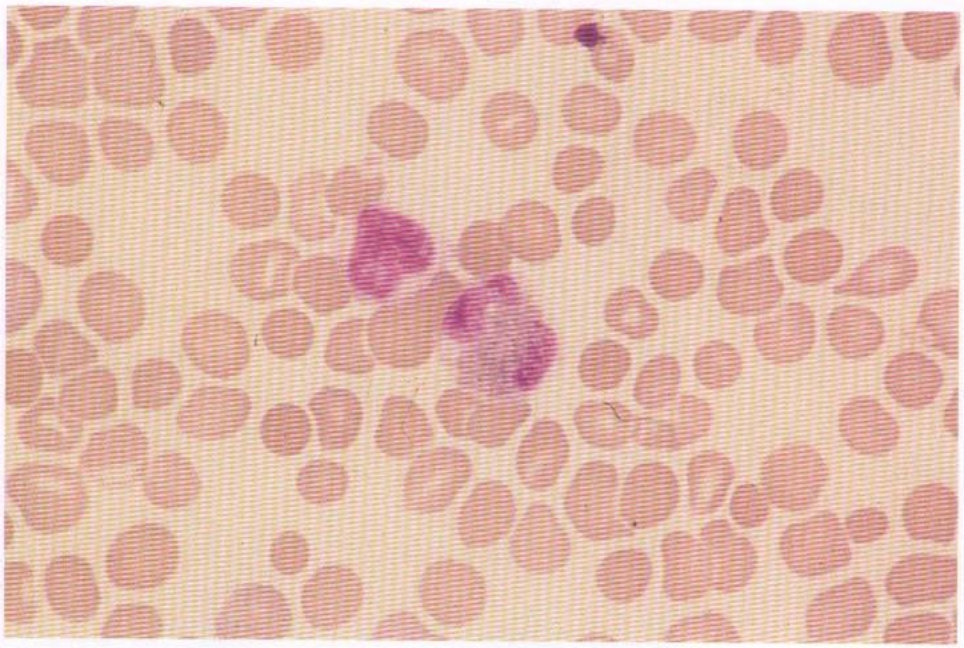
Leukoerythroblastic picture

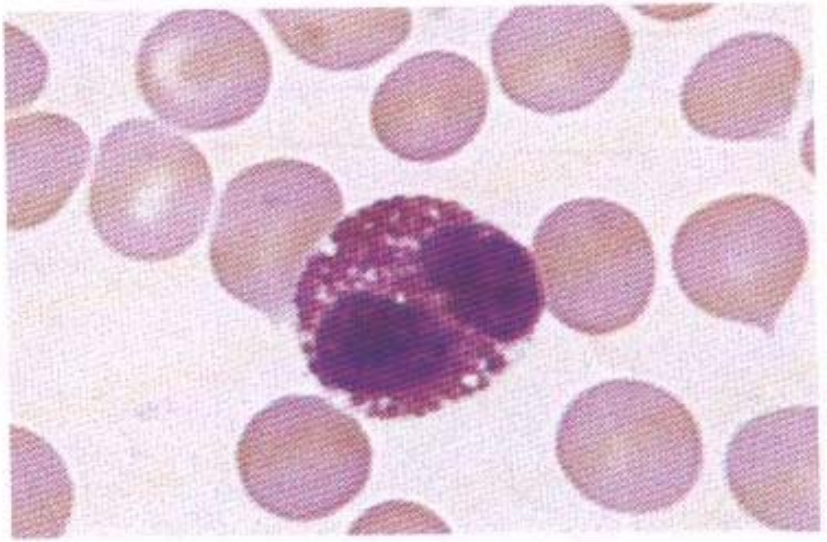
Increased Demand

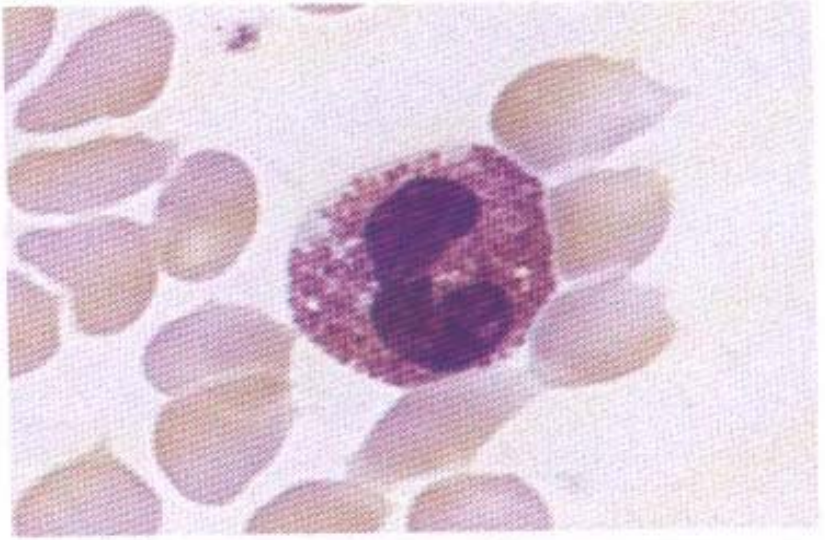
- Hemorrhage
- Hemolysis
- Severe infection
- Recovery from bone marrow failure or suppression
- Sickle cell crisis
- Thalassemia major
- Systemic lupus erythematosus

Bone Marrow Infiltration

- Myelofibrosis
- Other causes of bone marrow fibrosis
- Hematologic malignancies
  - CML, AML, ALL, Hodgkin disease, non-Hodgkin lymphoma, myeloma
- Nonhematologic malignancies
  - Metastatic to bone marrow
- Granuloma
- Bone marrow infarction
- Storage disease
- Severe megaloblastic anemia
- Severe rickets







Eosinophils

Protozoan infection

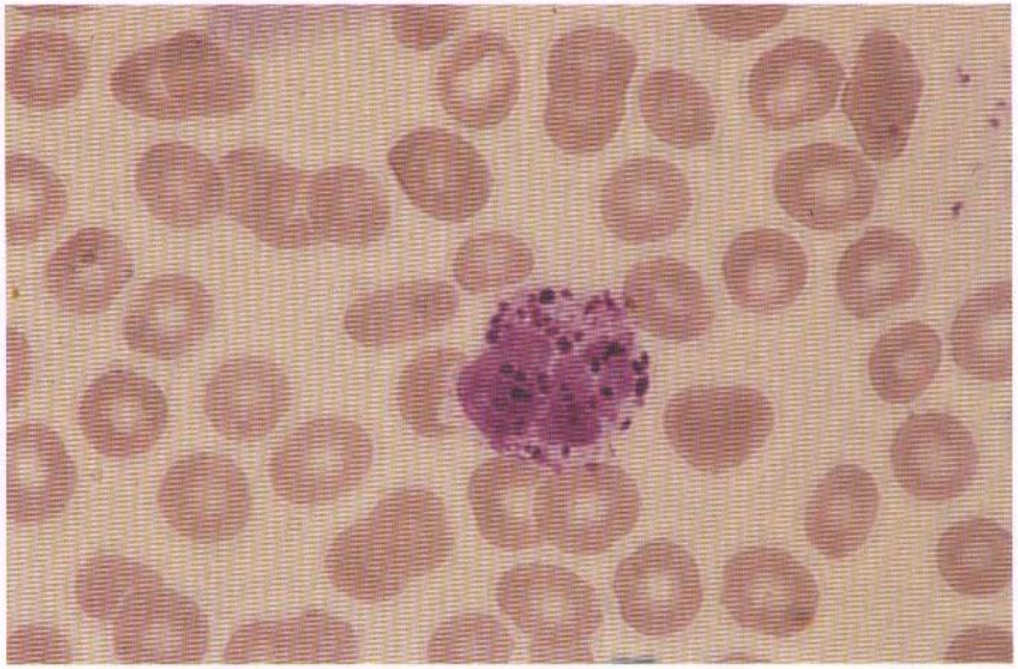
Hypereosinophilic syndrome

Allergic disorders

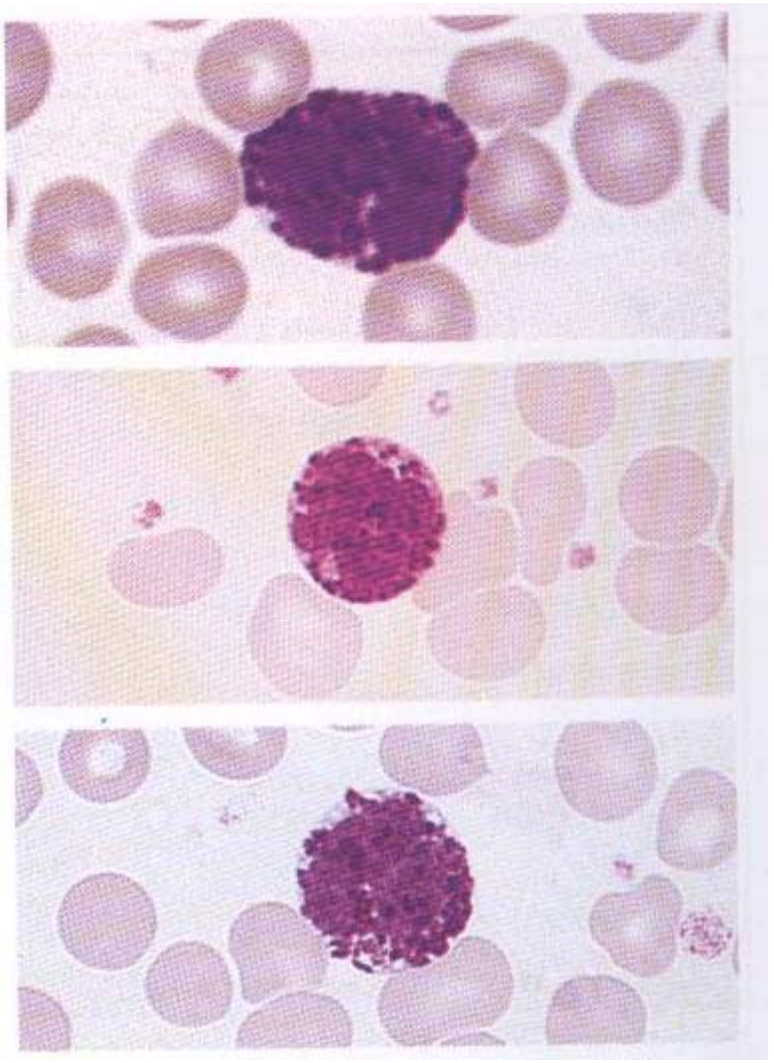
Chronic myelocytic leukemia

Dermatitis

Hodgkin lymphoma



Basophils

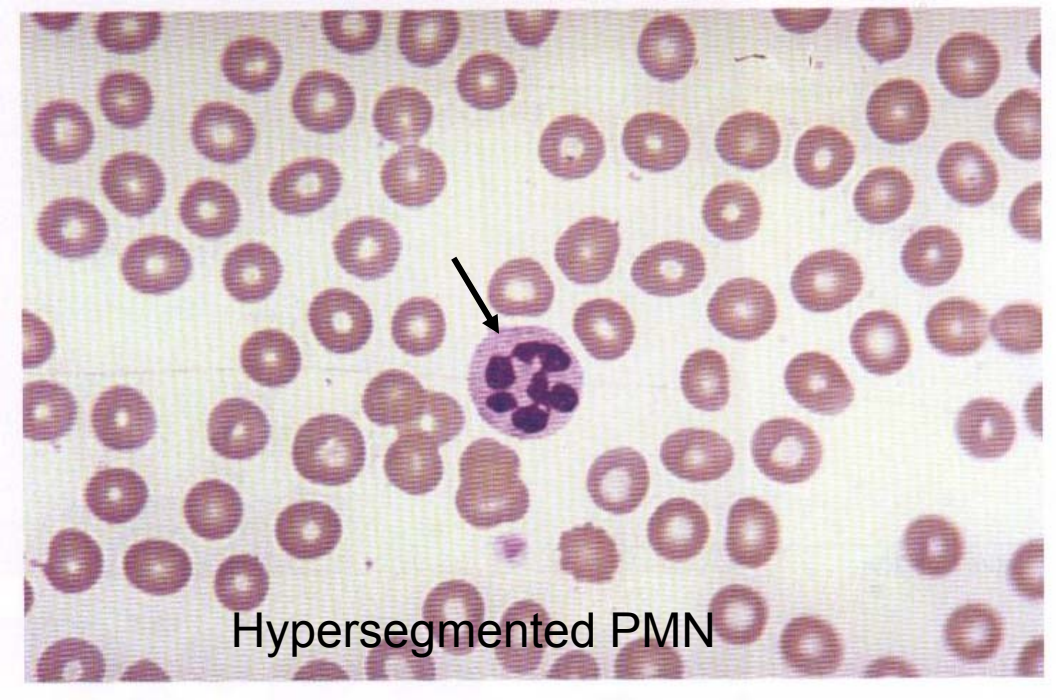


Acute basophilic leukemia

Myeloproliferative diseases

Allergy and inflammation

Infection-chicken pox



Chronic infection

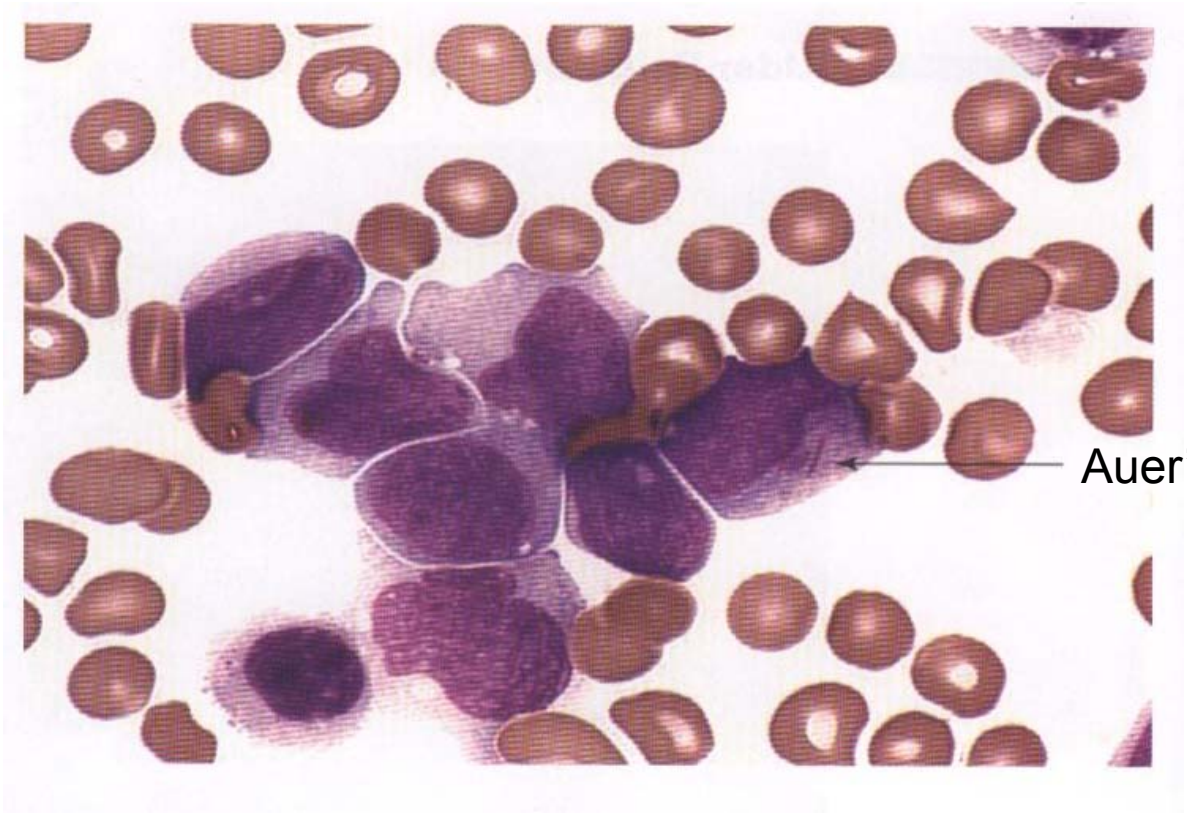
B12 deficiency

Folic acid deficiency

Myelodysplastic syndrome

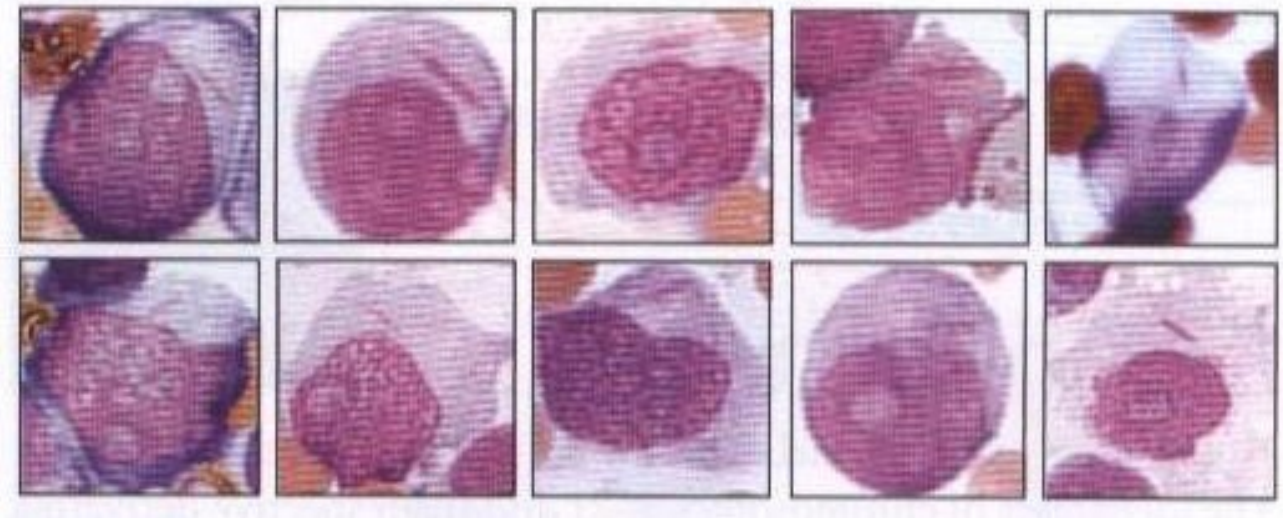
Hereditary hypersegmentation

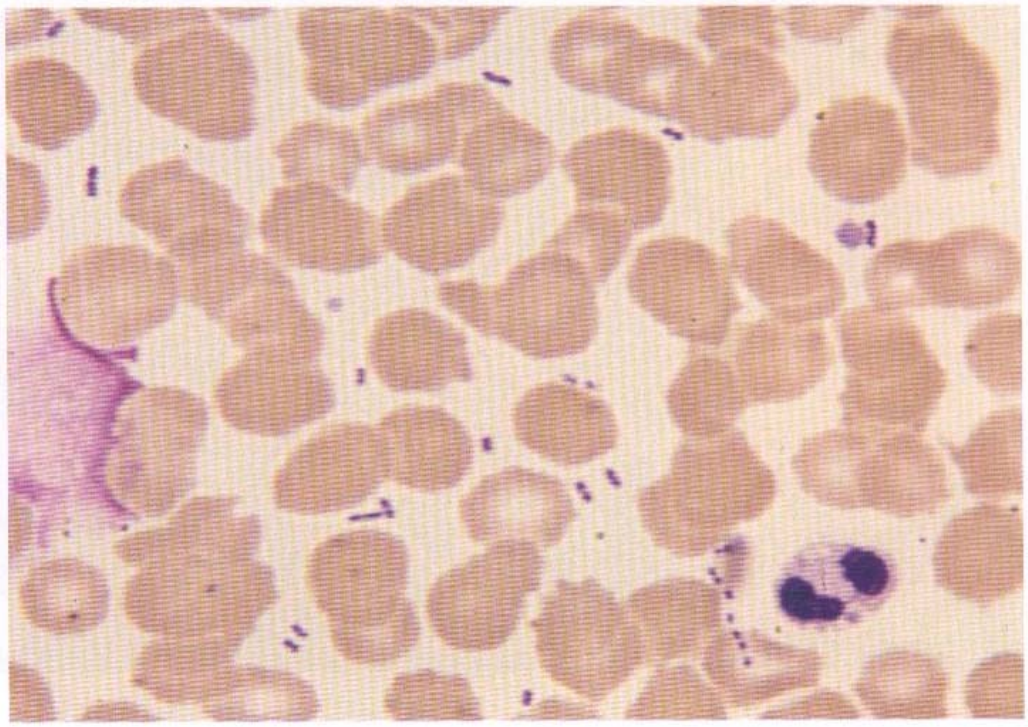
Long-term infection



Acute myelocytic leukemia

CML in blastic transformation





Microbial infection

Toxic granules

Infection

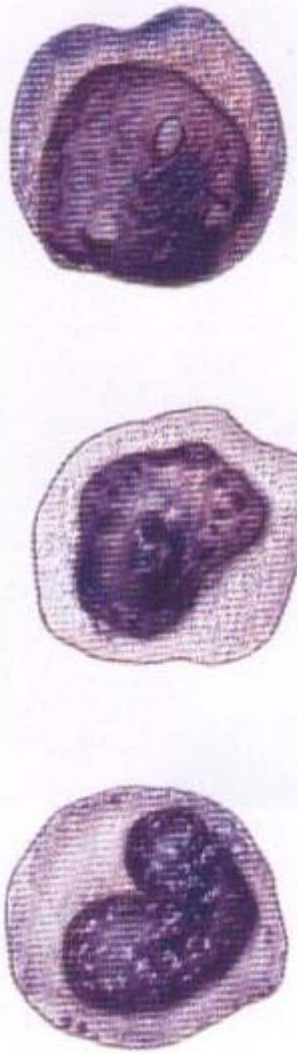
Burns

Drug intoxication

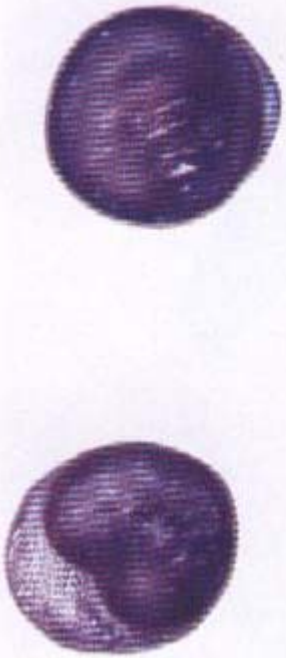
Inflammation

Growth factor therapy

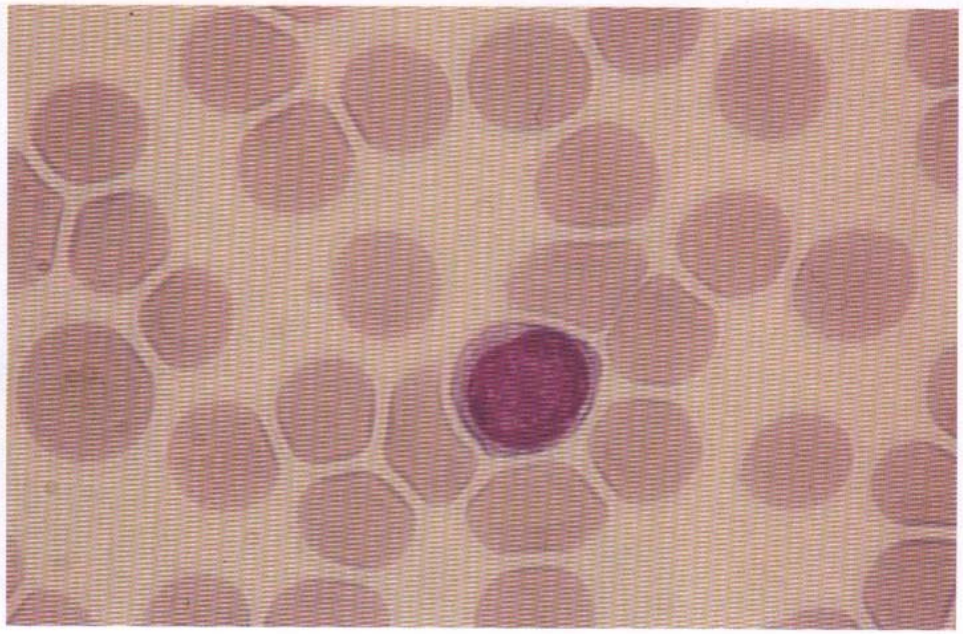
Monocyte Maturation Series

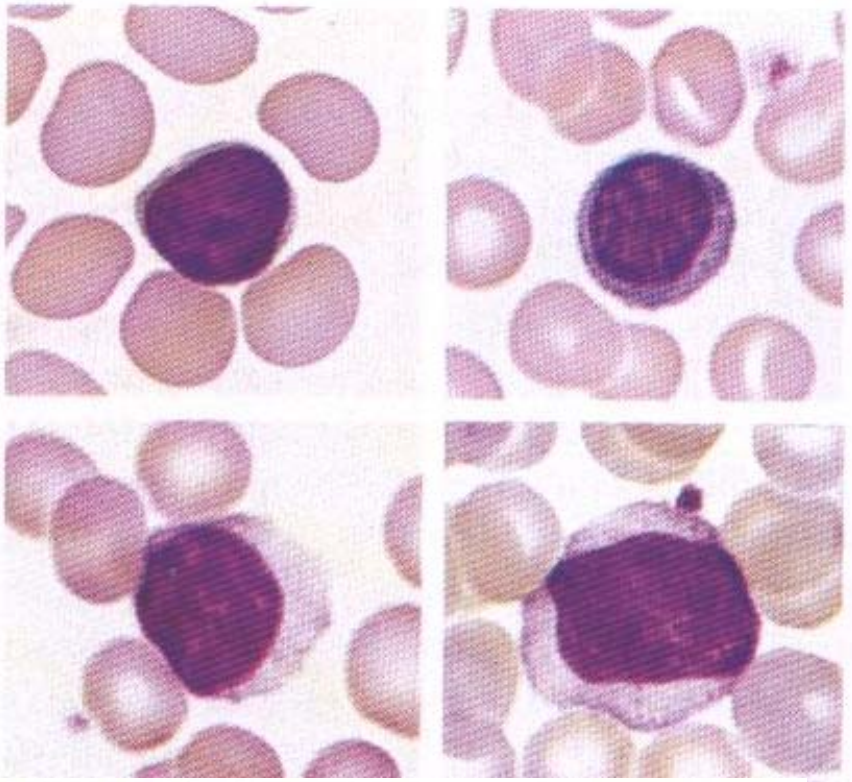


Lymphocyte Maturation Series



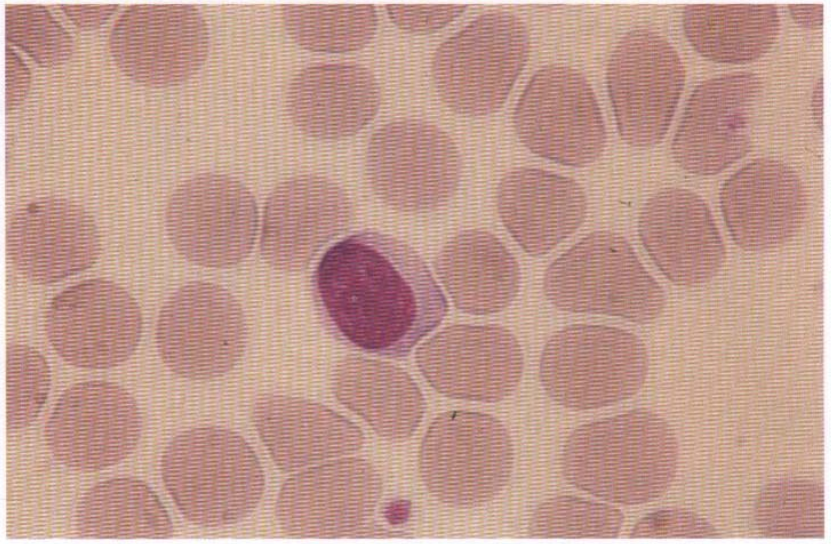
Mature Lymphocyte

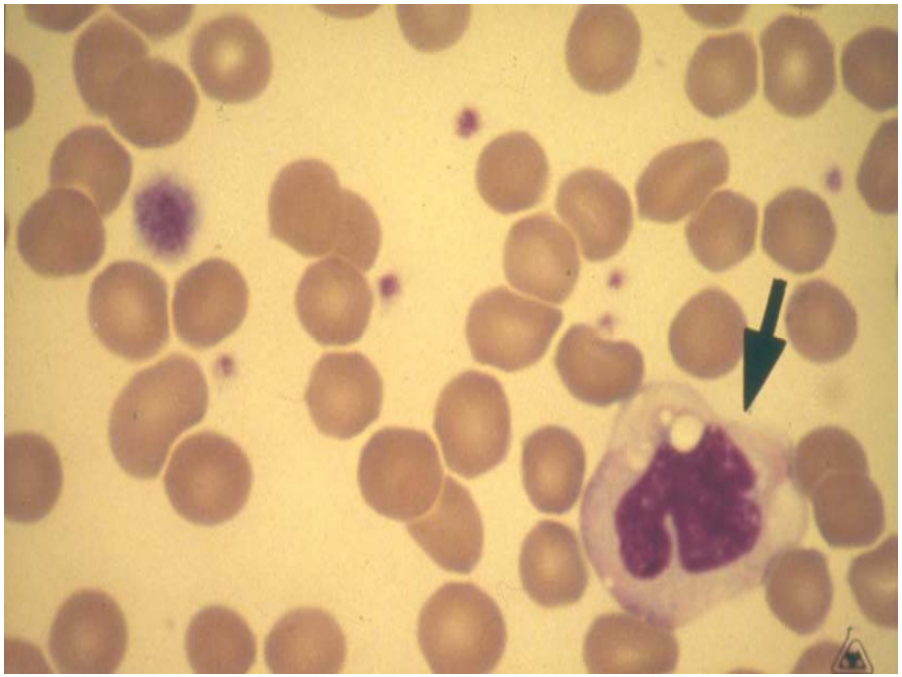


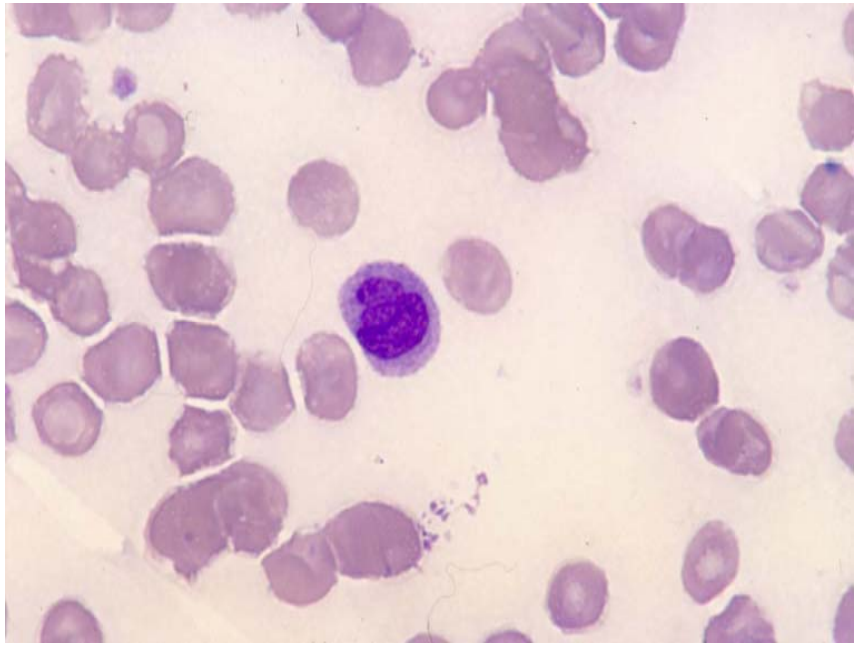


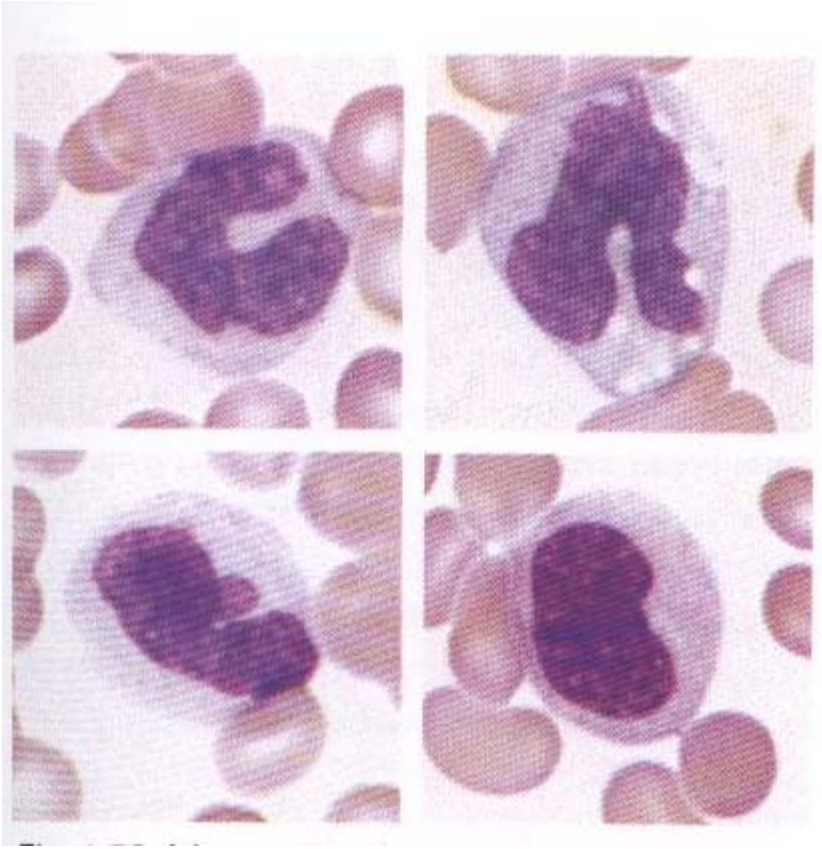
Large Granular Lymphocyte

Large Lymphocyte





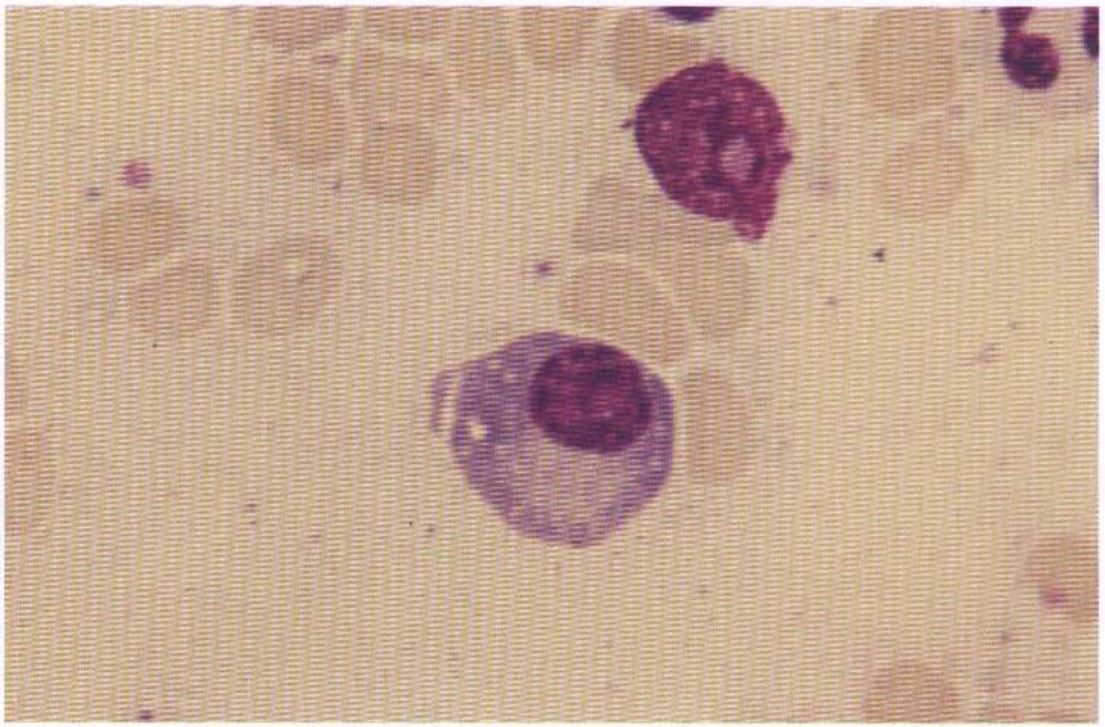




Monocytes

Plasma Cell Series

Plasma Cell

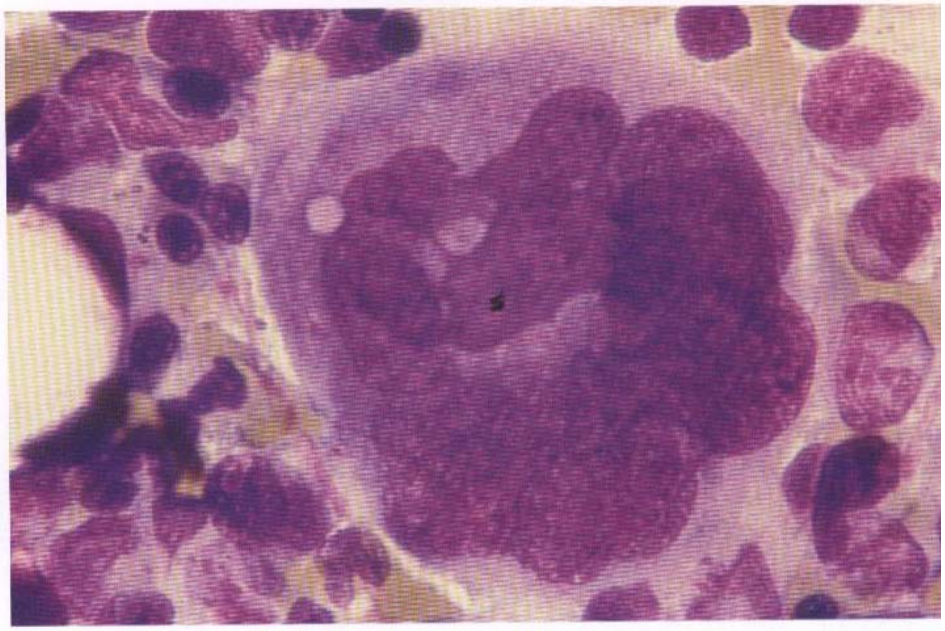


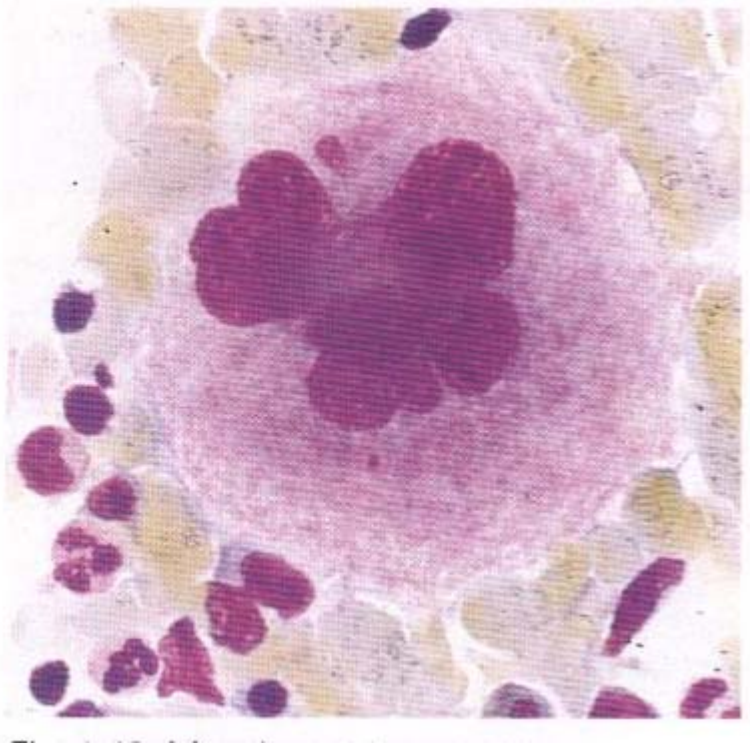
Plasma cell disorders

Response to infection

Normal Megakaryocytic Series

Megakaryocyte





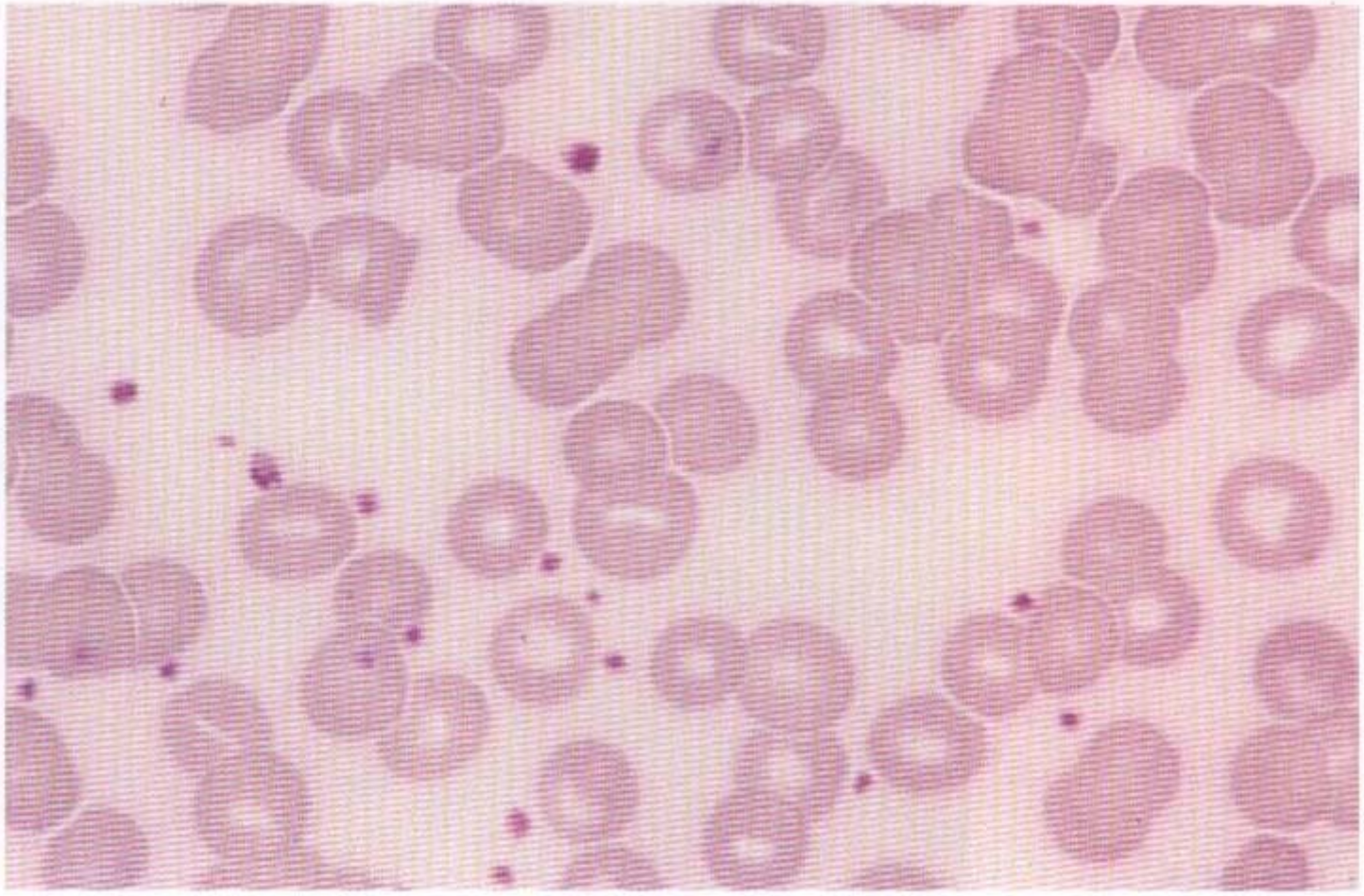
Acute megakaryoblastic leukemia (M7)

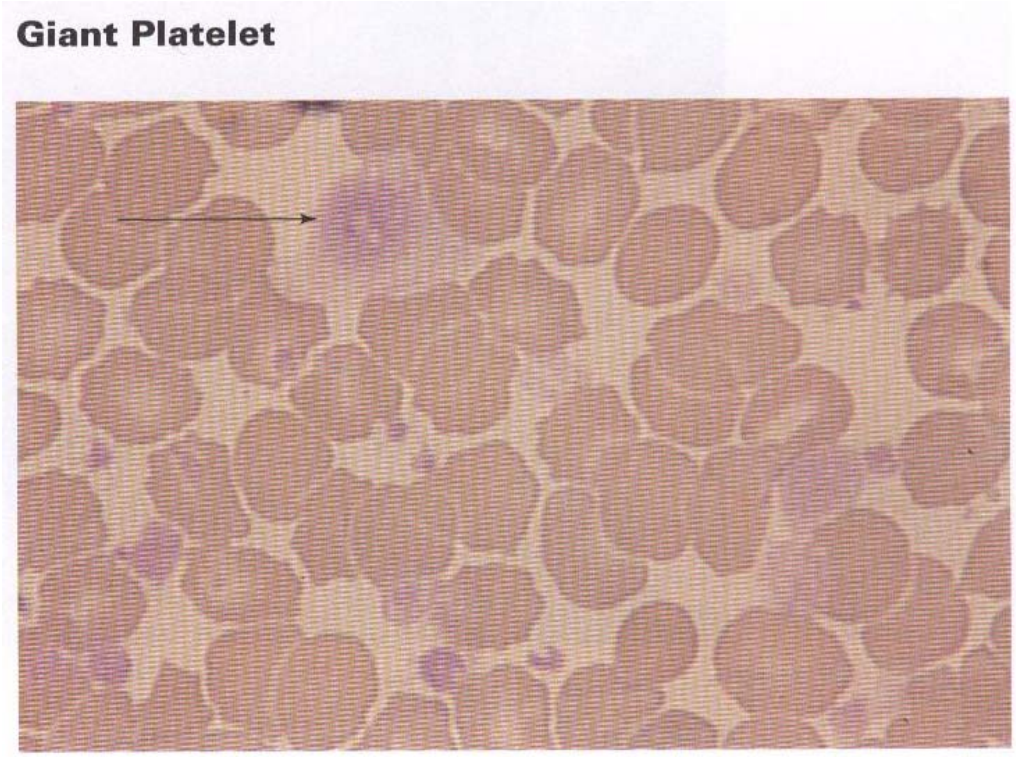
Myeloproliferative diseases

Myelodysplastic syndrome

骨髓中最大顆的多核細胞　　周邊血最小顆的無核細胞

Platelets





May-Hegglin syndrome

Myelofibrosis

Thrombasthenia

Myeloproliferative diseases

Splenectomy

Myelodysplastic syndrome