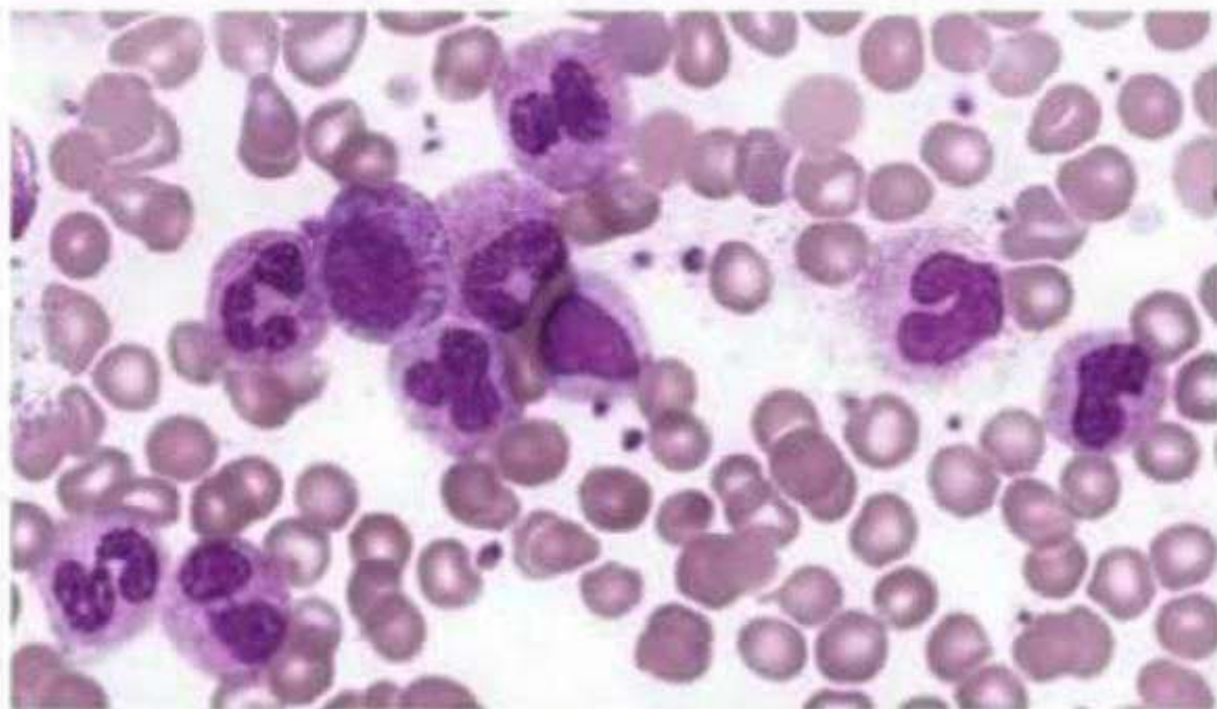


Leukemoid Reaction



Marked increase in neutrophils. $>50,000 \times 10^9$

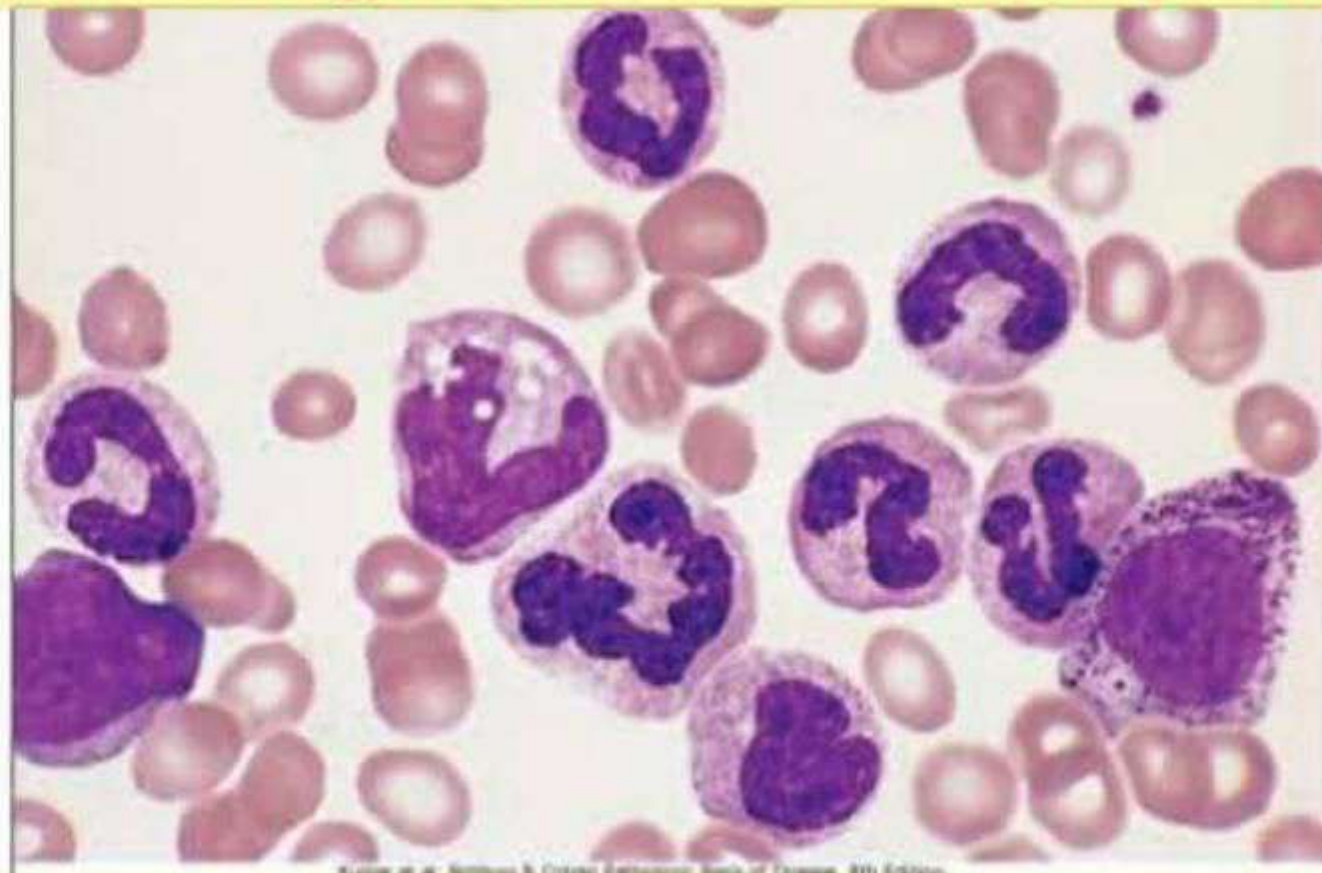
Shift to left → immature forms.

Severe infection, trauma, bone marrow infiltration

Looks like leukemia*

(no blasts)

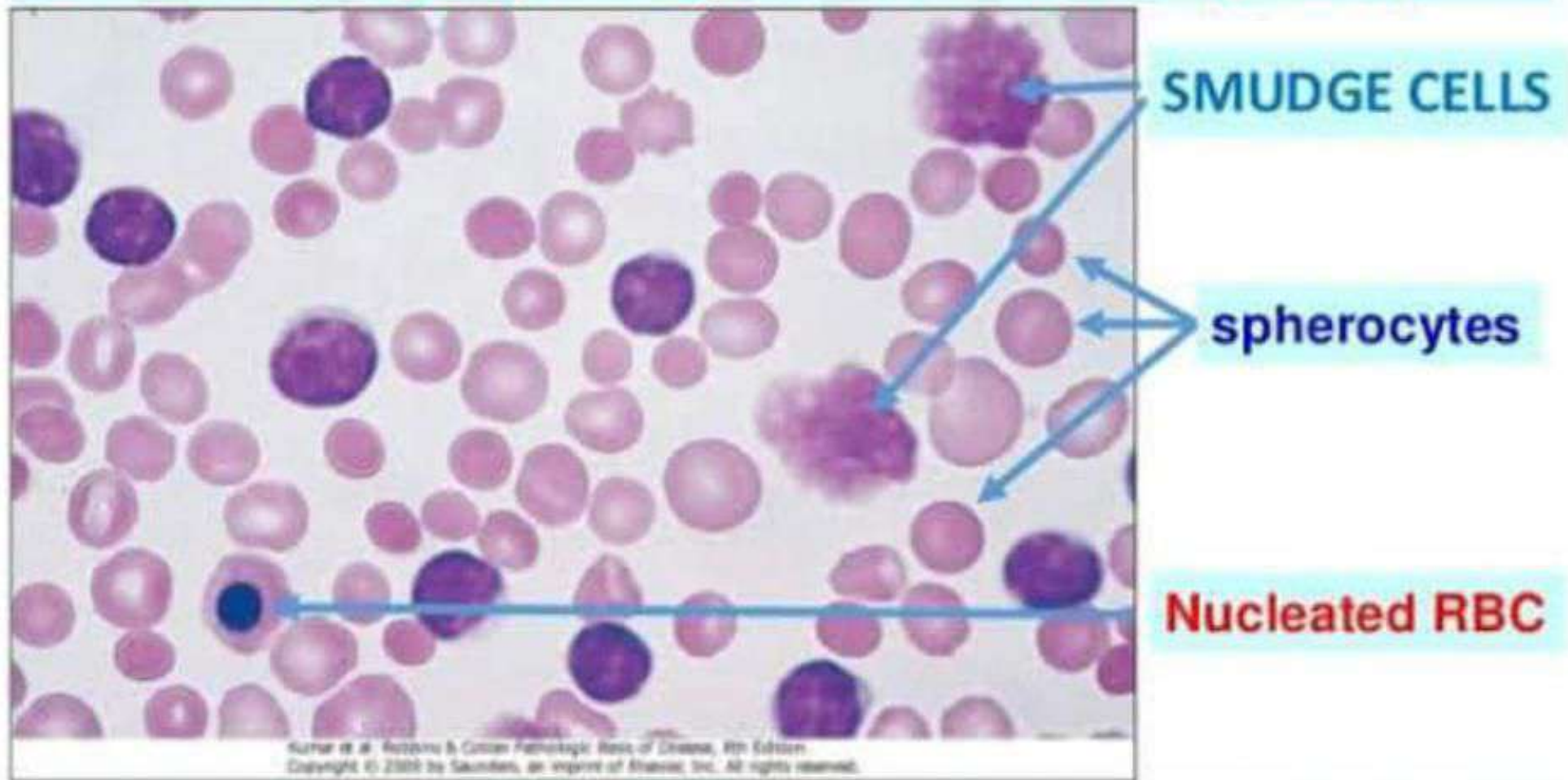
Chronic Myeloid leukemia (CML)



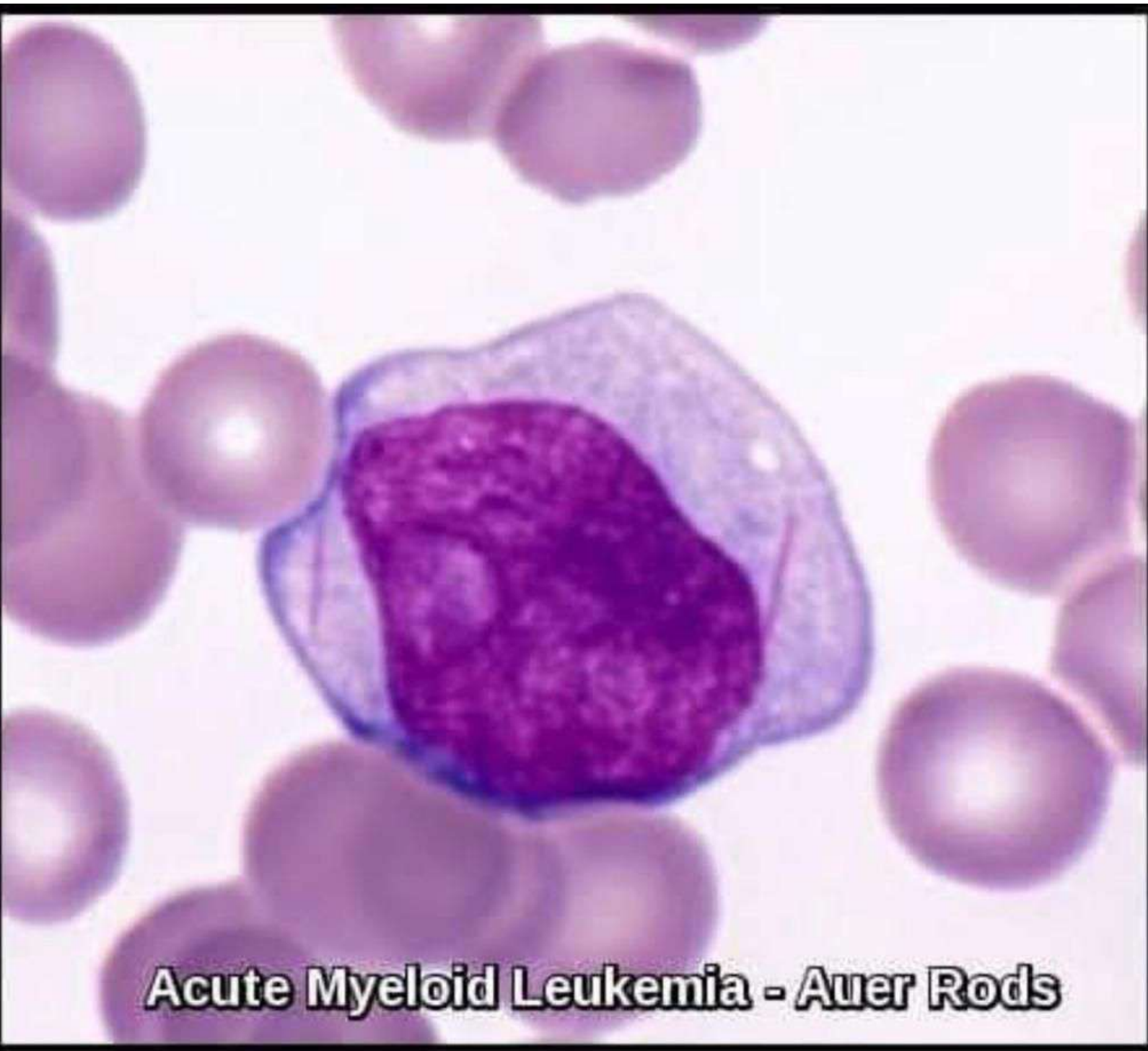
Source: W. H. Bennett & C. C. Cotran: Pathologic Basis of Disease, 8th Edition.

Peripheral blood smear shows marked leucocytosis with the presence of whole spectrum of myeloid cells including many mature neutrophils, some metamyelocytes, and a myelocyte and **basophilia**

Chronic Lymphocytic leukemia (CLL)

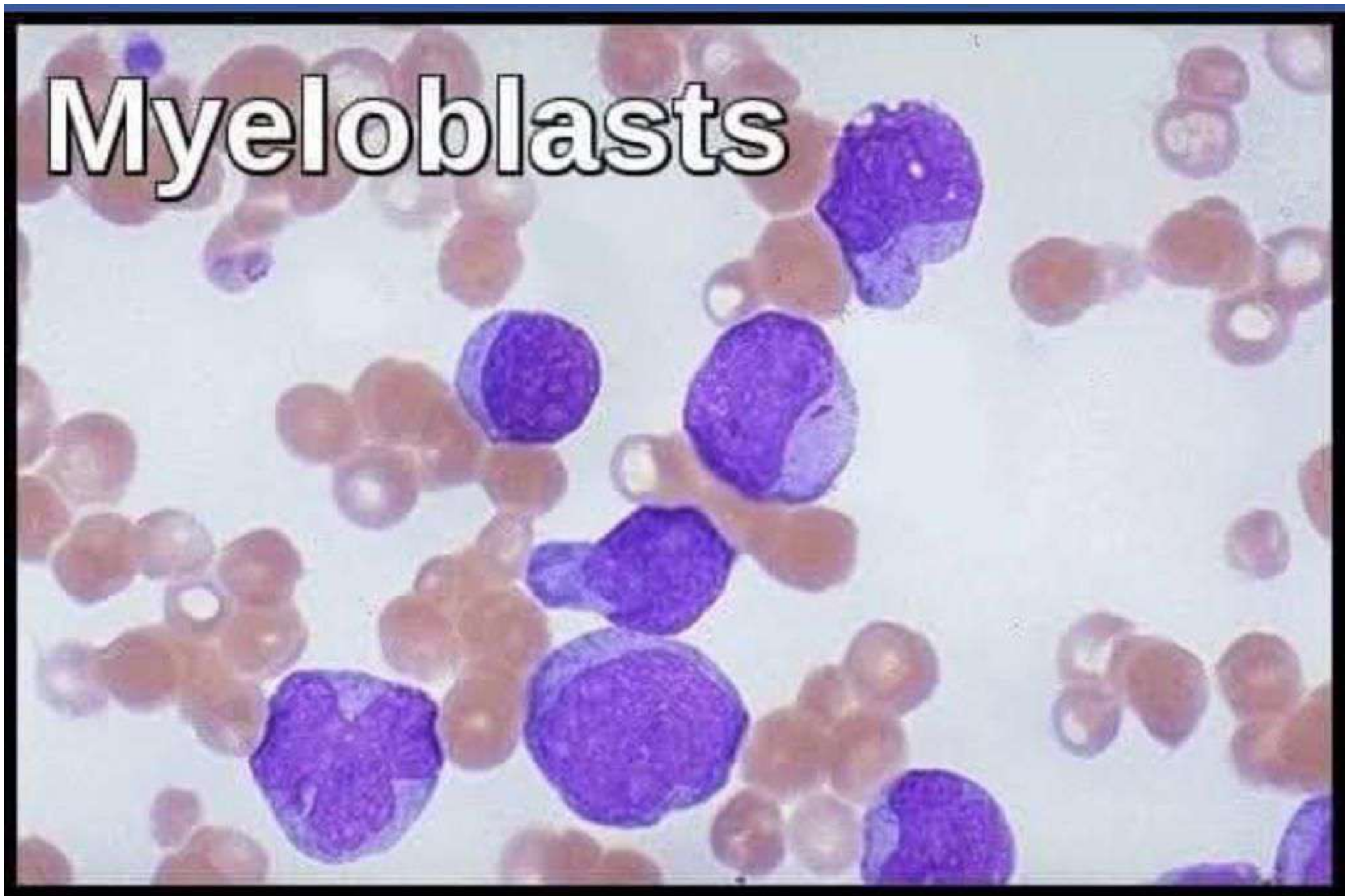


large numbers of small round lymphocytes with scant cytoplasm and **smudge cells** (disrupted cells) and spherocytes



Acute Myeloid Leukemia - Auer Rods

Myeloblasts

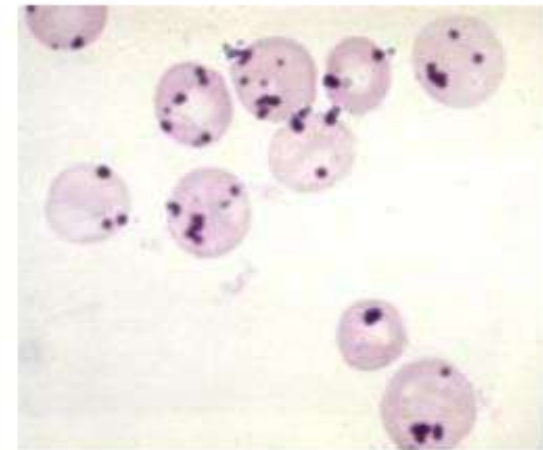


Blood films: pathological cell forms



Heinz bodies

G6PD deficiency
Alpha-thalassaemia

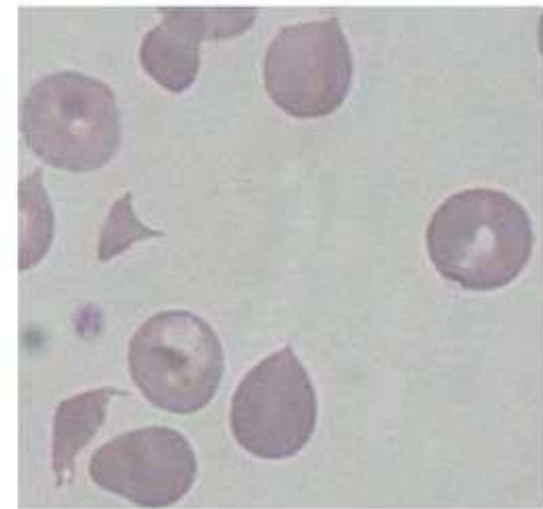


Blood films: pathological cell forms



Schistocytes ('helmet cells')

Intravascular haemolysis
Mechanical heart valve
Disseminated intravascular coagulation

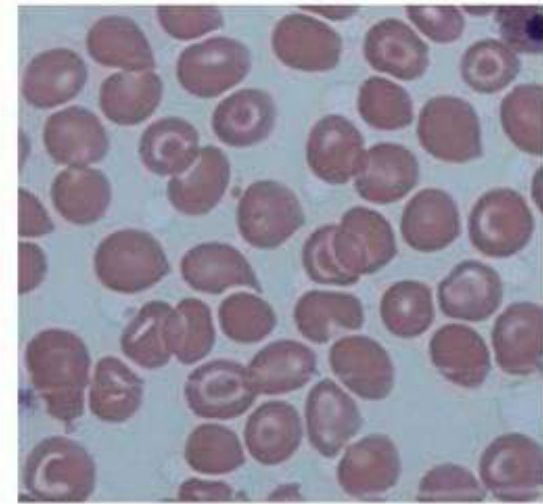


Blood films: pathological cell forms



Target cells

Sickle-cell/thalassaemia
Iron-deficiency anaemia
Hyposplenism
Liver disease

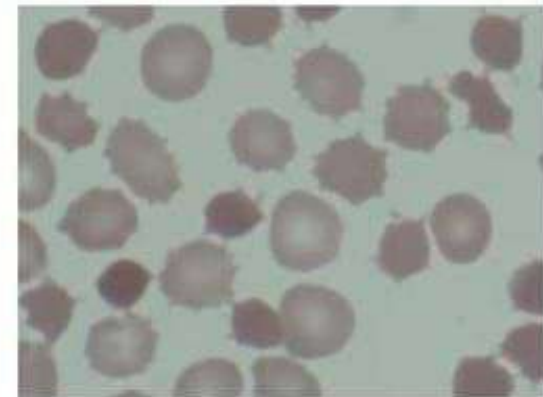


Blood films: pathological cell forms



Acanthocytes

Abetalipoproteinemia



Chronic lymphocytic leukaemia



Investigations

- blood film: smudge cells (also known as smear cells)
- immunophenotyping

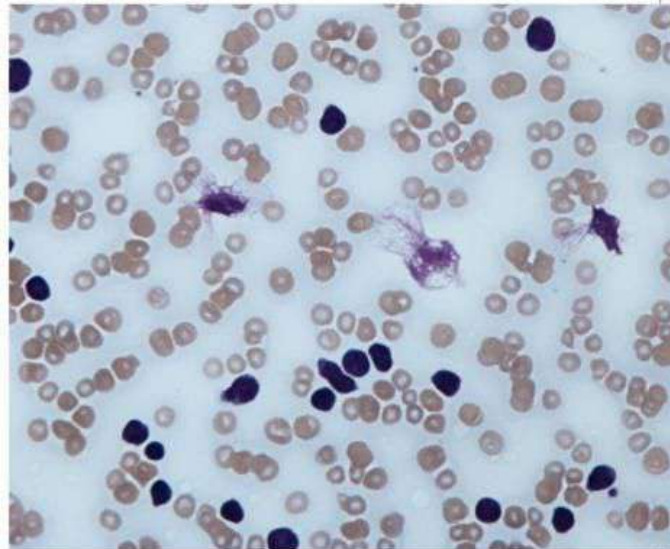


Image sourced from Wikipedia

Peripheral blood film showing smudge B cells



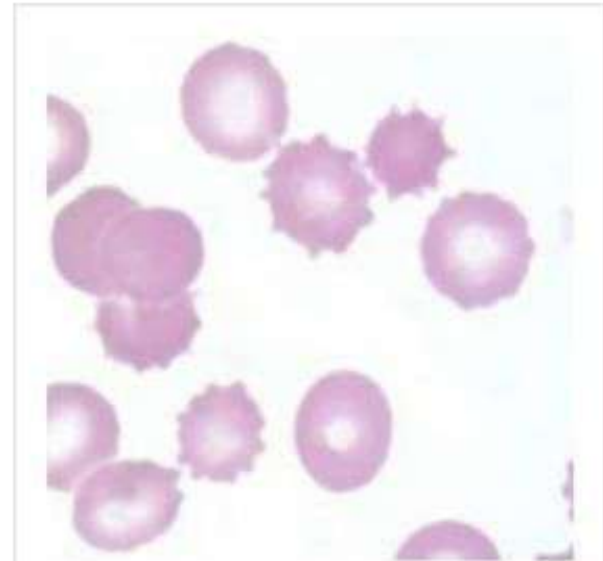
Improve these notes ✎

Blood films: pathological cell forms

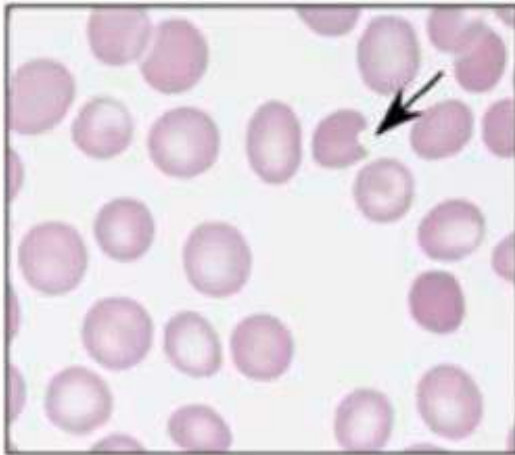


Burr cells
(echinocytes)

Uraemia
Pyruvate kinase deficiency

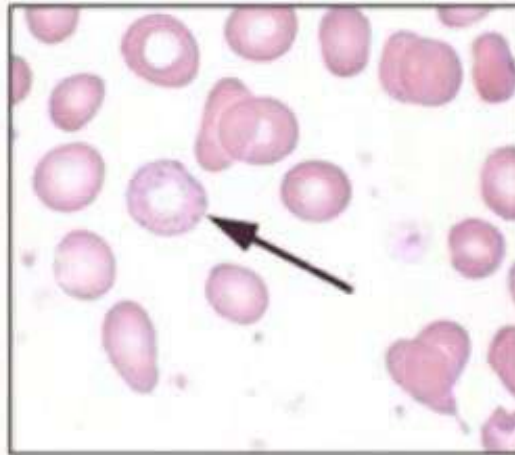


More Clues From The Blood Smear



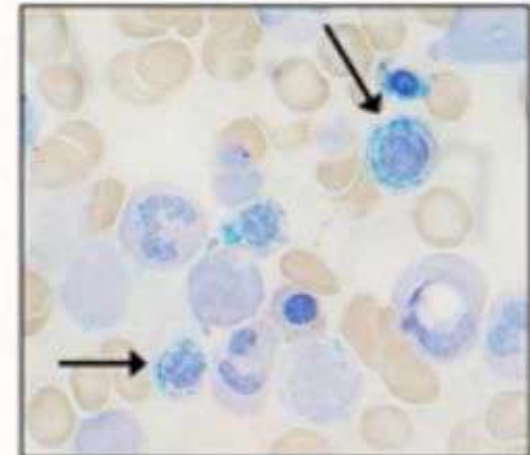
Bite cells

G6PD deficiency
Thalassemia



Basophilic stippling

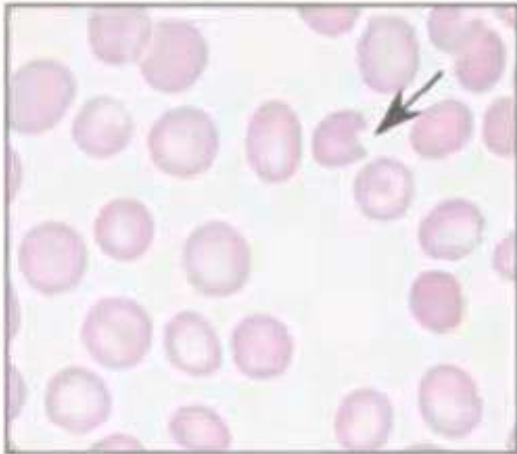
Thalassemia
Alcohol abuse
Heavy metal poisoning



Ring Sideroblasts

*(bone marrow aspirate,
not peripheral smear)*

More Clues From The Blood Smear



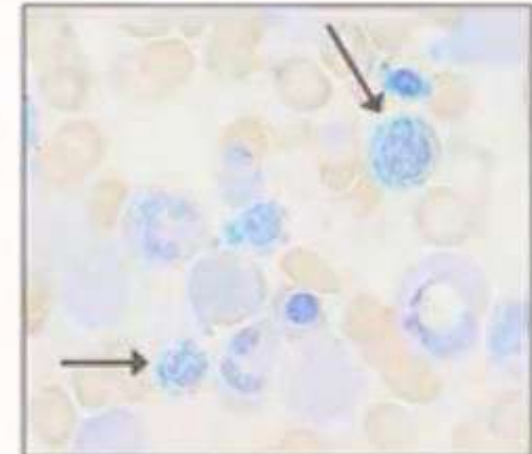
Bite cells

G6PD deficiency
Thalassemia



Basophilic stippling

Thalassemia
Alcohol abuse
Heavy metal poisoning

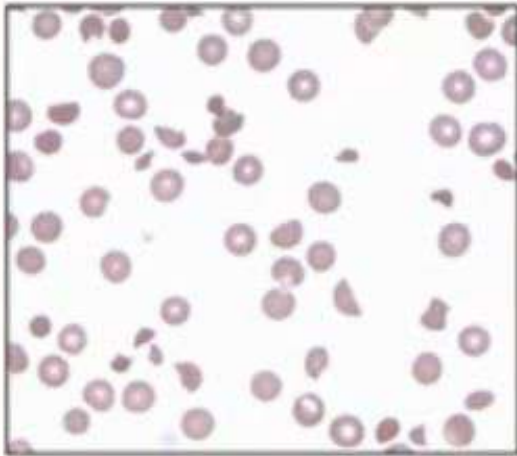


Ring Sideroblasts

*(bone marrow aspirate,
not peripheral smear)*

Various congenital disorders
Myelodysplastic syndrome
Isoniazid → vit B₆ deficiency
Alcohol abuse
Copper deficiency

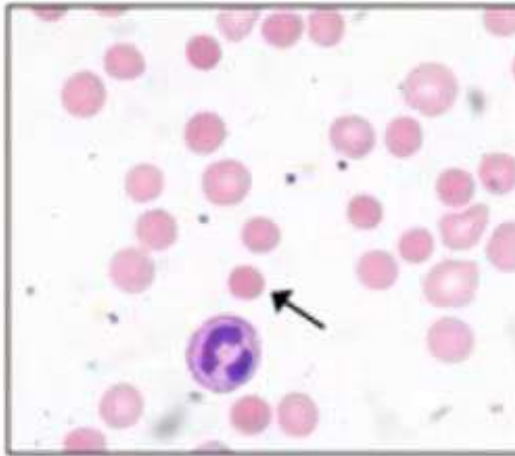
More Clues From The Blood Smear



Schistocytes

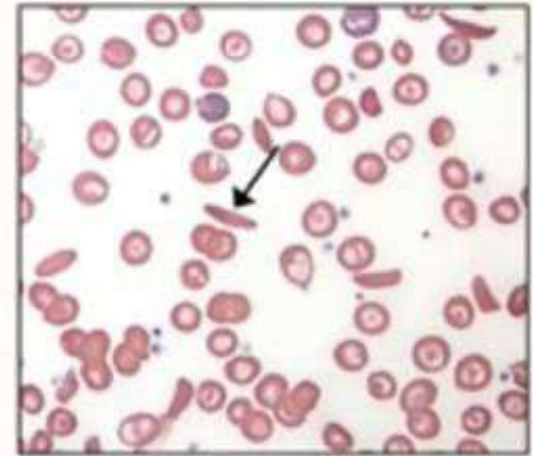
Microangiopathic
hemolytic anemia

(e.g. DIC, TTP, HUS)



Microspherocytes

Autoimmune
hemolytic anemia



Sickled red cells

Sickle cell disease

TABLE 14. Laboratory Characteristics of Inflammatory Anemia, Iron Deficiency Anemia (IDA), and IDA with Inflammation

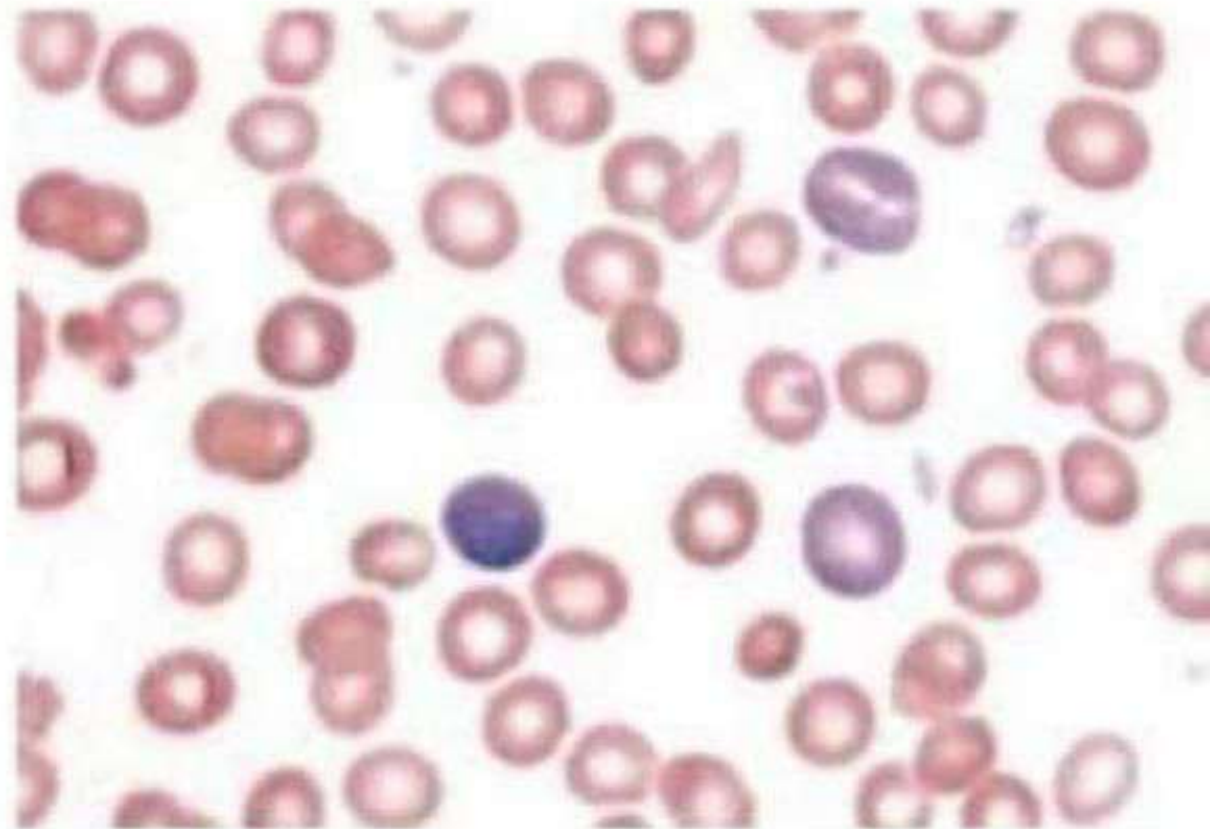
Finding	Type of Anemia		
	Inflammatory Anemia	Iron Deficiency Anemia	IDA with Inflammation
MCV	72-100 fL	<80 fL	<100 fL
Serum iron	<60 µg/dL (11 µmol/L)	<60 µg/dL (11 µmol/L)	<60 µg/dL (11 µmol/L)
TIBC	<250 µg/dL (45 µmol/L)	>400 µg/dL (72 µmol/L)	<400 µg/dL (72 µmol/L)
TIBC saturation	2%-20%	<15% (usually <10%)	<15%
Ferritin	>35 ng/mL (35 µg/L)	<15 ng/mL (15 µg/L)	<100 ng/mL (100 µg/L)
Serum soluble transferrin receptor concentration	Normal	Increased	Increased
Stainable iron in bone marrow	Present	Absent	Absent

MCV = mean corpuscular volume; TIBC = total iron-binding capacity.

Polychromatophilia

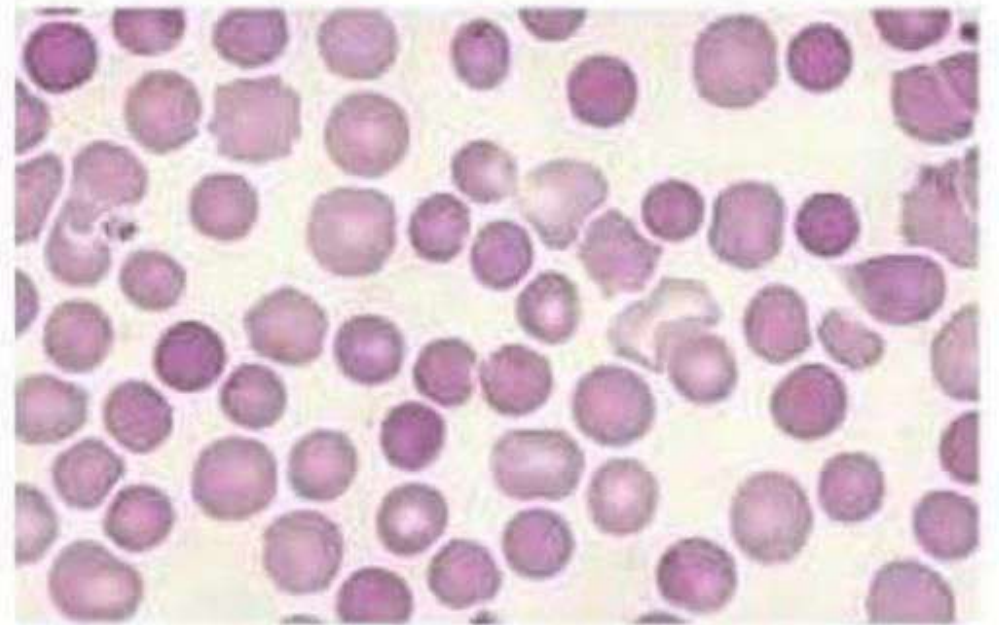
Blue grey tint of red cells
Due to Hb and
RNA(Residual) in young
cells.

- Larger than normal and may lack central pallor.
- Implies Reticulocytosis
- Seen in
 - Hemolysis
 - Acute blood loss

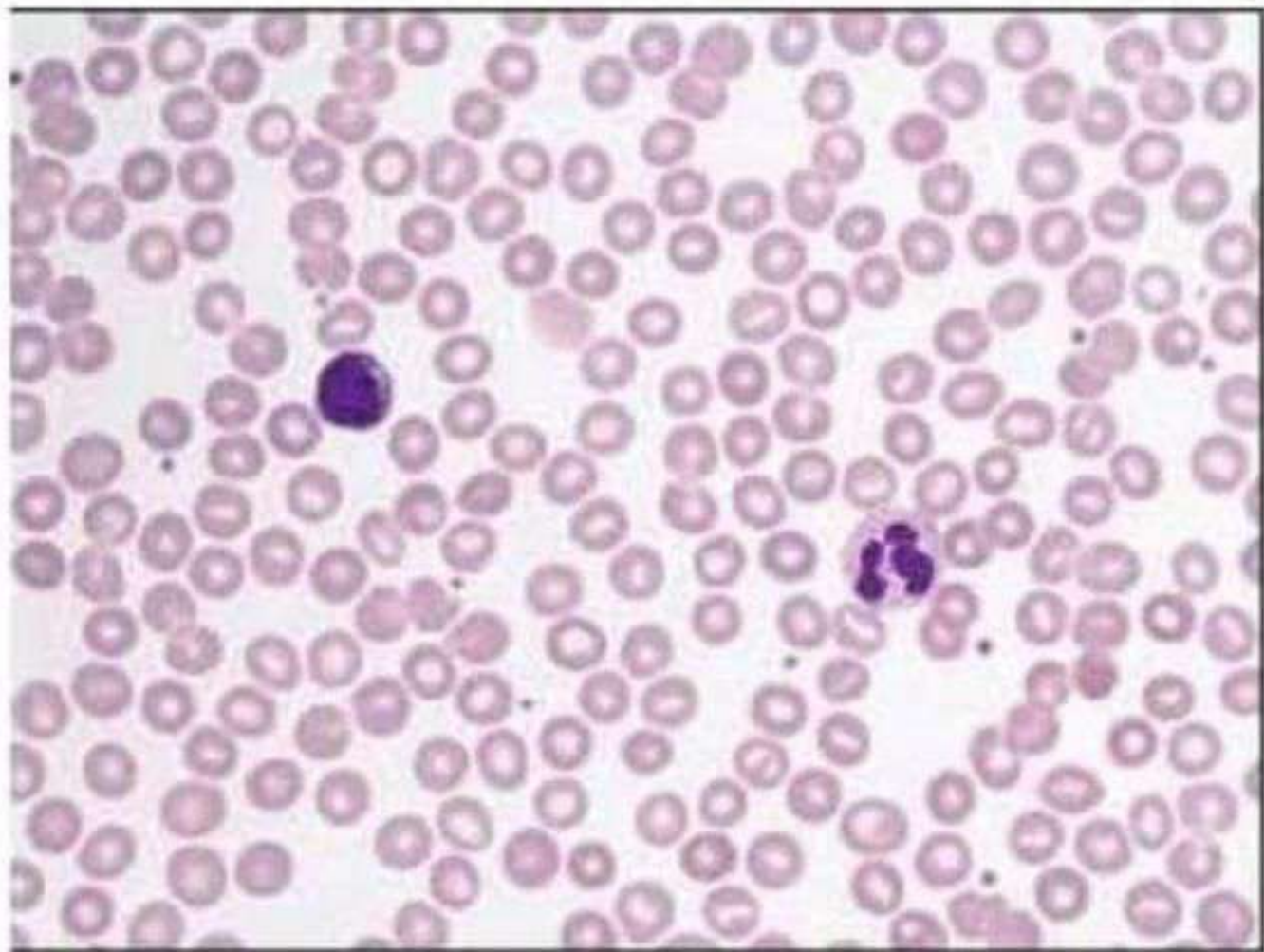


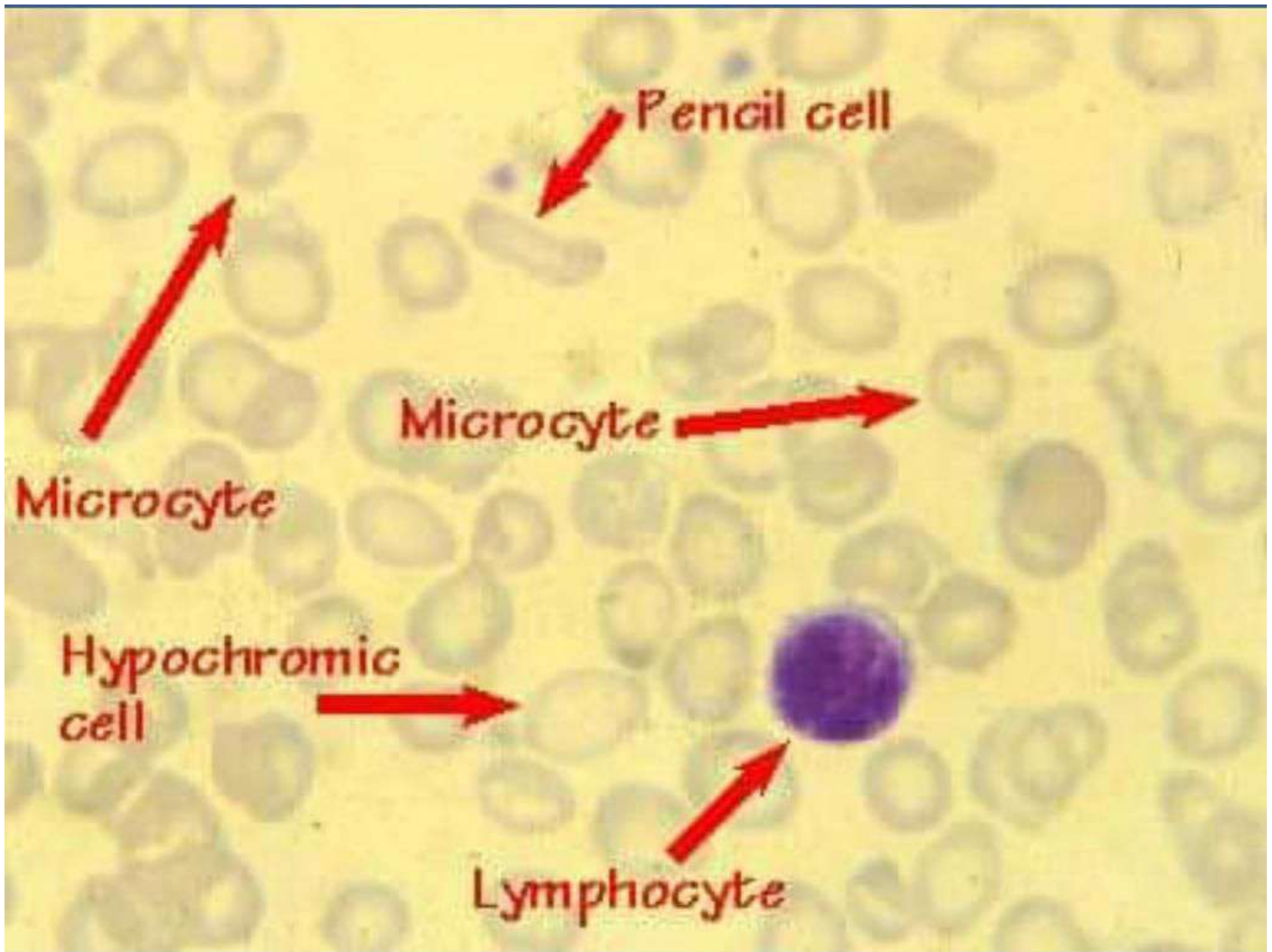
Spherocytes

- Nearly spherical
- Diameter is smaller than normal
- Lack central pale area or have a smaller, eccentric, pale area
- Seen in
 - hereditary spherocytosis
 - Some cases of autoimmune hemolytic anemia
 - direct physical or chemical injury



Normal peripheral smear





Pencil cell

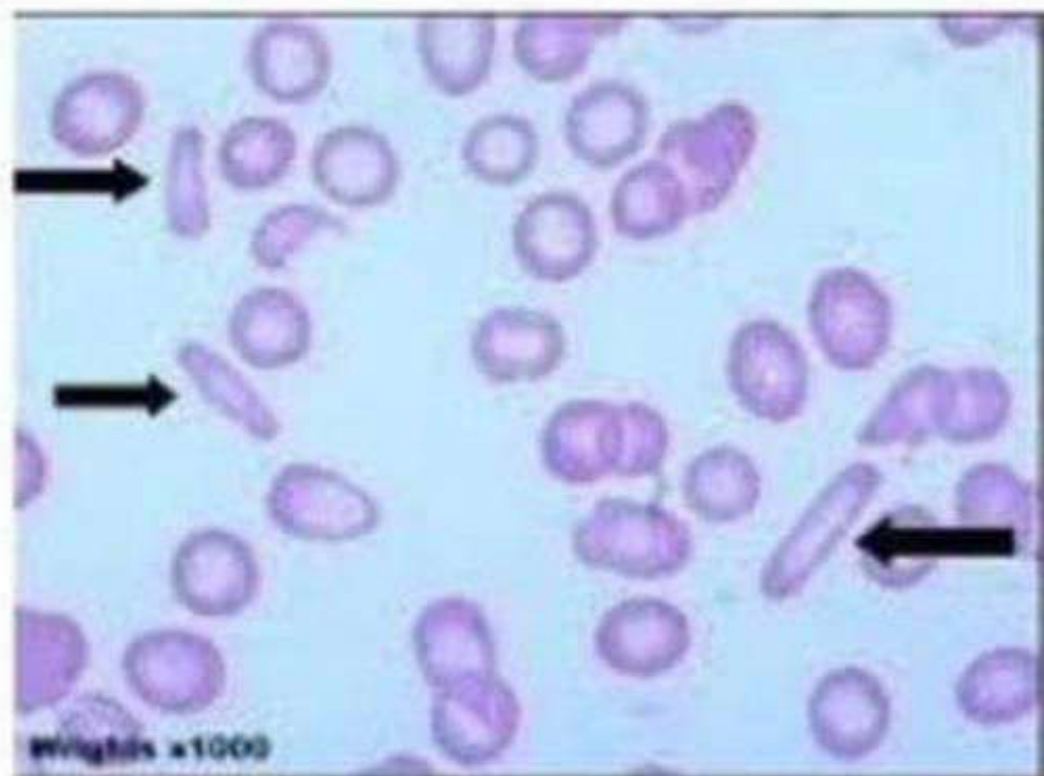
Microcyte

Microcyte

Hypochromic cell

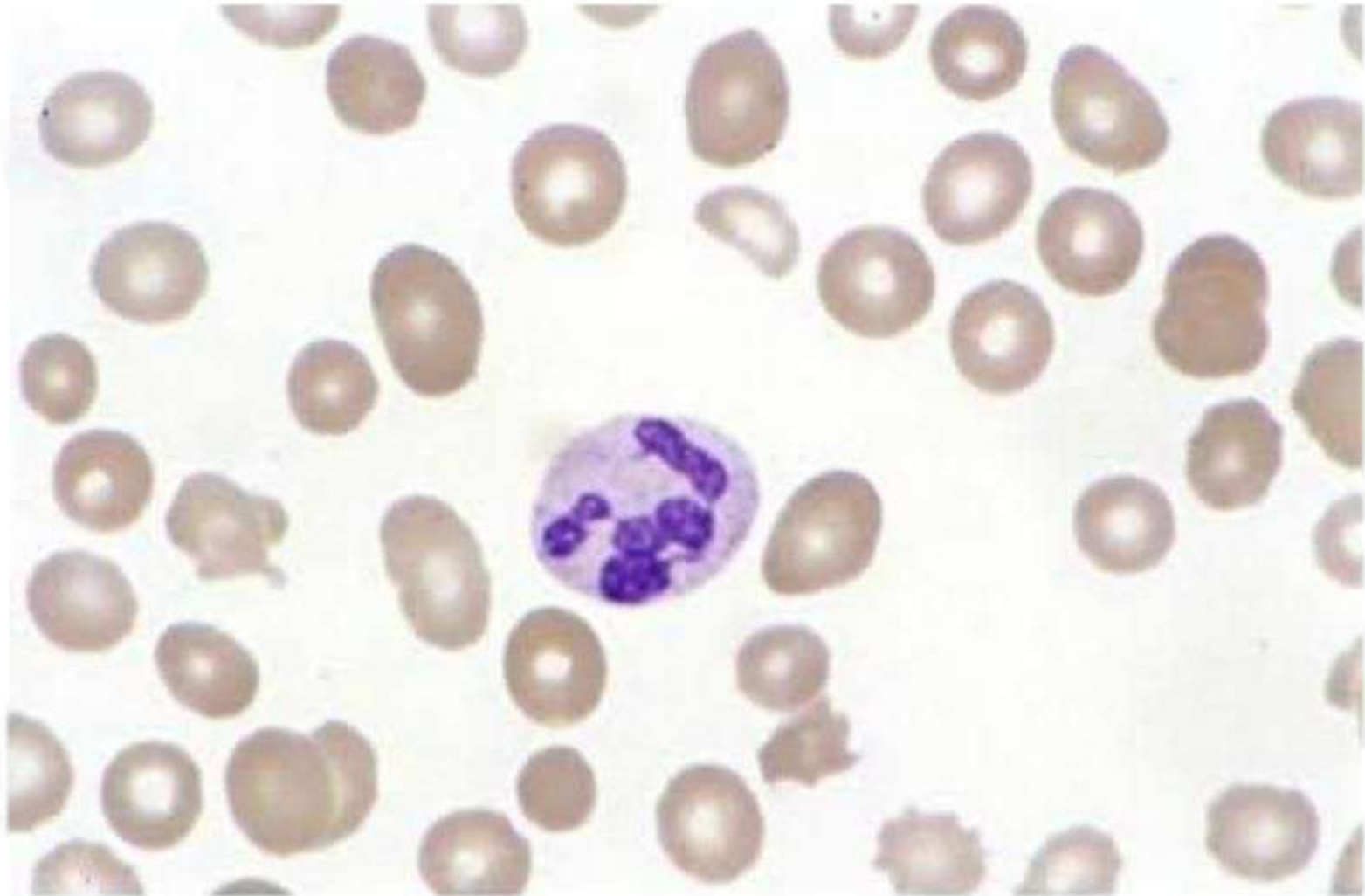
Lymphocyte

Pencil cells: Elongated narrow red cells
Feature of iron deficiency anaemia



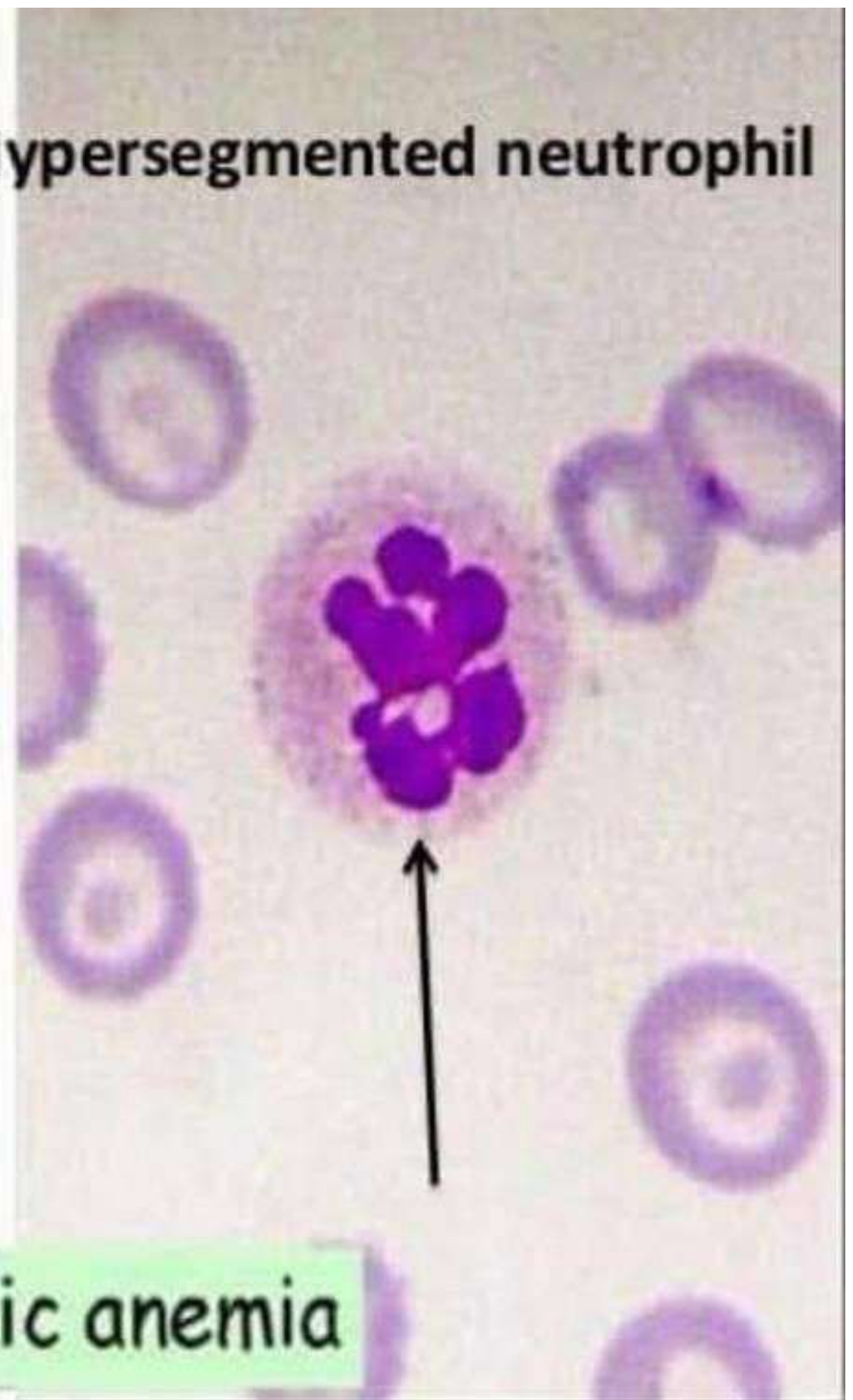
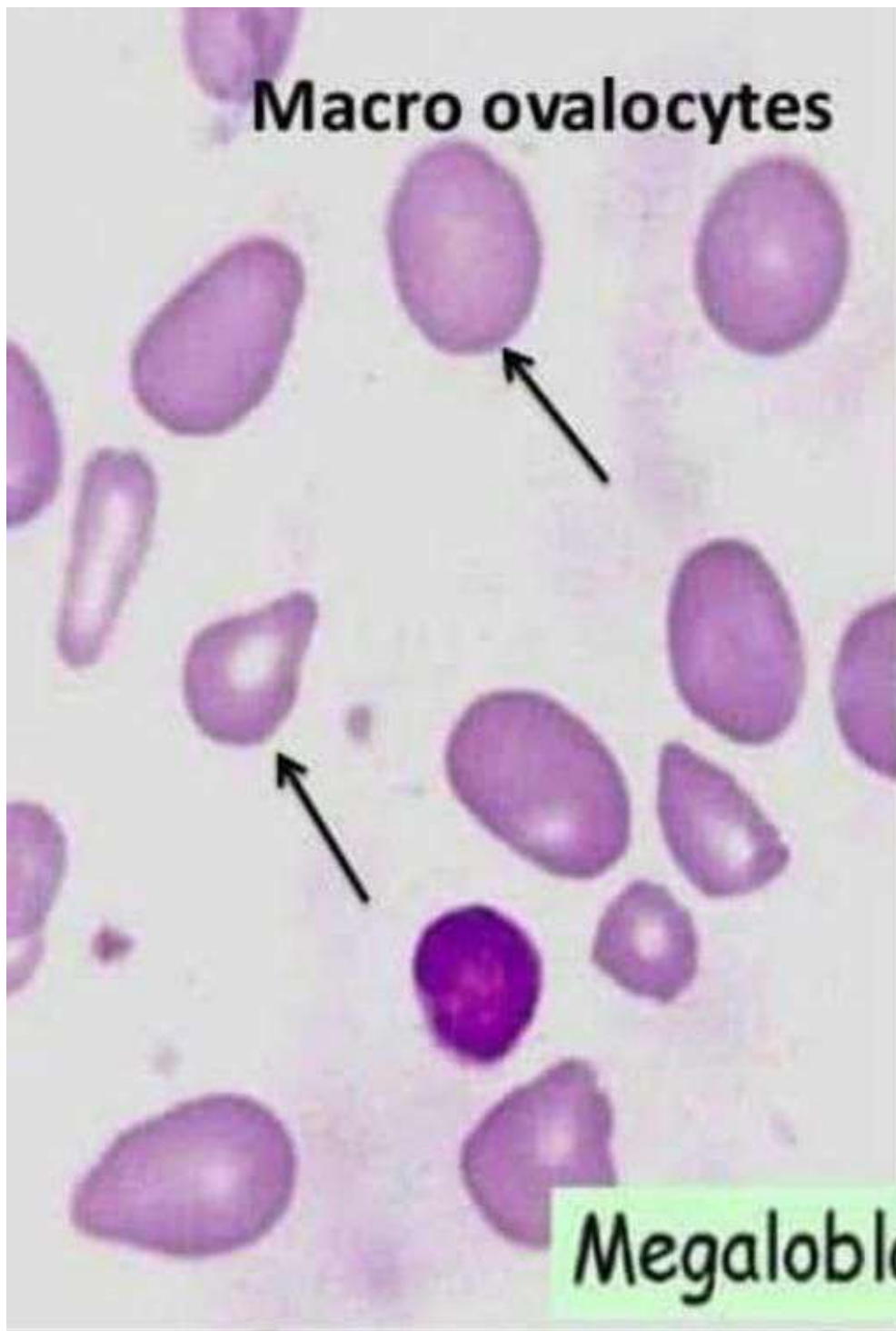
Megaloblastic Anemia

Hypersegmented neutrophils

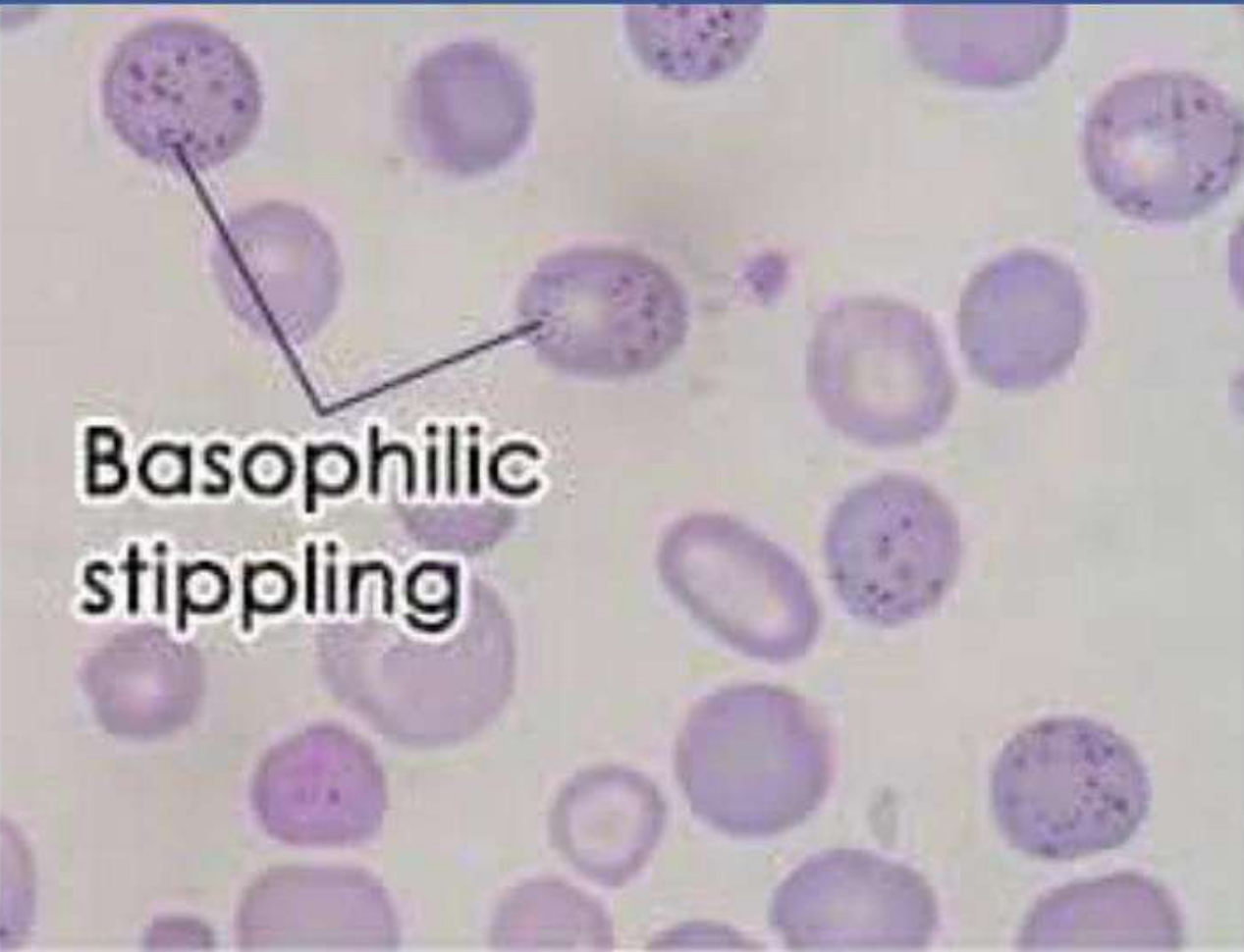


Macro ovalocytes

Hypersegmented neutrophil



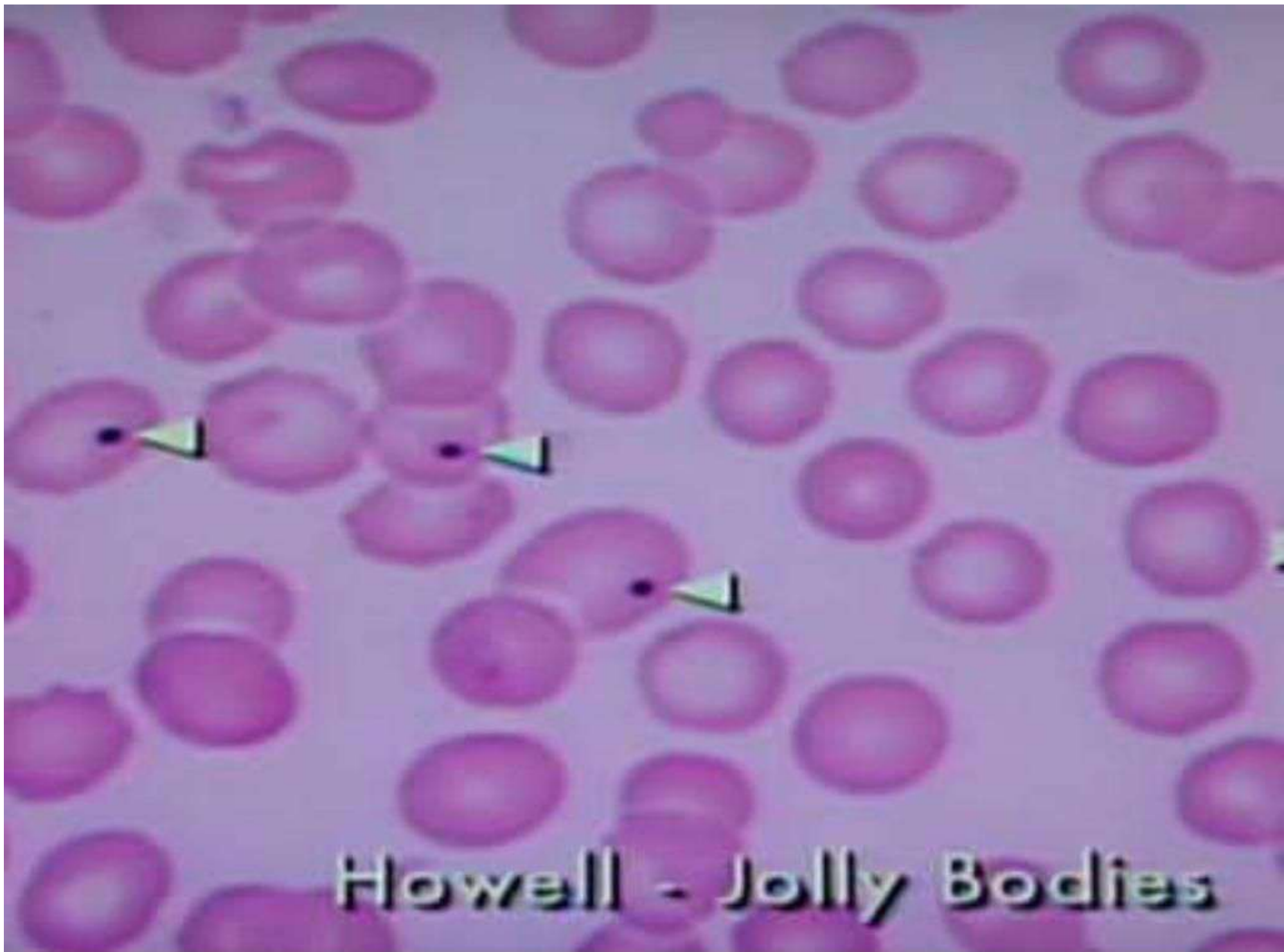
Megaloblastic anemia



Basophilic stippling

A microscopic image of a blood smear showing numerous red blood cells. Two cells in the upper left quadrant are highlighted with black lines pointing to their nuclei, which contain small, dark, granular inclusions known as basophilic stippling. The rest of the field is filled with other red blood cells of varying sizes and colors, some appearing normal and others slightly abnormal.

Basophilic stippling commonly occurs due to medical conditions such as thalassemia, hemoglobin diseases, iron deficiencies, or lead poisoning.



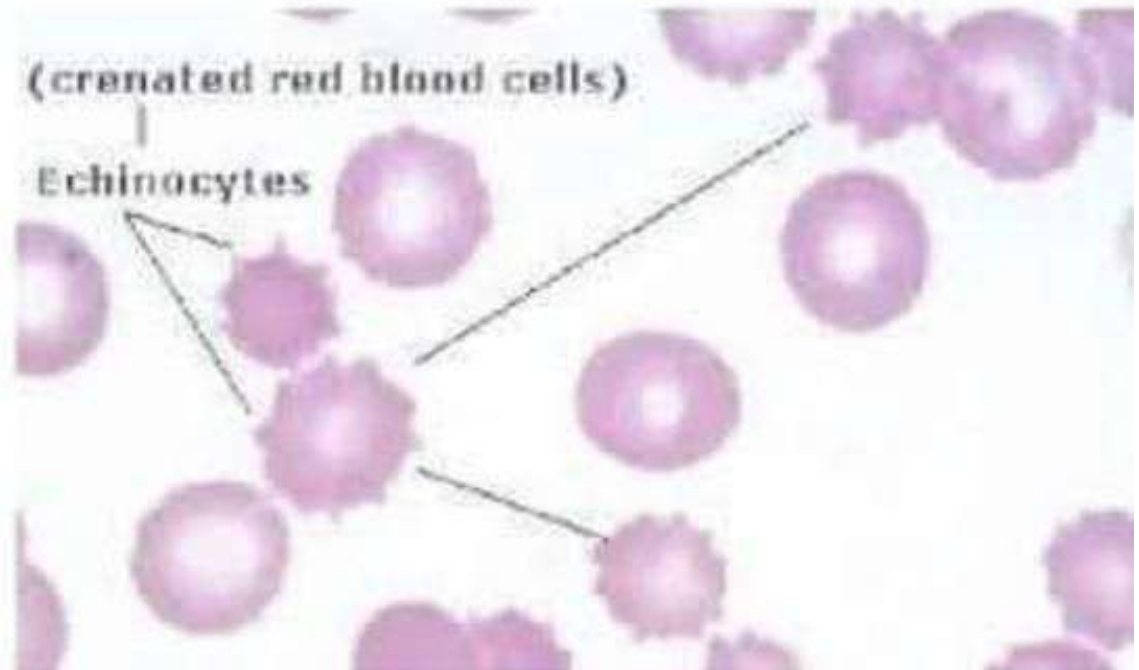
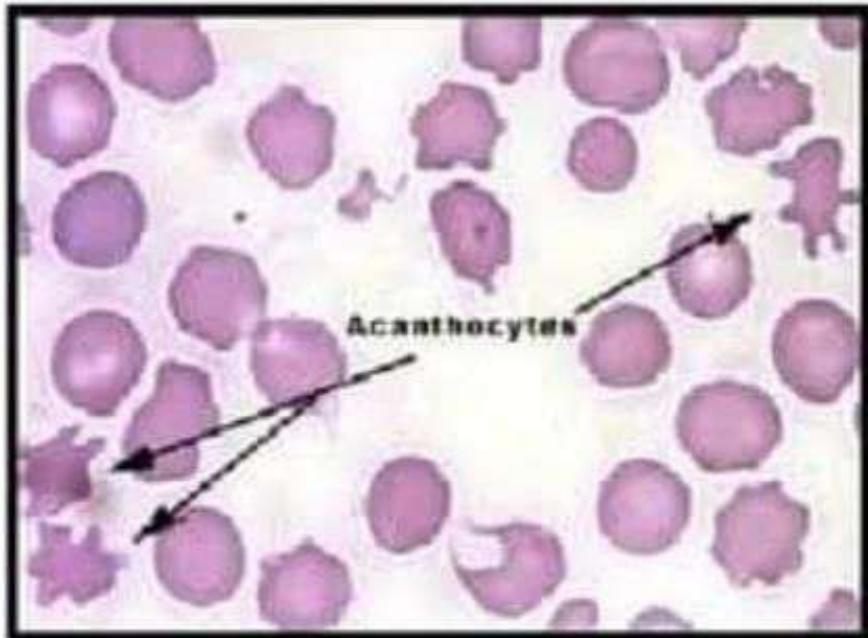
Howell - Jolly Bodies

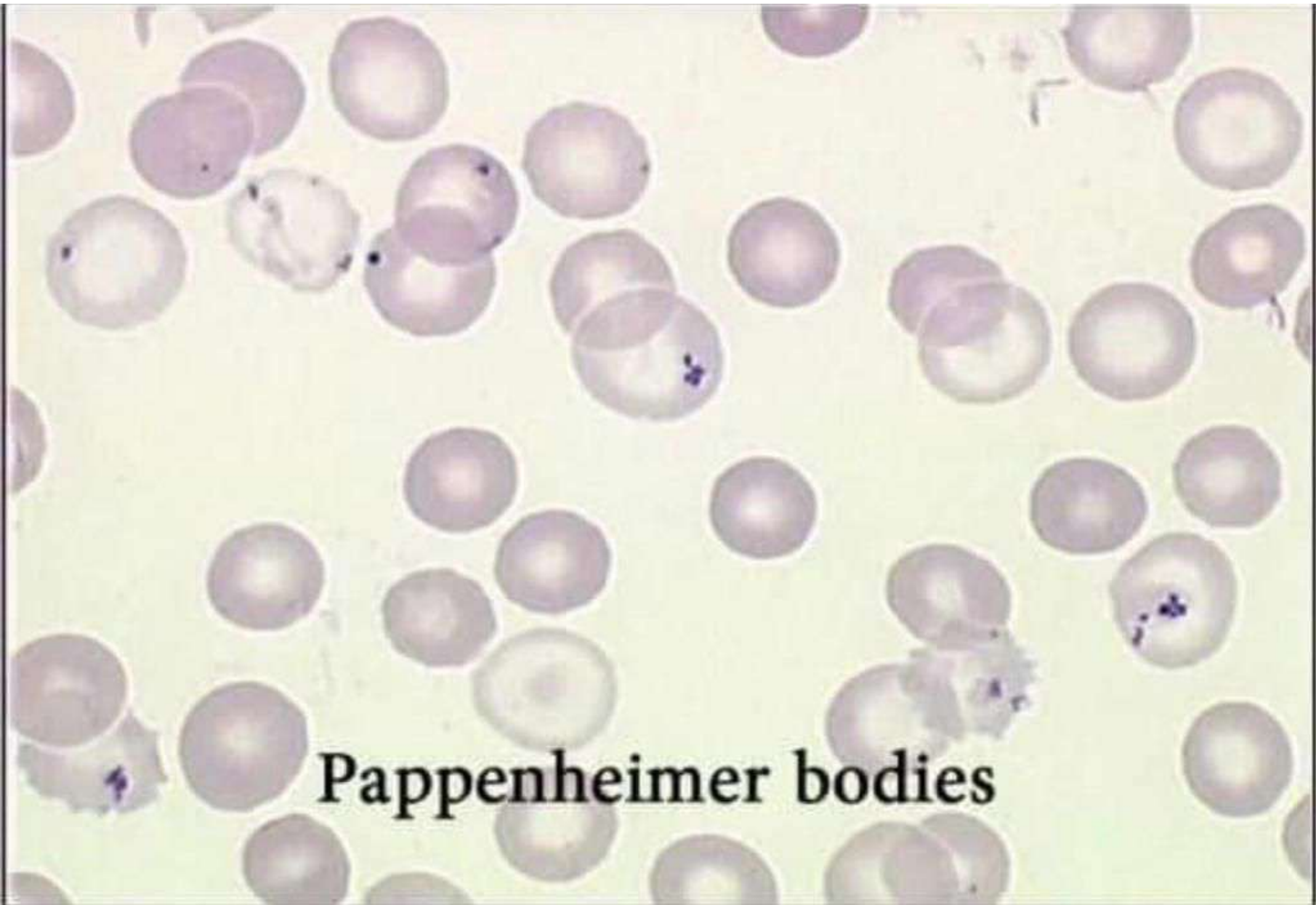


Acanthocyte



Echinocyte





Pappenheimer bodies