Morphology Practical

23rd & 25th of August 2016

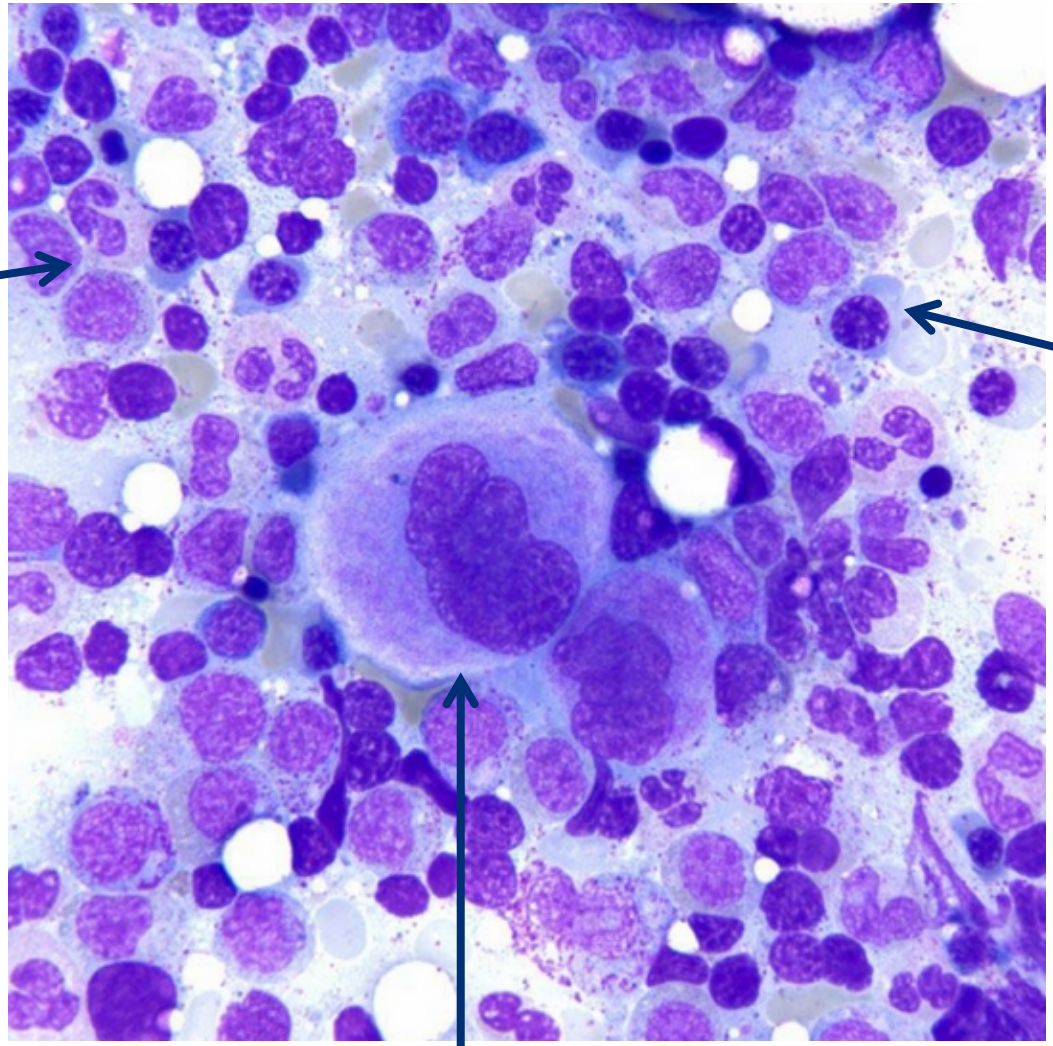
2:15 – 4:15 p.m.

Compiled by Drs Senani Williams

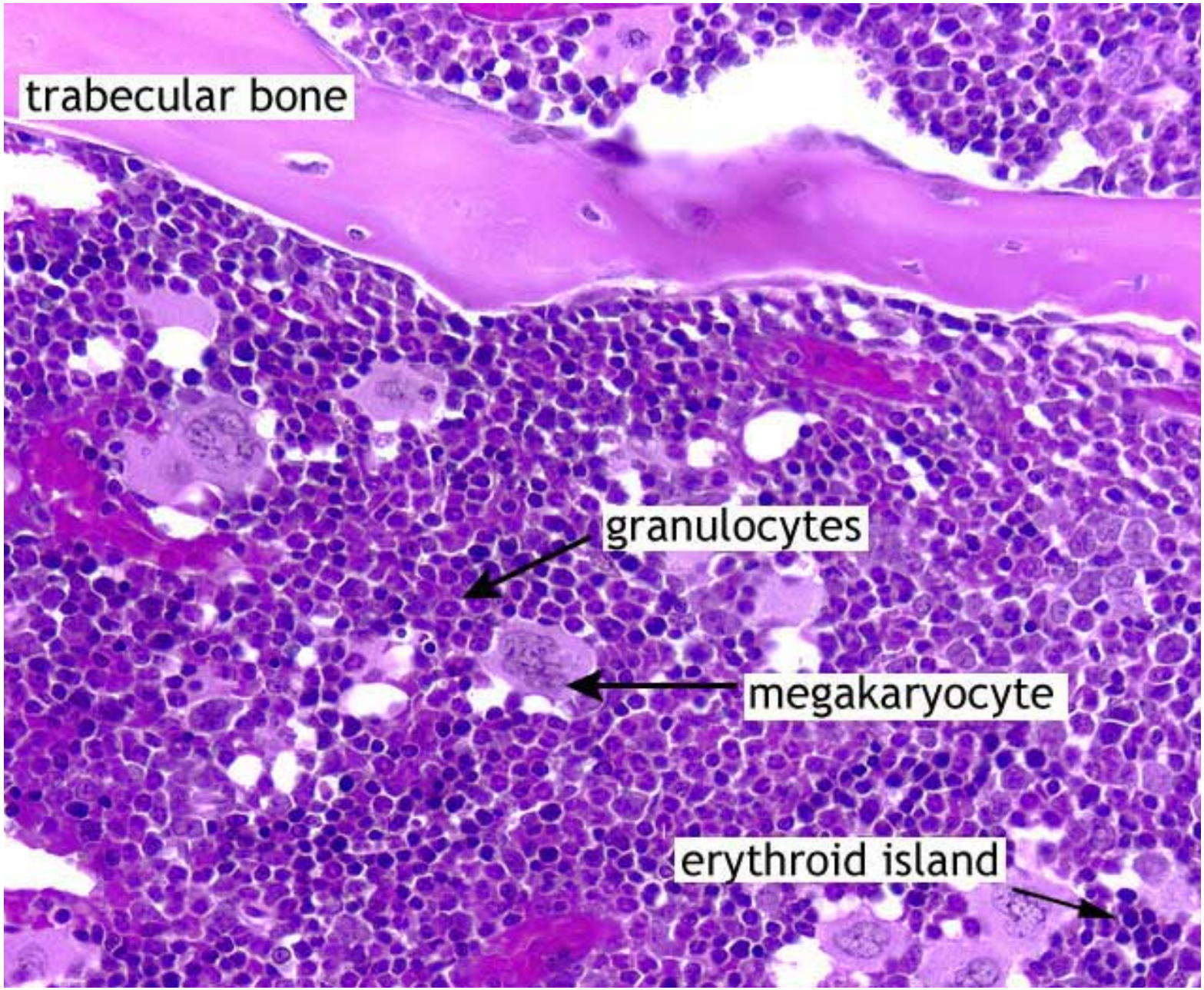
and

Durga Moratuwagama

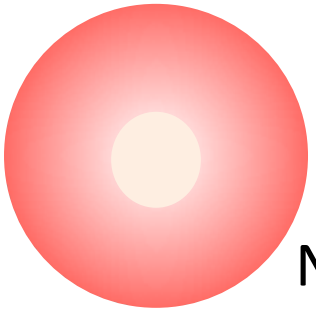
Normal bone marrow



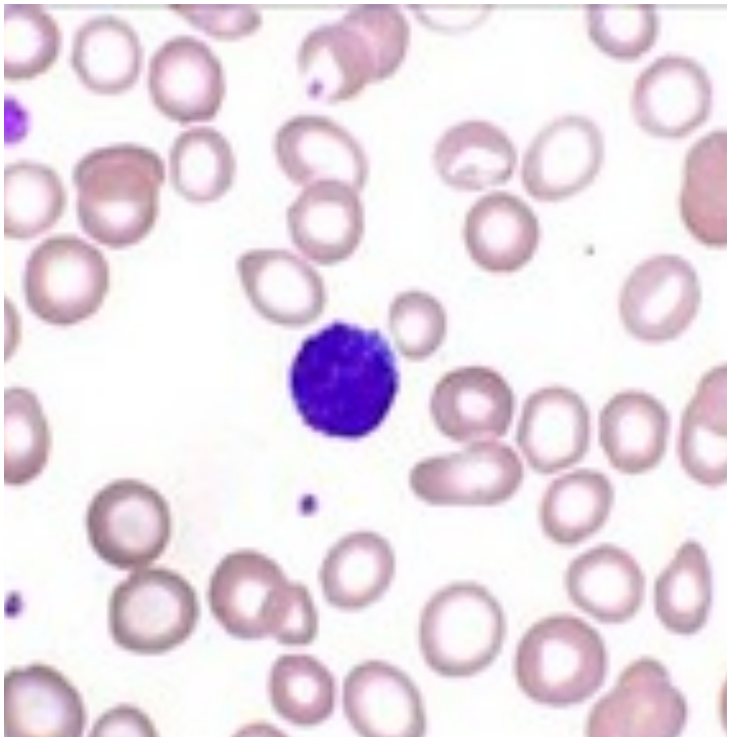
Normal bone marrow

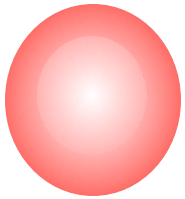


Morphological Classification of Anaemia



Normocyte
75 - 95 fl

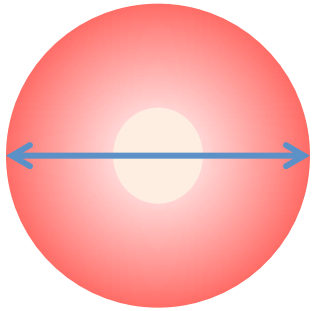




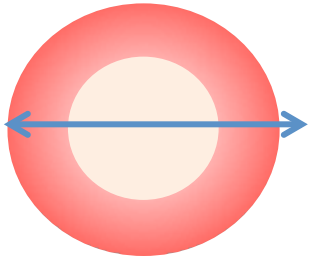
Microcyte
<75 fl

The normal red cell is the size of a small lymphocyte

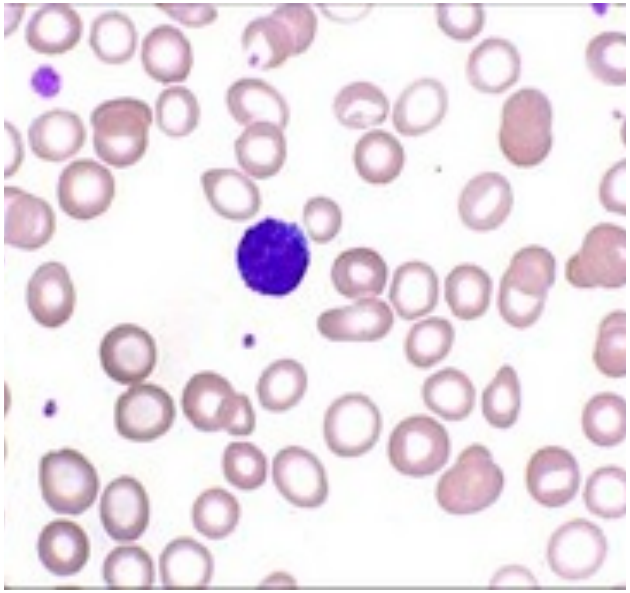
Hypochromic red cells



1/3 area of central pallor
Normochromic red cell

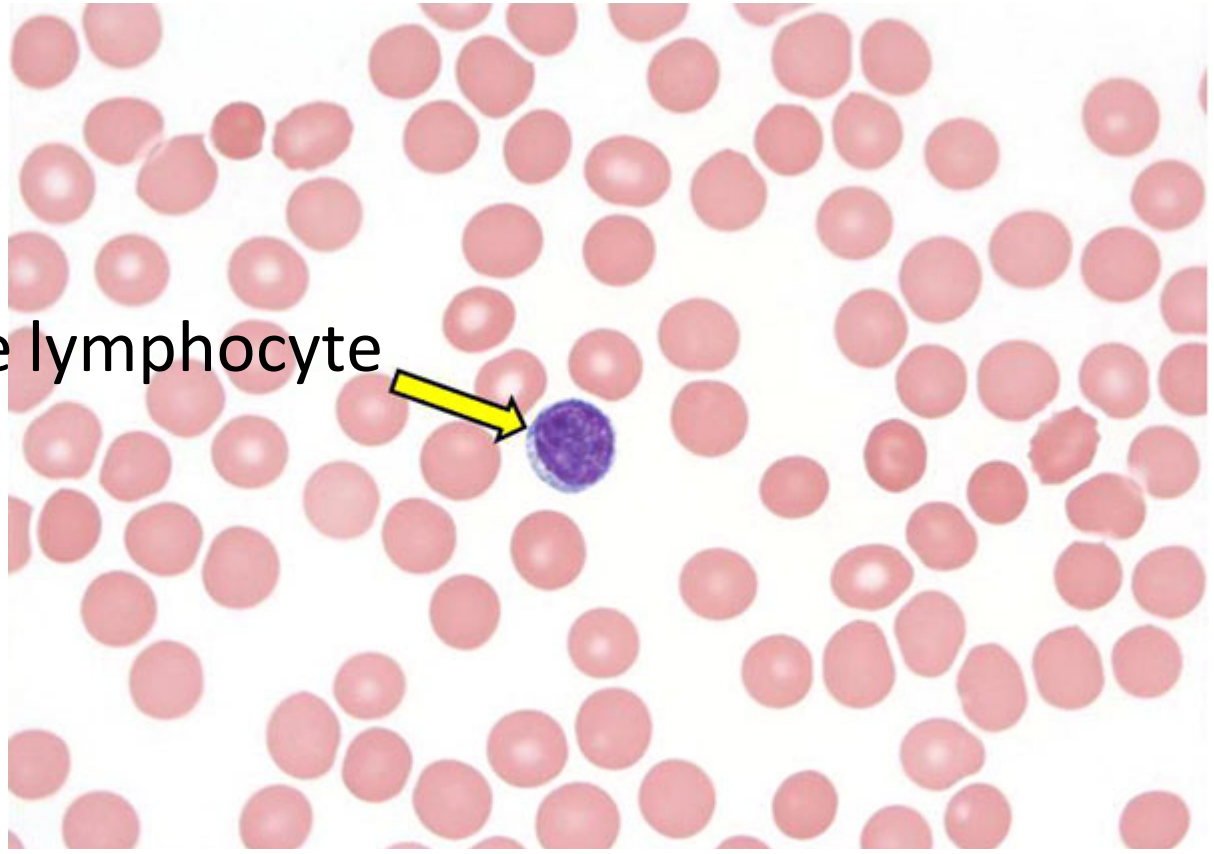


> 1/3 area of central pallor
Hypochromic red cell

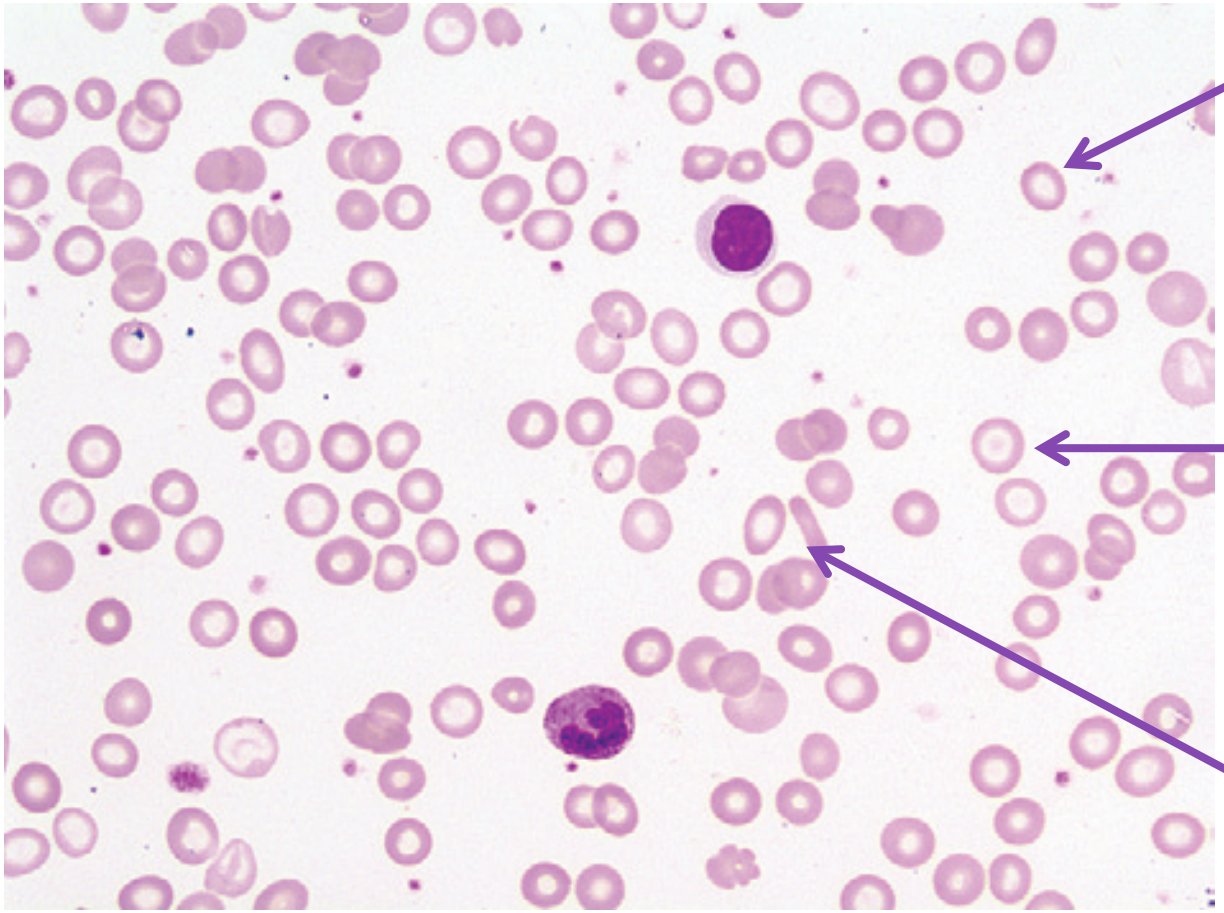


Normocytic Normochromic red cells

Small mature lymphocyte

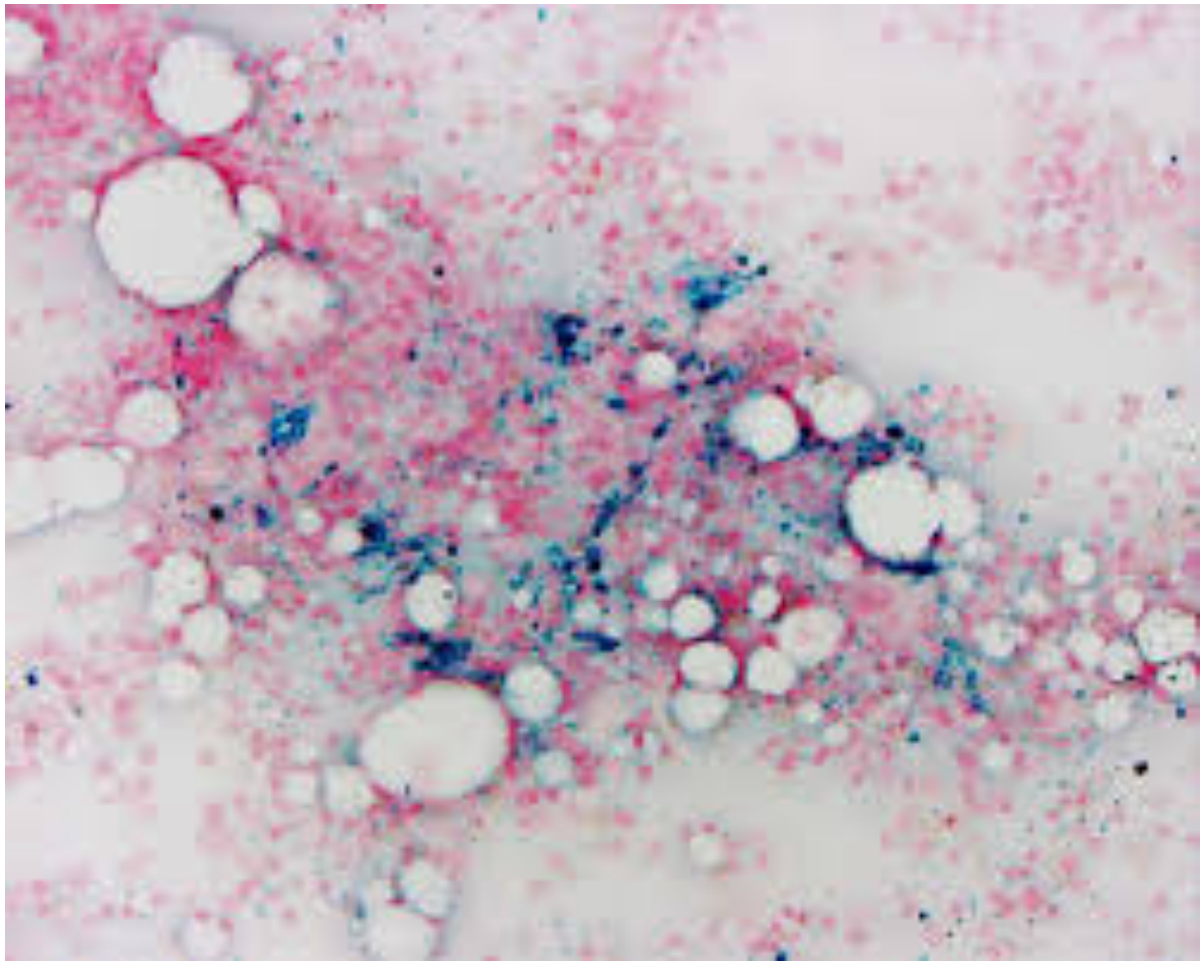


Iron deficiency anaemia



- Red cells are smaller than a small lymphocyte
- Central area of pallor of red cells is >1/3
- Note the pencil shaped cells.

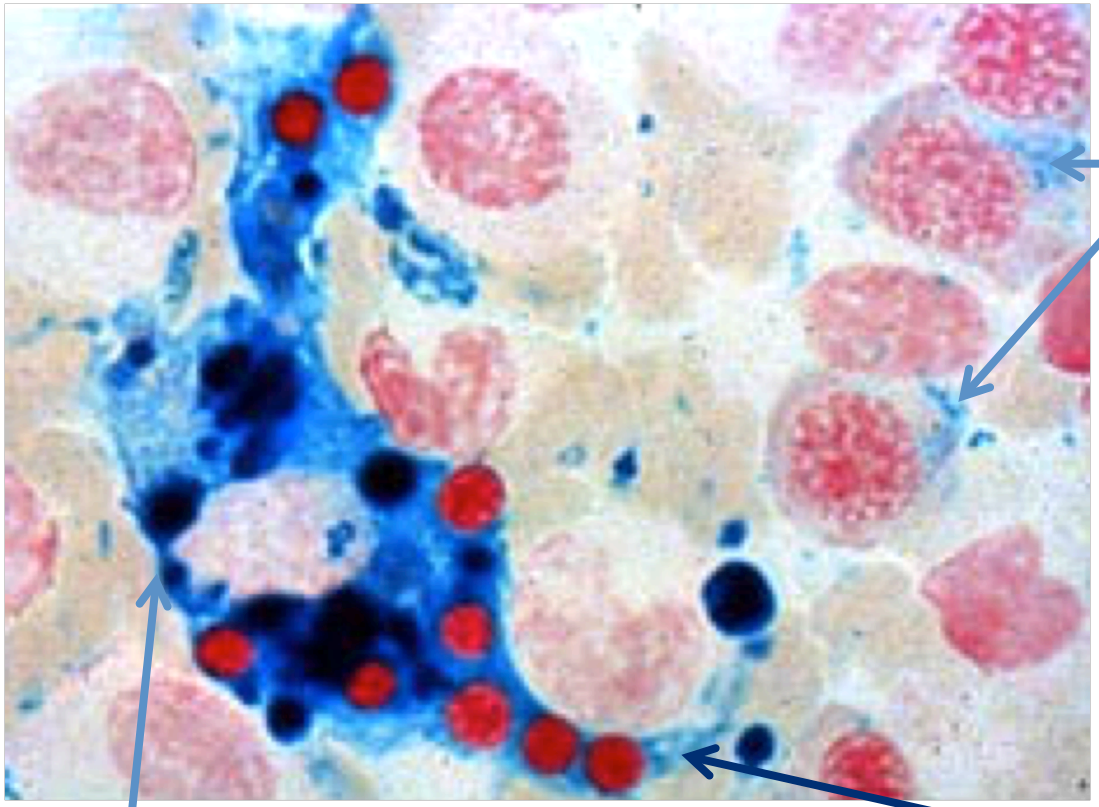
Perls stain for iron on bone marrow aspirate



Note the prussian blue stain of iron within macropahges

In iron deficiency the fragments do not have a blue colour

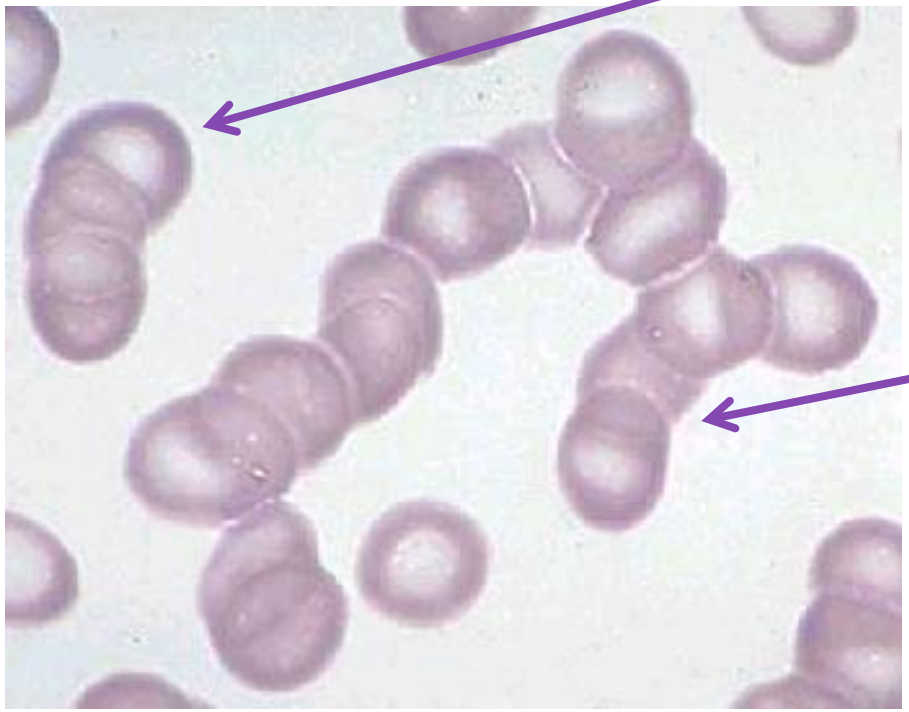
Macrophage containing iron



Erythroid precursors containing iron

Macrophage cytoplasm containing iron feeding developing erythrocytes

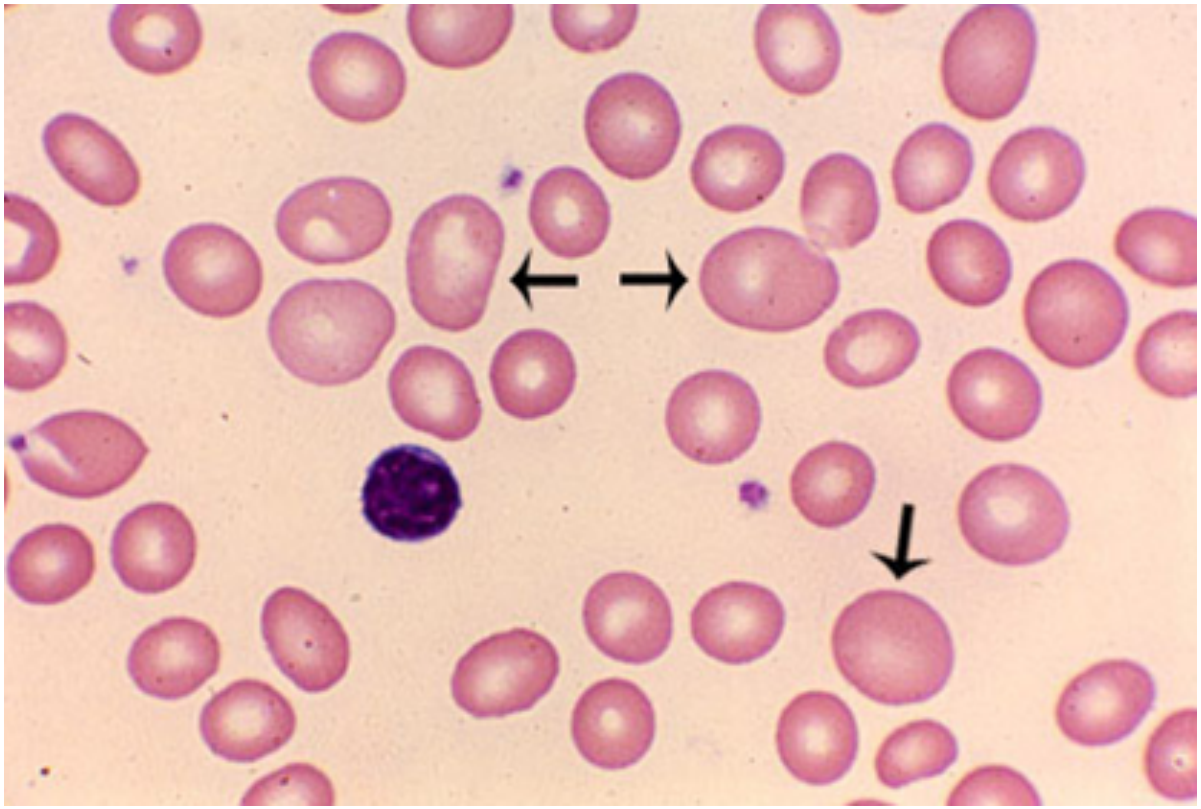
Anaemia of chronic disease



Mildly hypochromic red cells

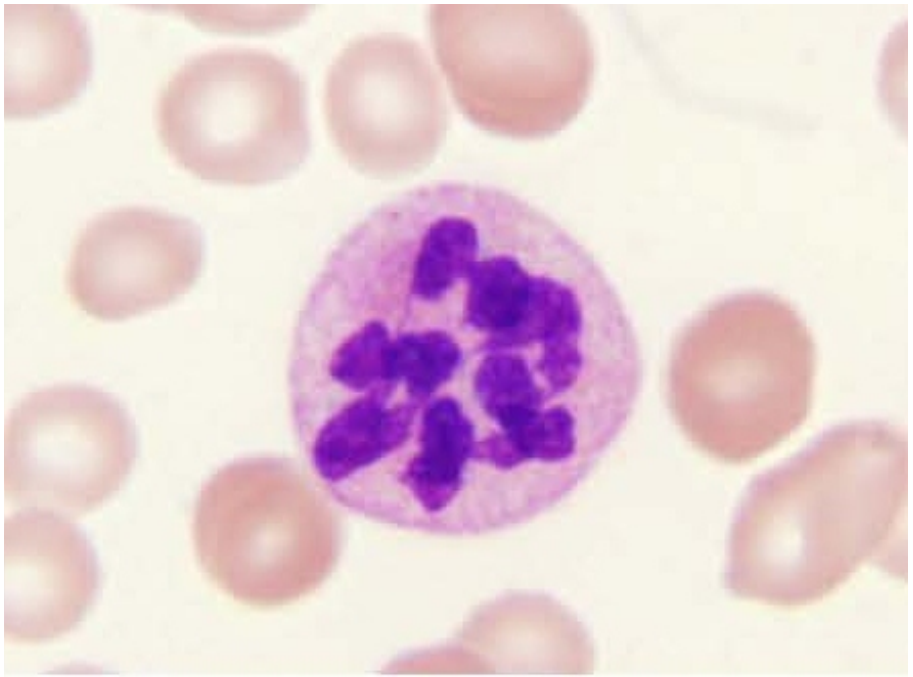
Rouleaux formation.

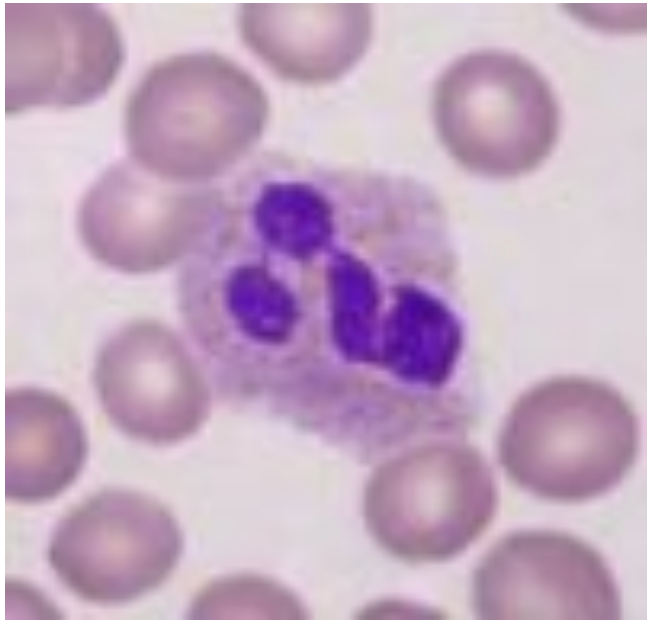
Vitamin B12 or Folate deficiency



Note that the red cells are larger than a small lymphocyte and that they are oval in shape

Hypersegmented neutrophils in megaloblastic anaemia

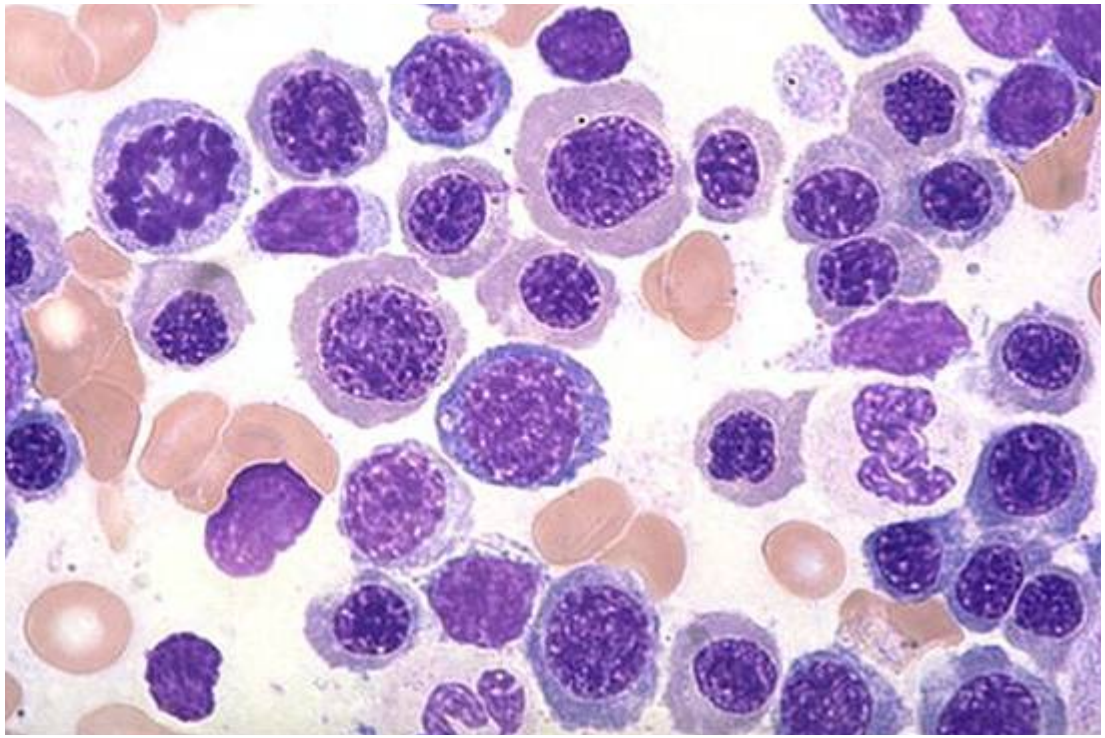




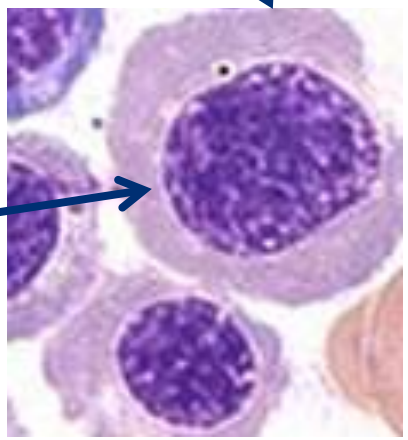
Normal neutrophil

Normal neutrophils have 3 – 5 lobes. Note this neutrophil with hypersegmented nucleus.

Megaloblasts in the Bone marrow

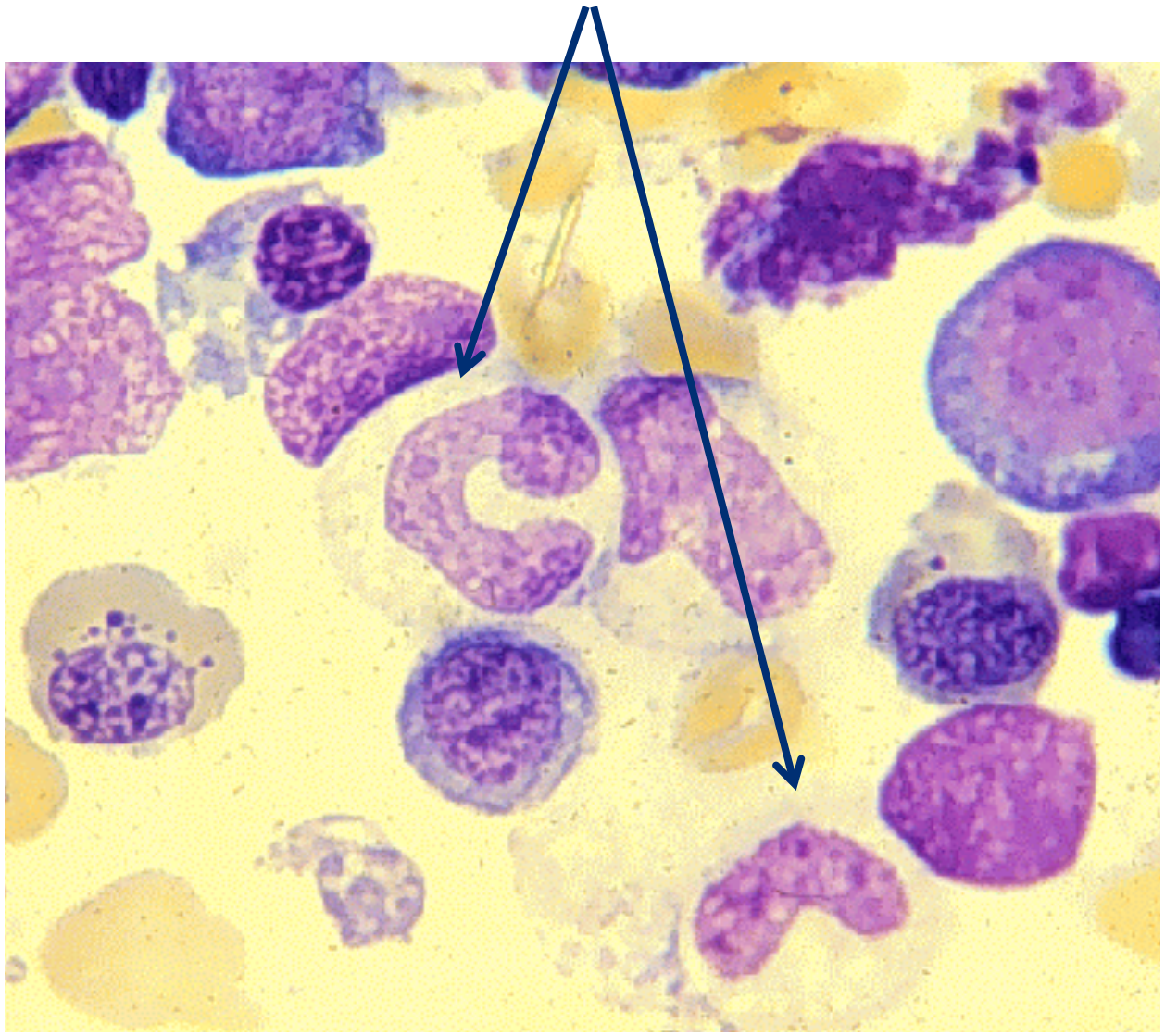


- Note the hyperplastic erythroid cells in the bone marrow.
- The cells have partially haemoglobinized cytoplasm.

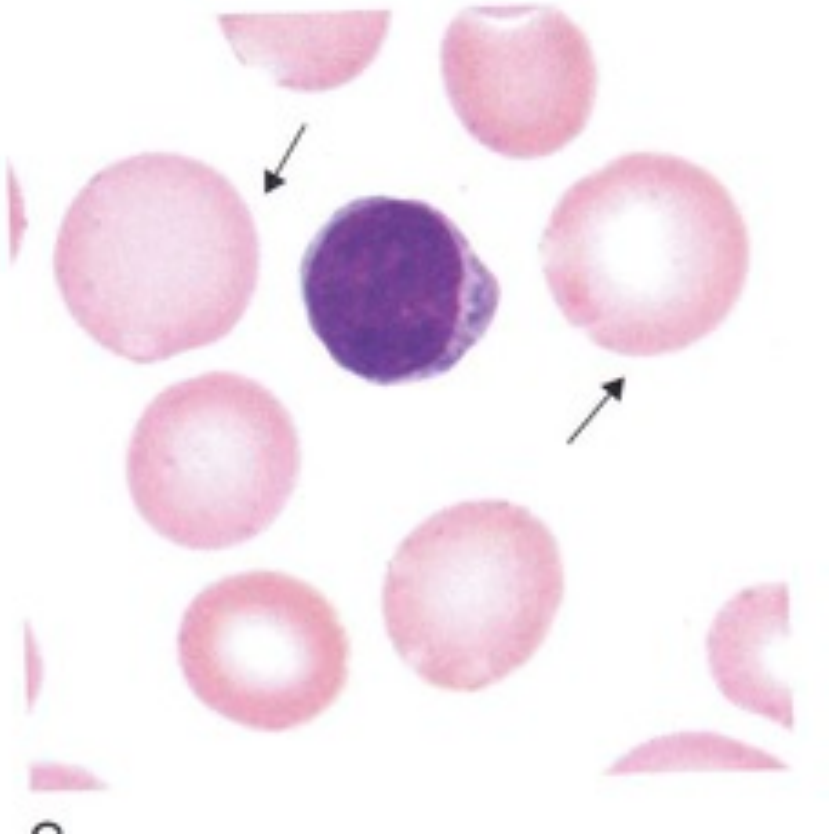


The nucleus is immature and has an open lace like chromatic pattern due to the lack of Vitamin B12 and folate.

Giant metamyelocytes



Round macrocytes



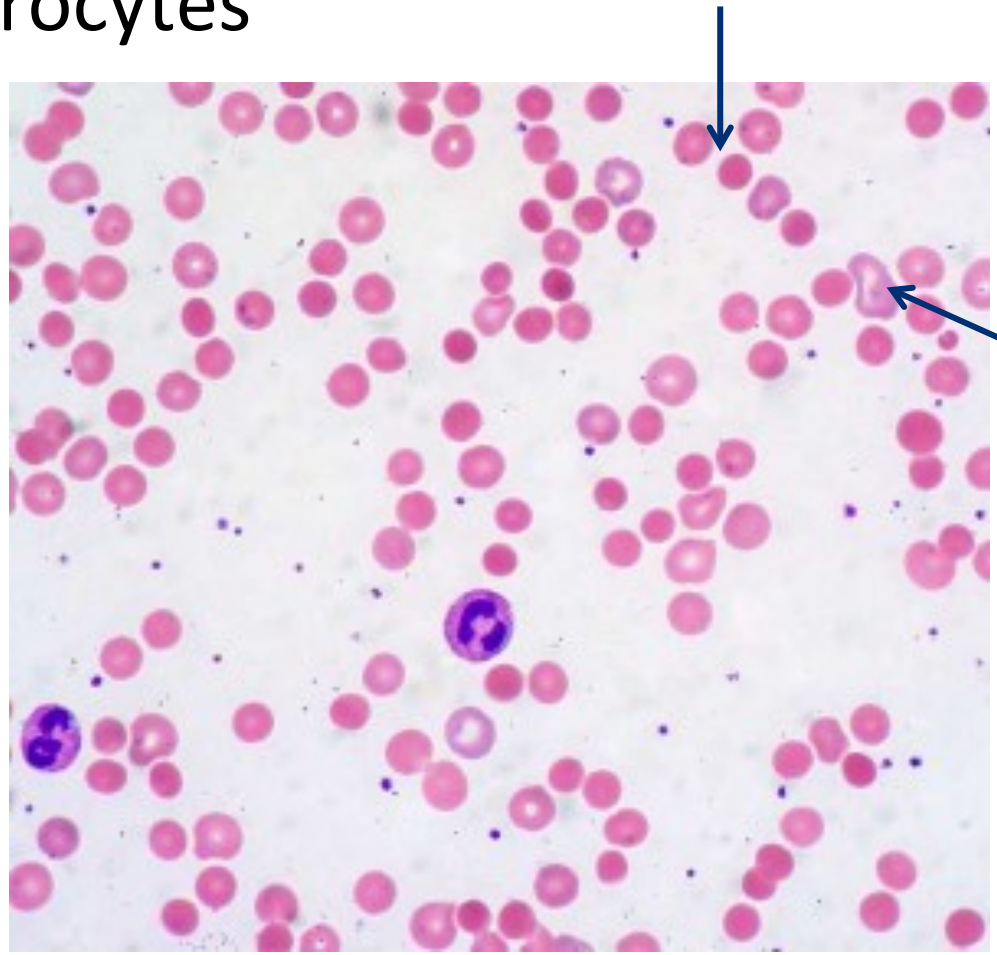
Causes of round macrocytes

- Liver disease
- Hypothyroidism

Note that the red cells are larger than a small lymphocyte and that they are round in shape

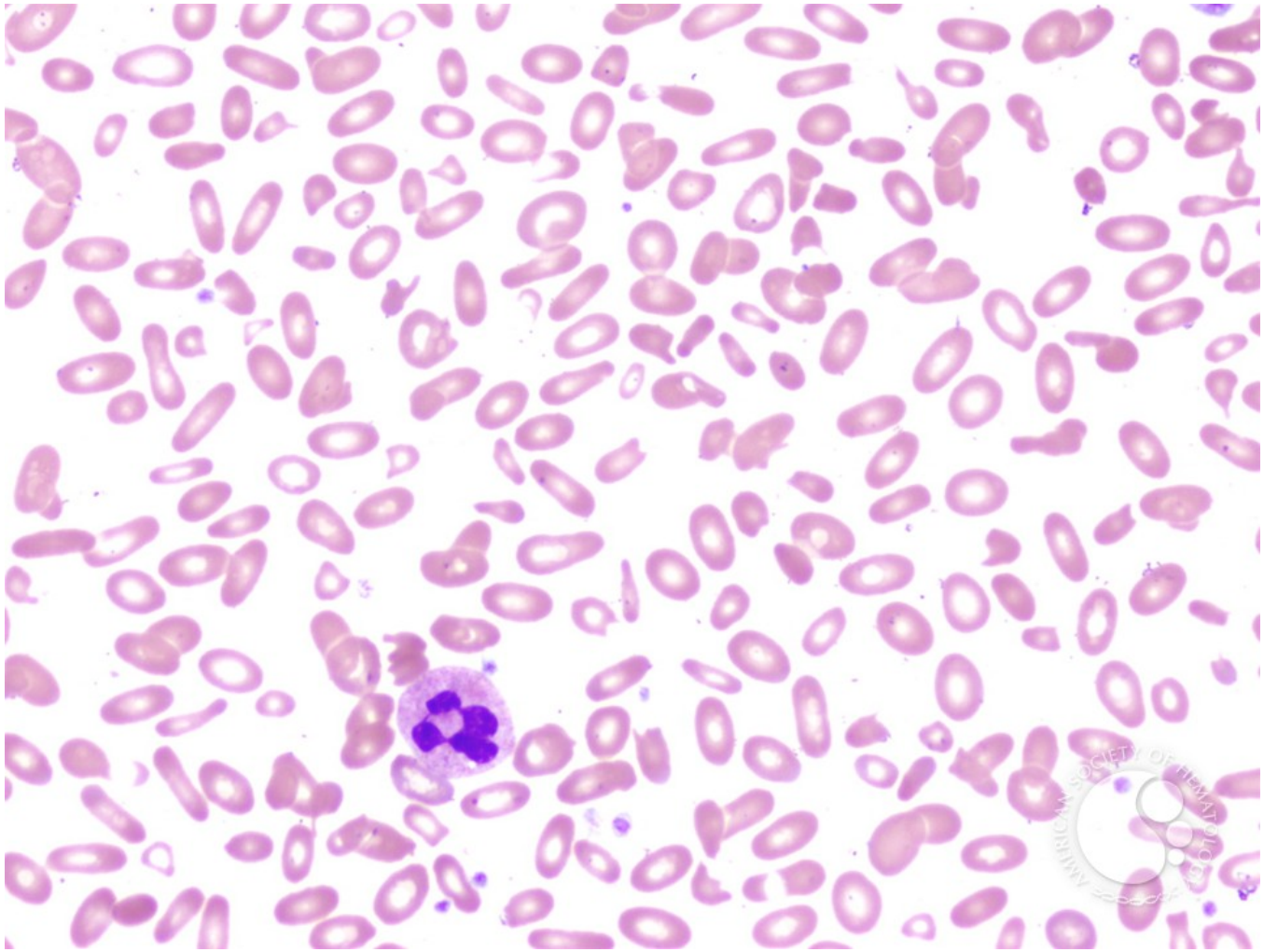
Hereditary spherocytosis

Note the absence of central area of pallor in the spherocytes

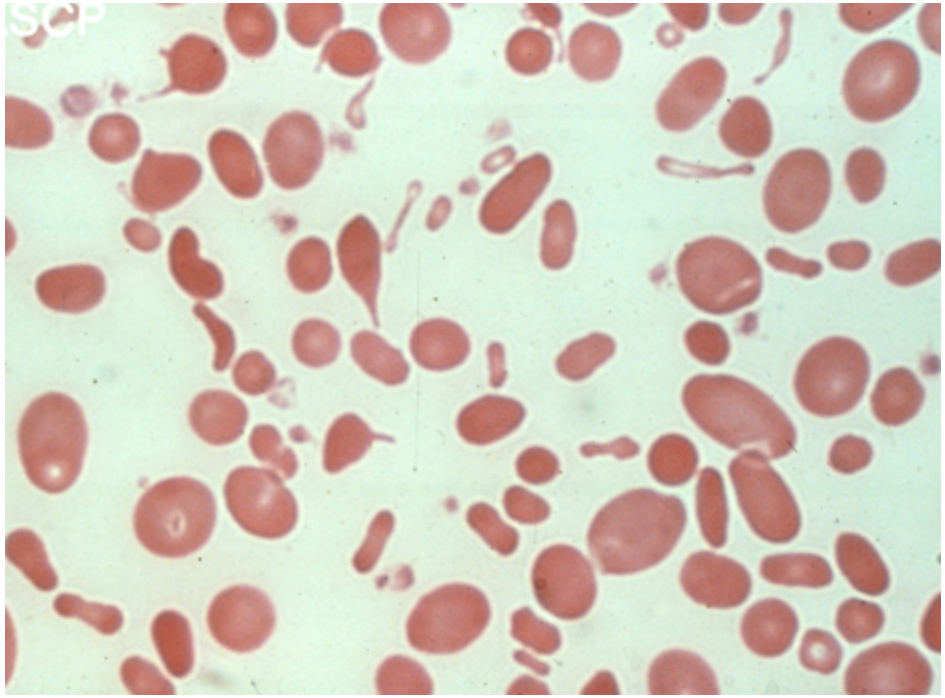


Polychromatic cells
Larger than normal darker than normal red cells

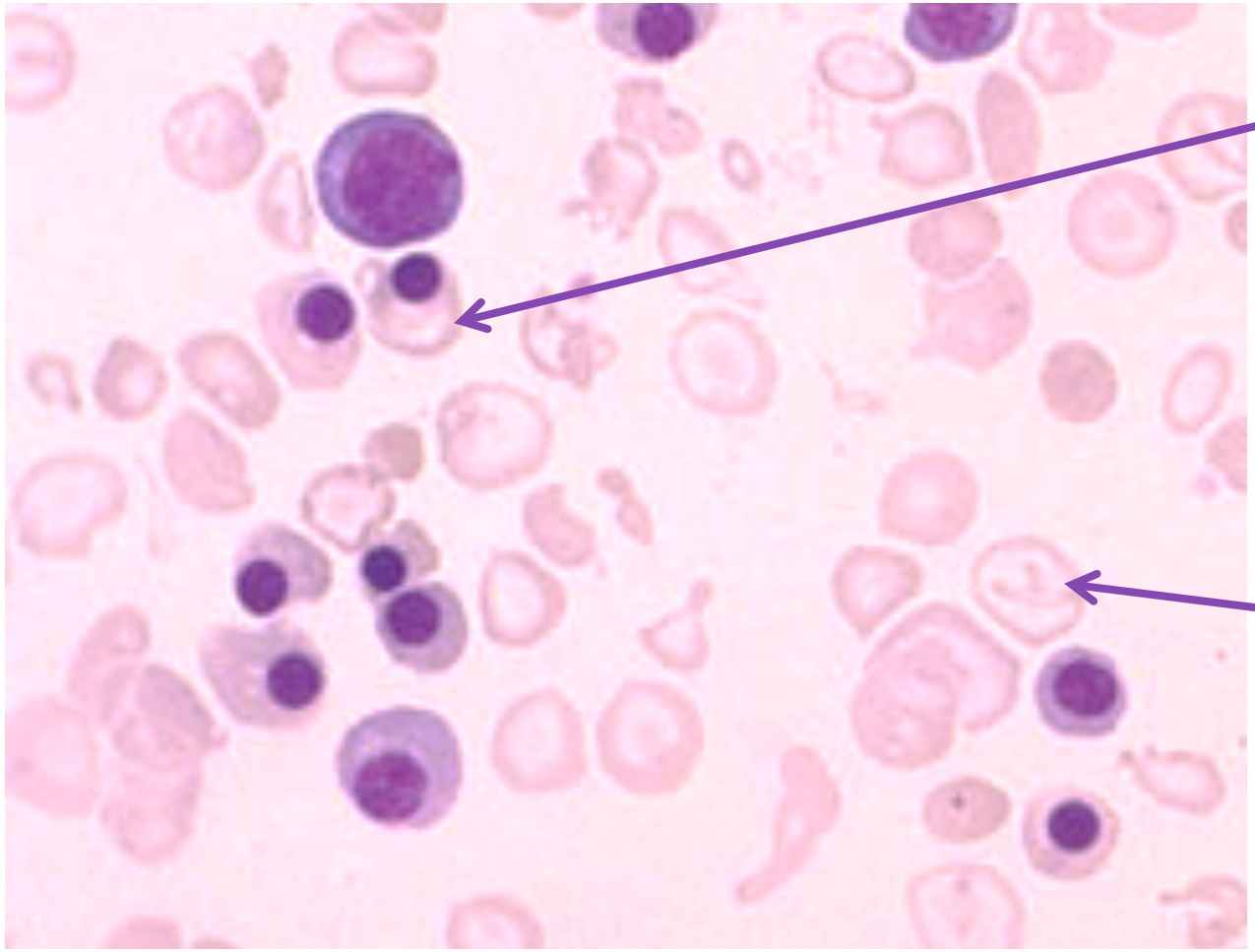
Hereditary elliptocytosis



Hereditary Pyropoikilocytosis

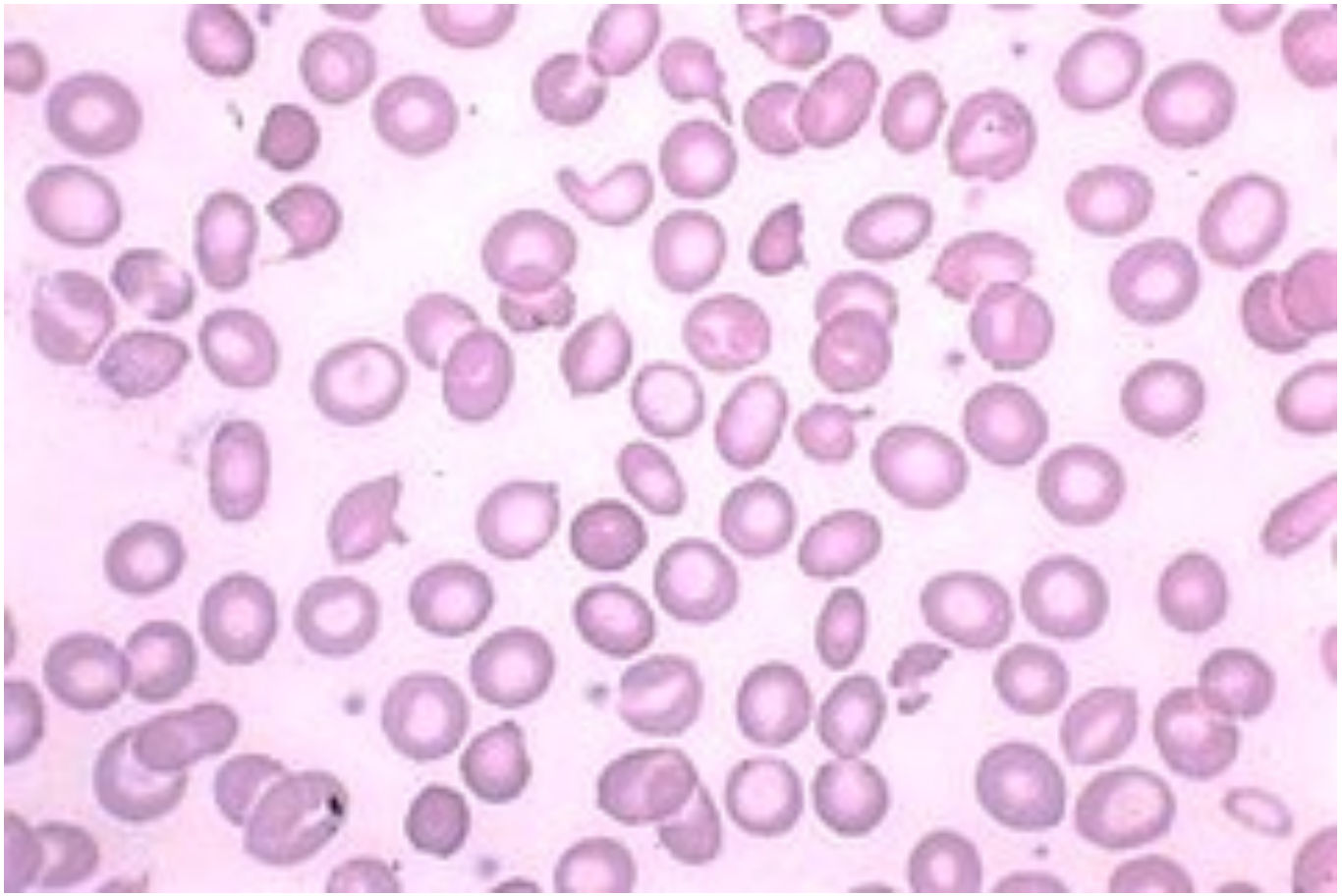


Thalassaemia major

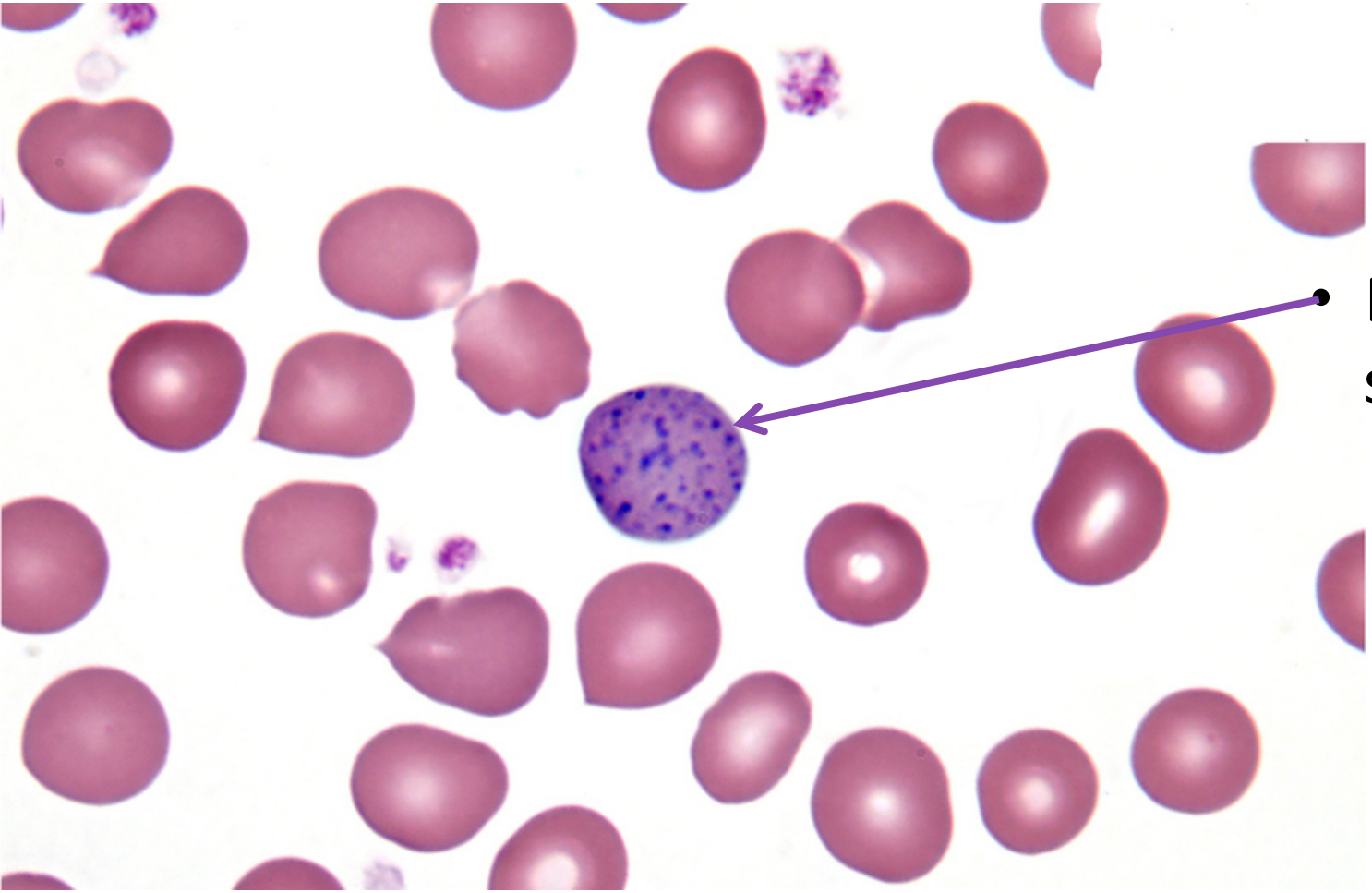


- Nucleated red cells with partially haemoglobinized cytoplasm
- Irregularly haemoglobinized cells

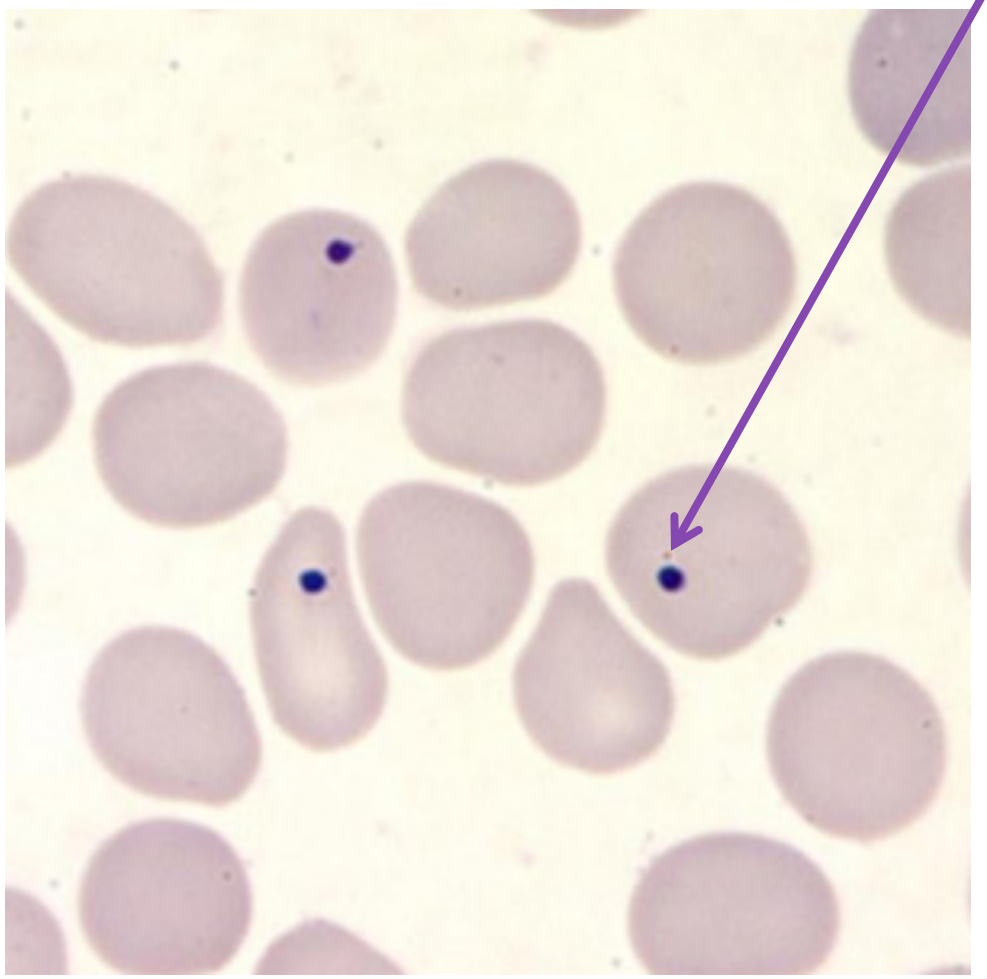
Thalassaemia trait



Basophilic stippling

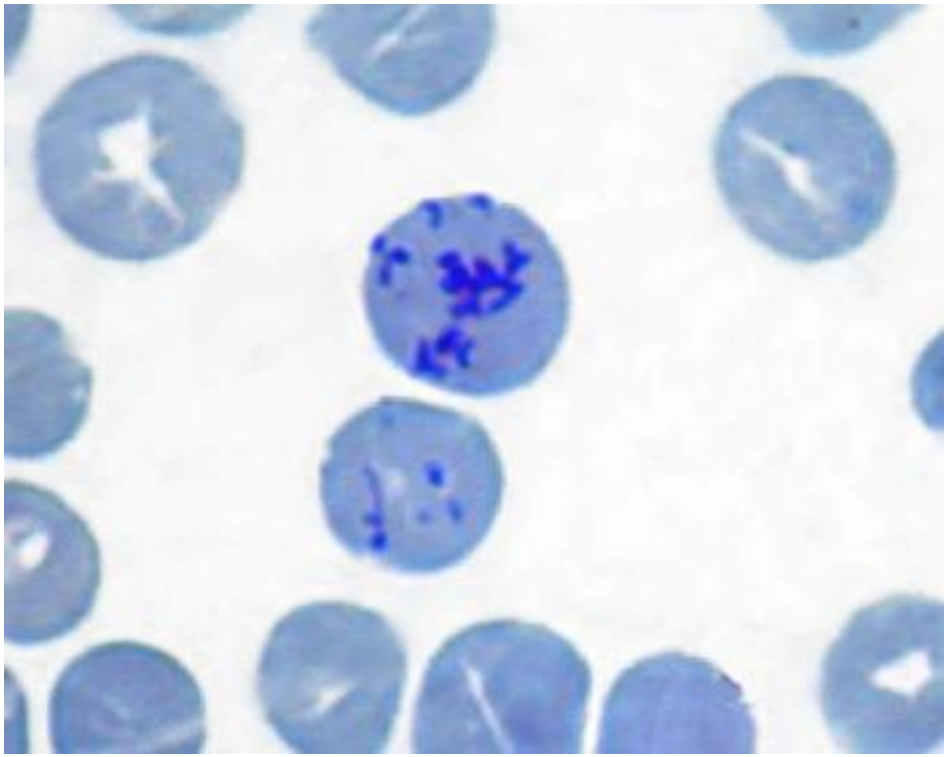


Howell Jolly bodies



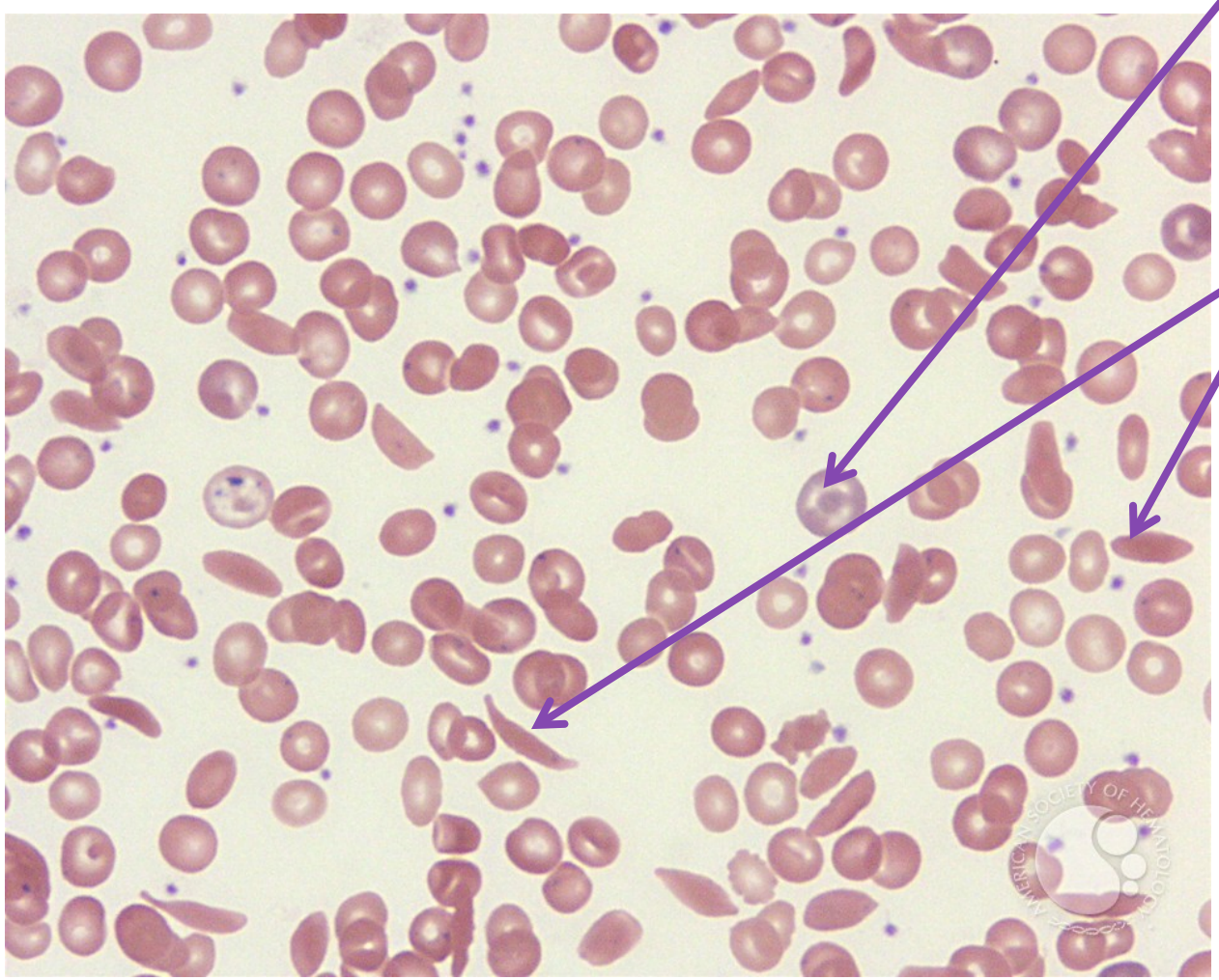
- Howell Jolly body
- Remnant of nuclear material

Reticulocytes



- Red cells containing RNA usually stain darker than normal on normal Leishmann stains
- Using supra vital stains such as methylene blue these cells display the RNA reticulum.

Sickle cell anaemia



- Polychromatic cells
- Sickle cells

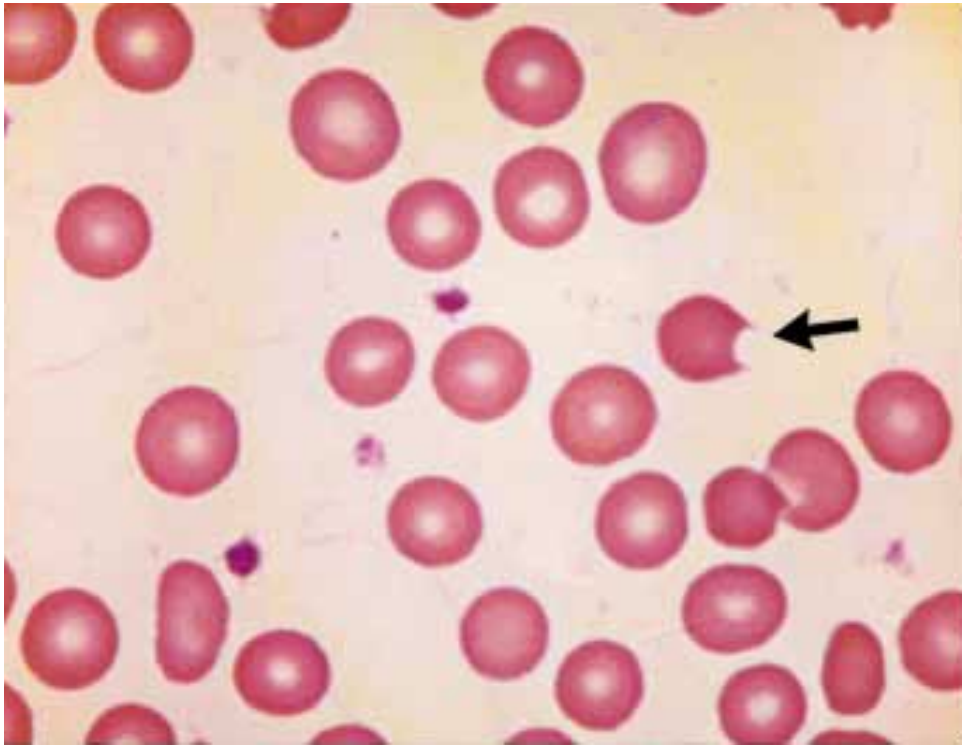
Sickling test

Negative Positive

- Note that haemolysis in the tube enables you to see through the tube and see the lines behind

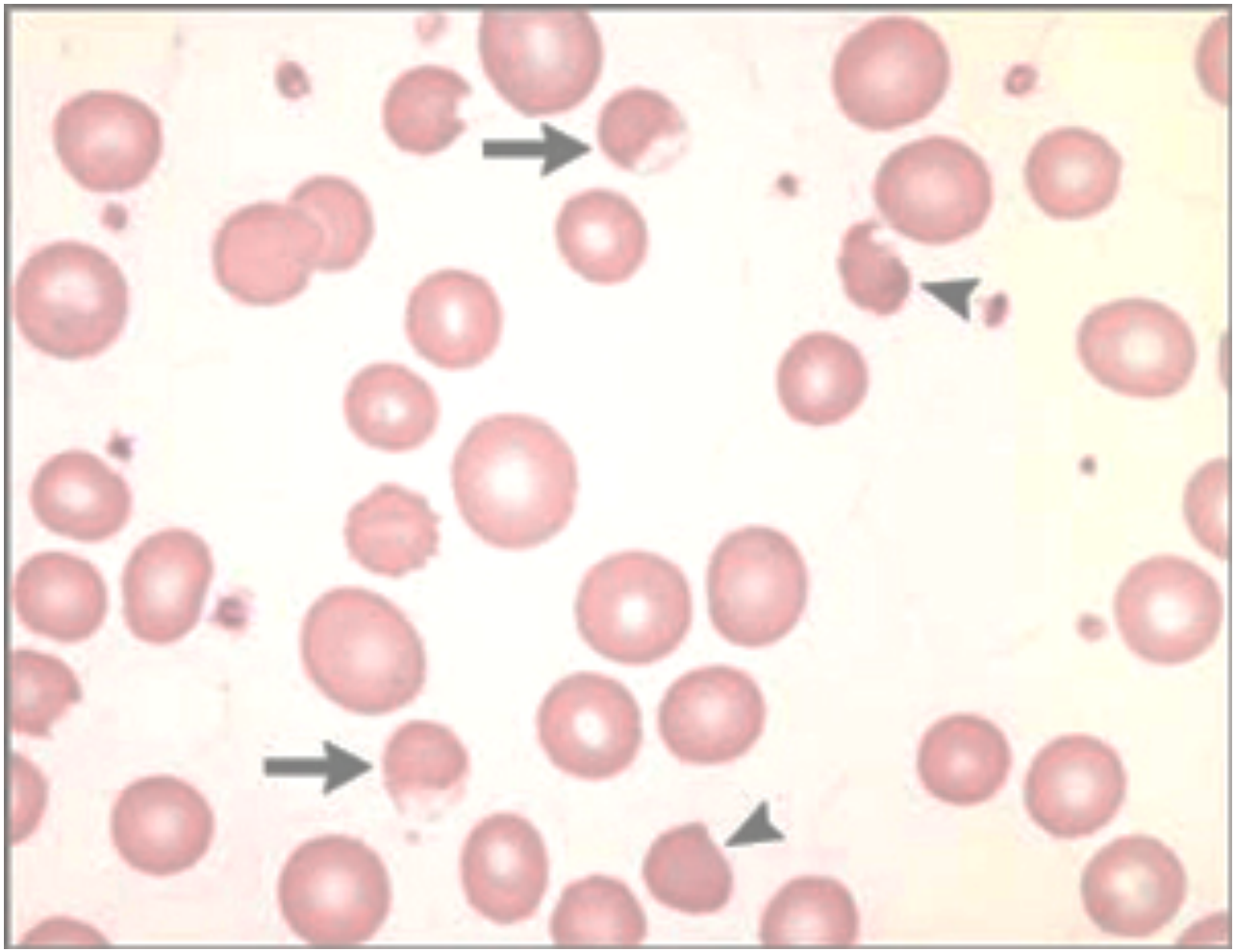
- Sickle cells absorb water and swell up and do not haemolyse. Therefore you cannot see the lines through the tube.

G6PD Deficiency

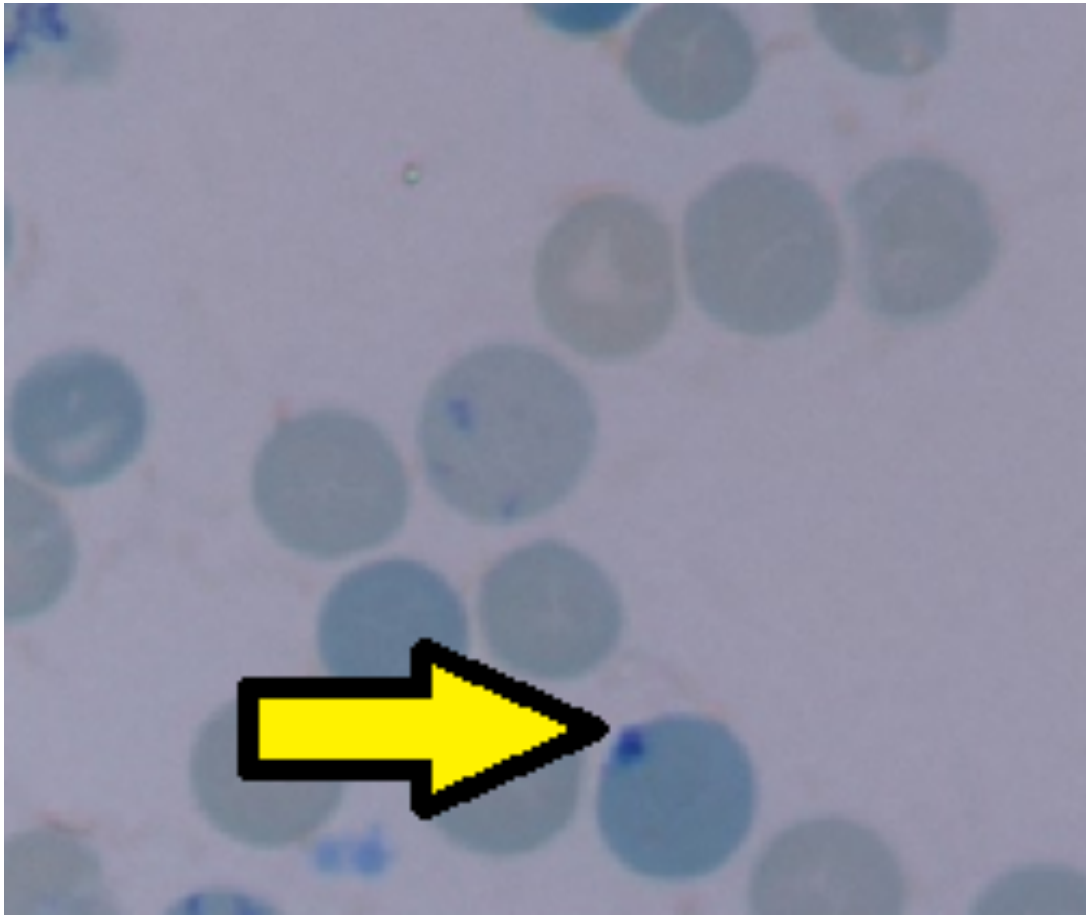


- Bite cell depicted by arrow
- The denatured haemoglobin present in the red cell has been bitten off by the RES system

Blister cells containing denatured haemoglobin

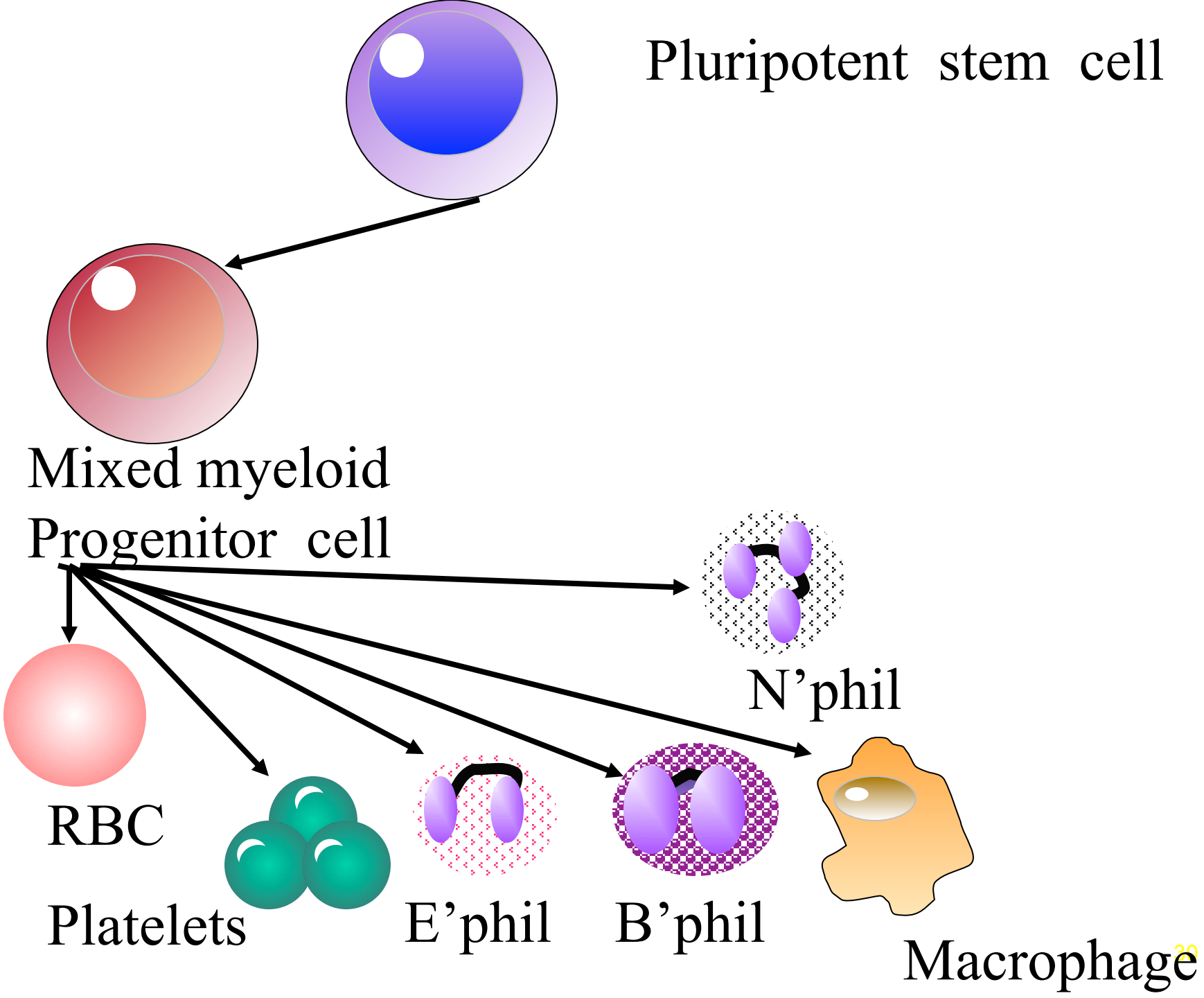


Heinz bodies



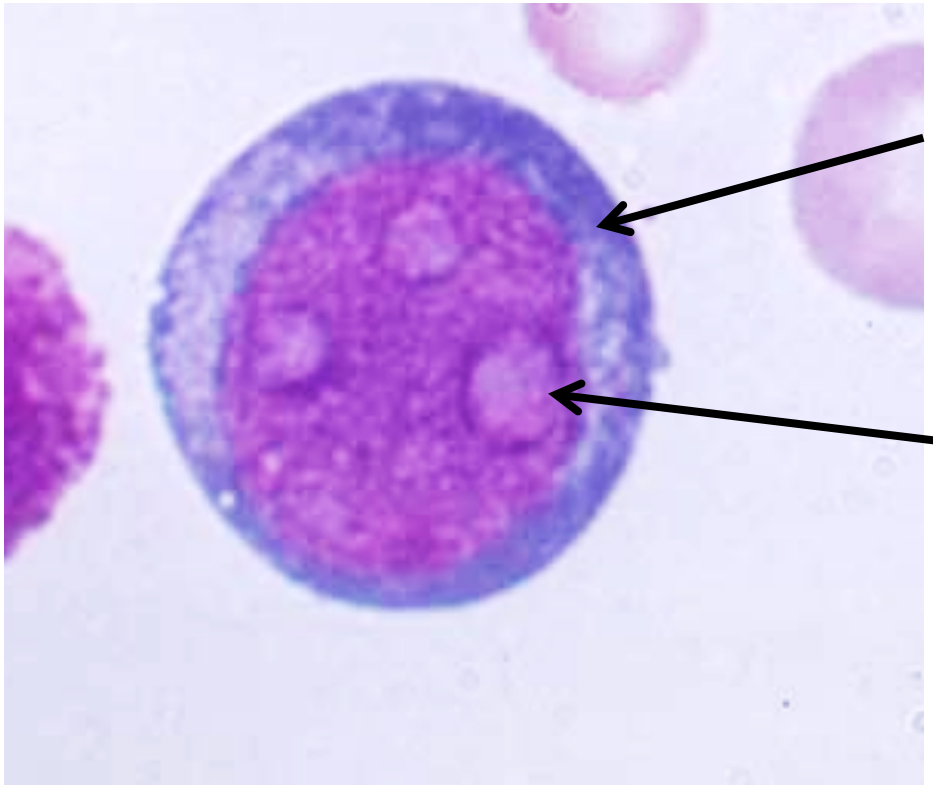
Oxidized denatured haemoglobin displayed by supravital staining

White cells


Pluripotent stem cell
Mixed myeloid
Progenitor cell
N'phil
RBC
Platelets
E'phil
B'phil
Macrophage

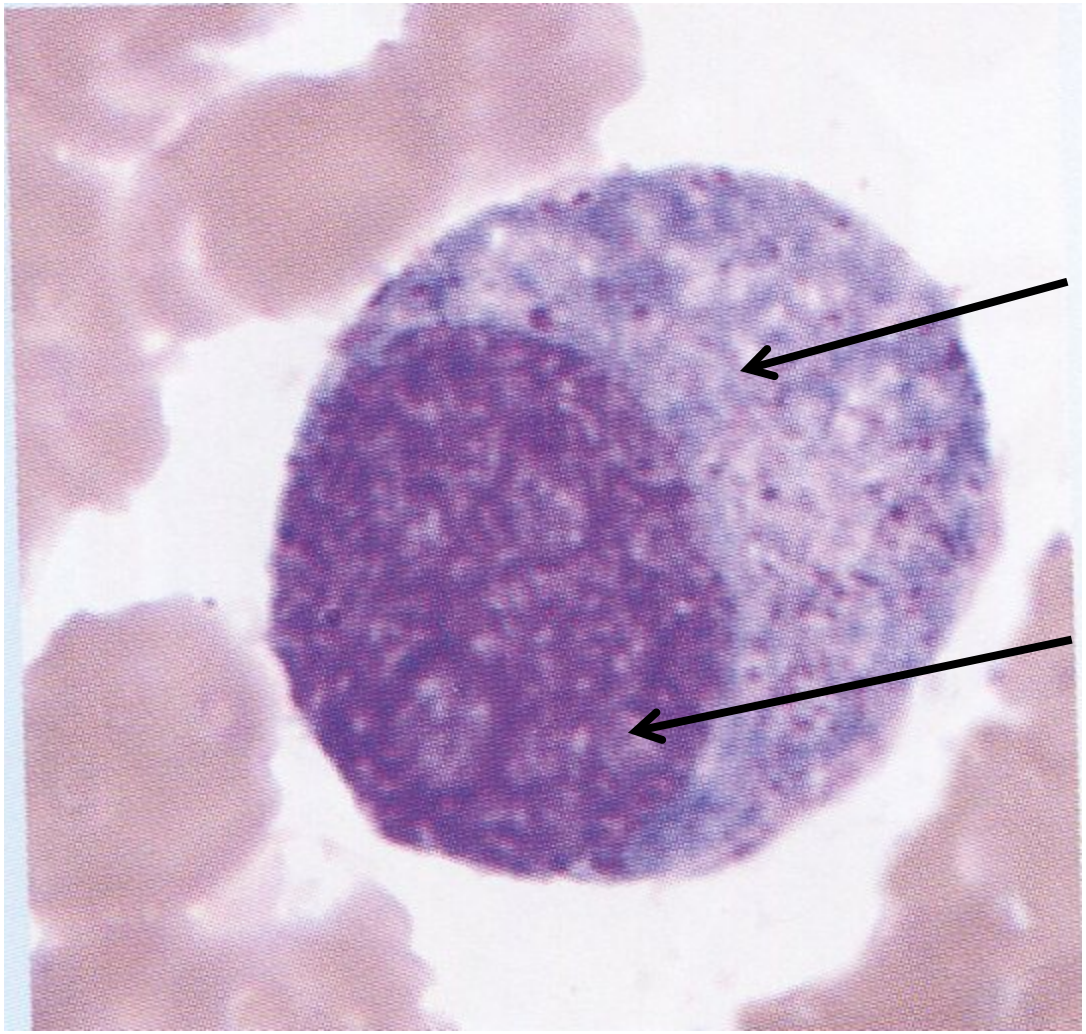
Granulopoiesis

Myeloblast

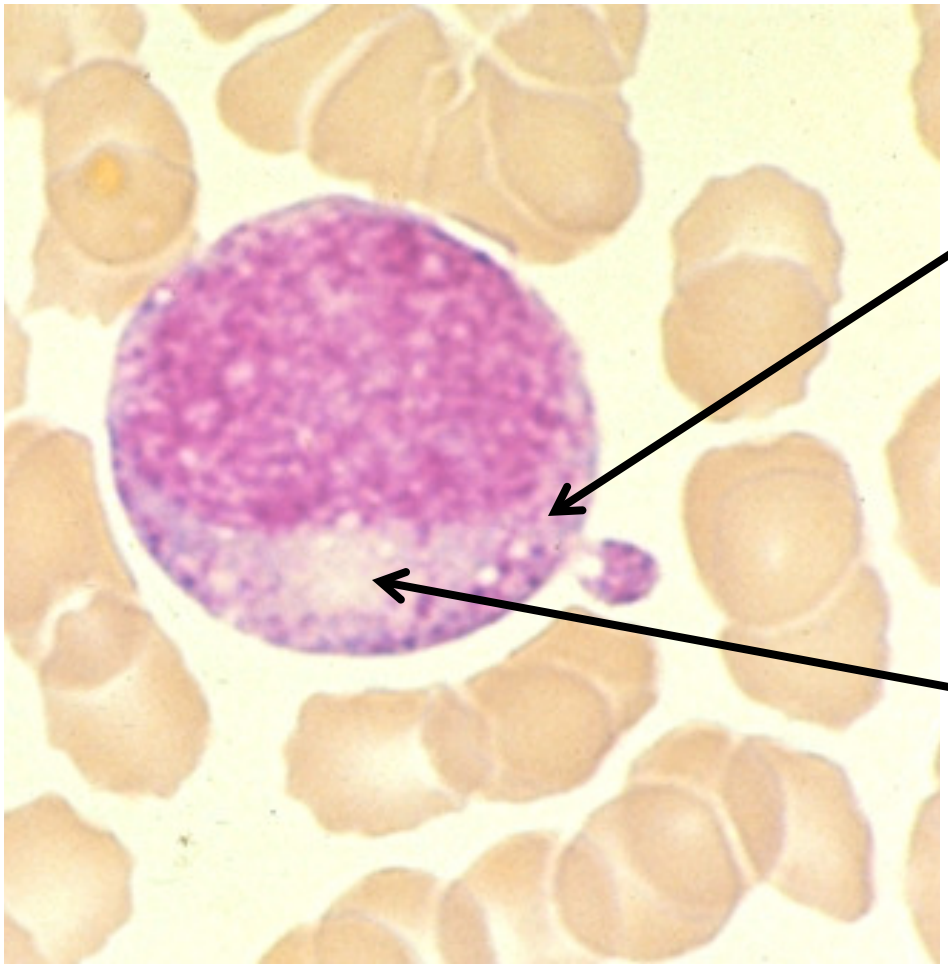


High nuclear : cytoplasmic ratio

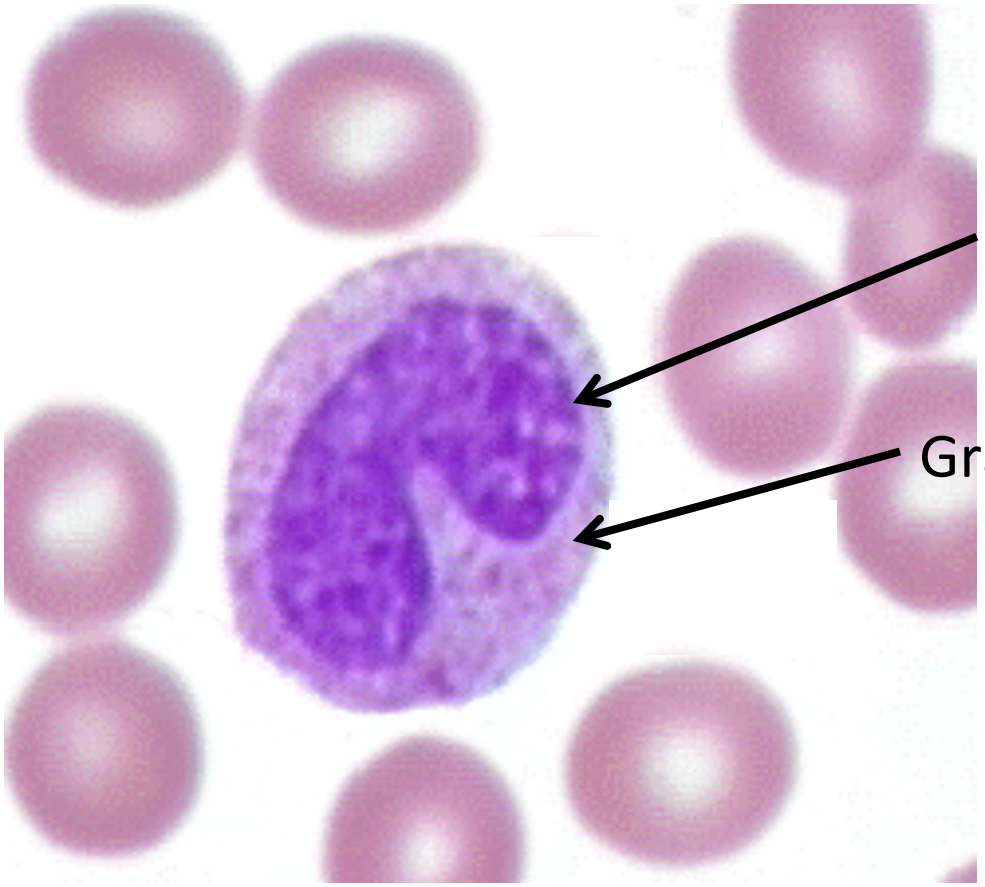
Promyelocyte



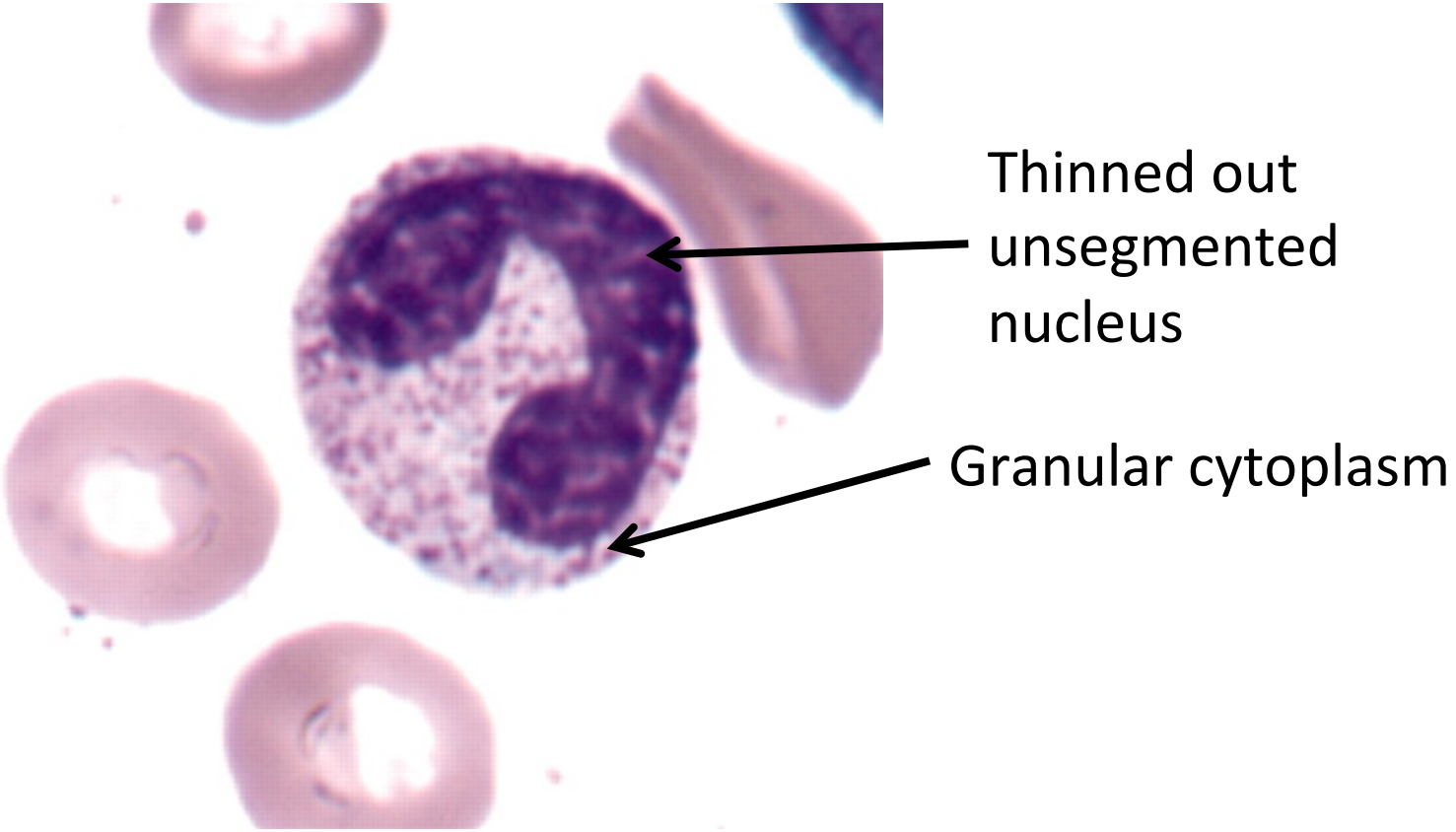
Myelocyte



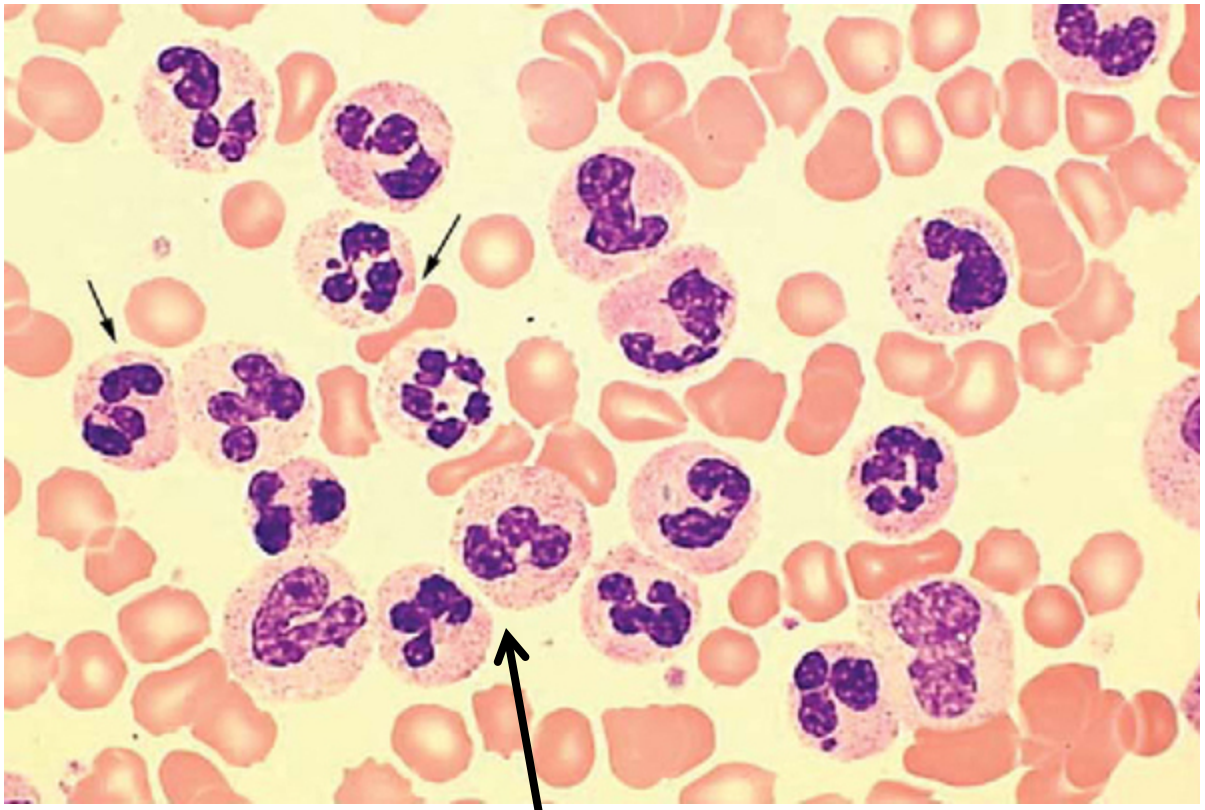
Metamyelocyte



Band forms

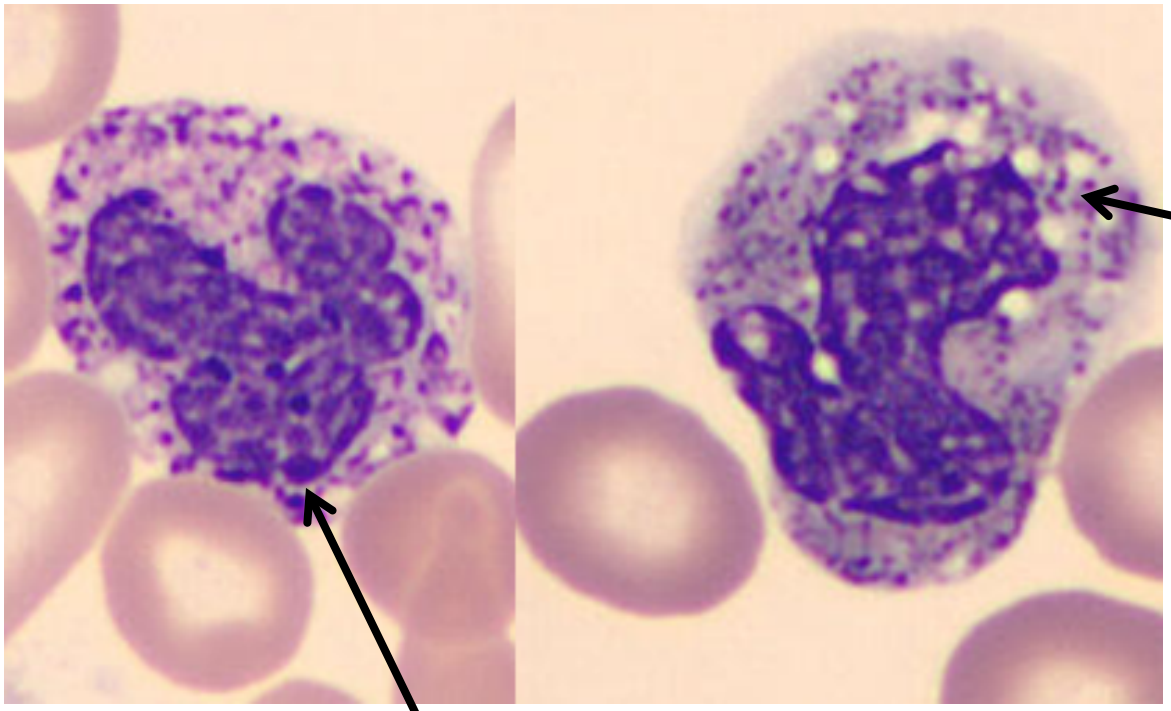


Neutrophil

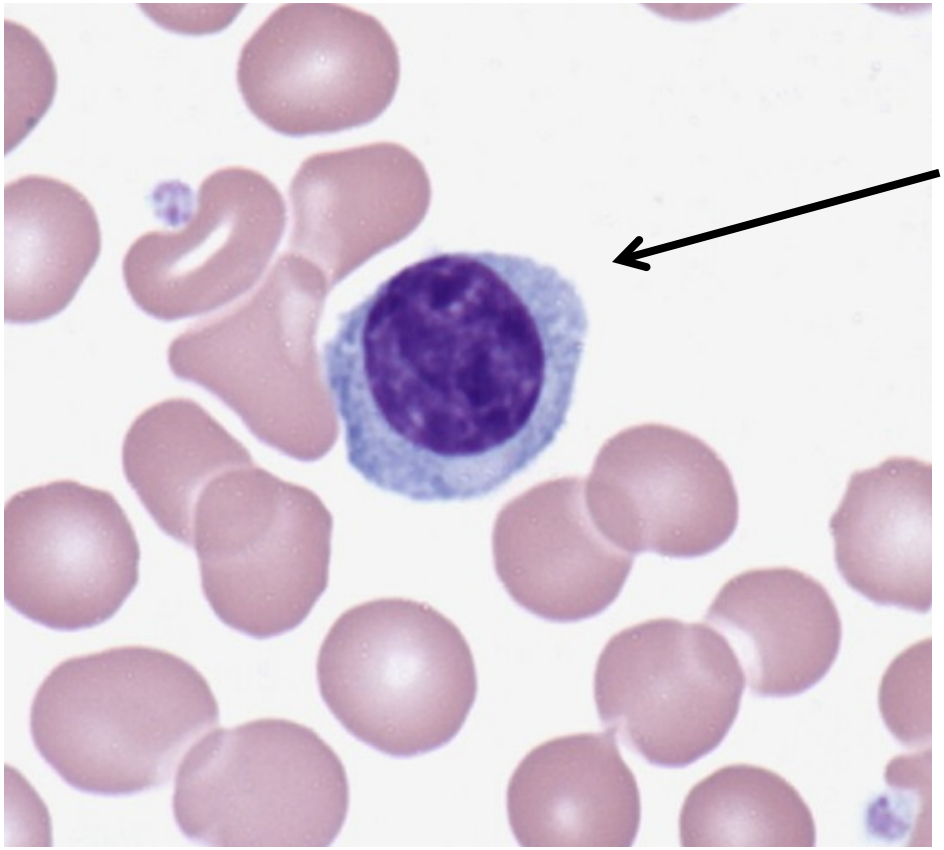


Segmented nucleus
3 – 5 nuclear lobes

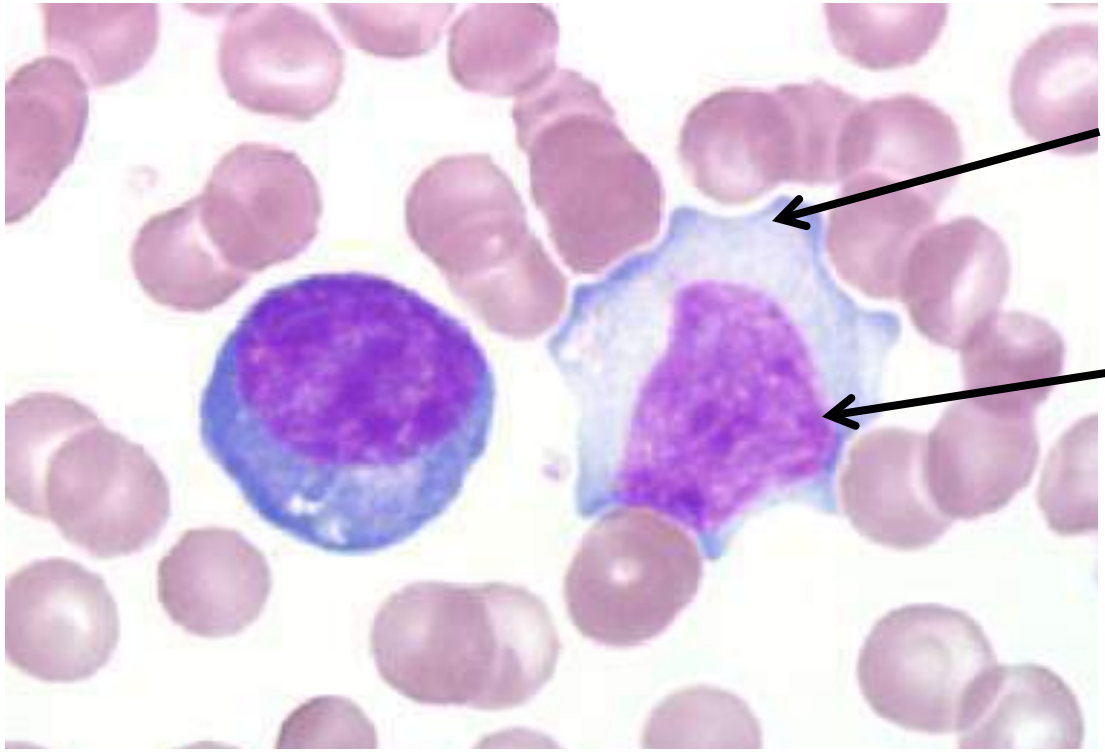
Neutrophil with toxic changes



Lymphocyte

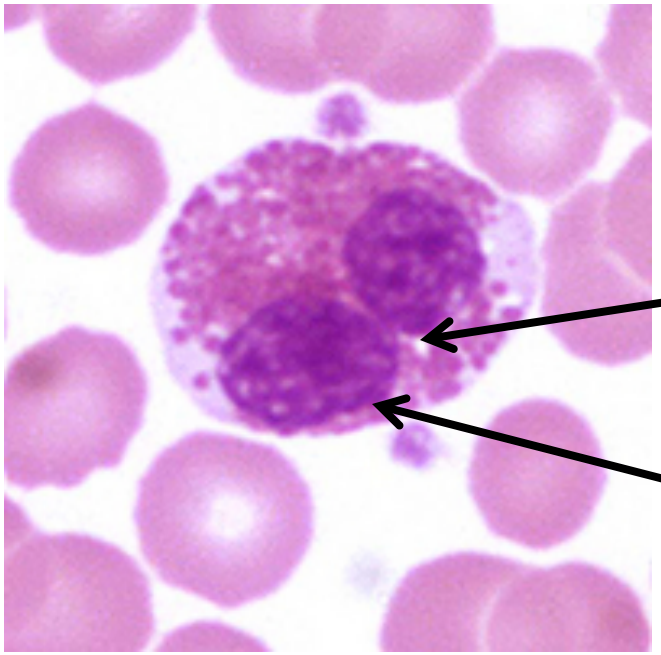


Reactive lymphocyte

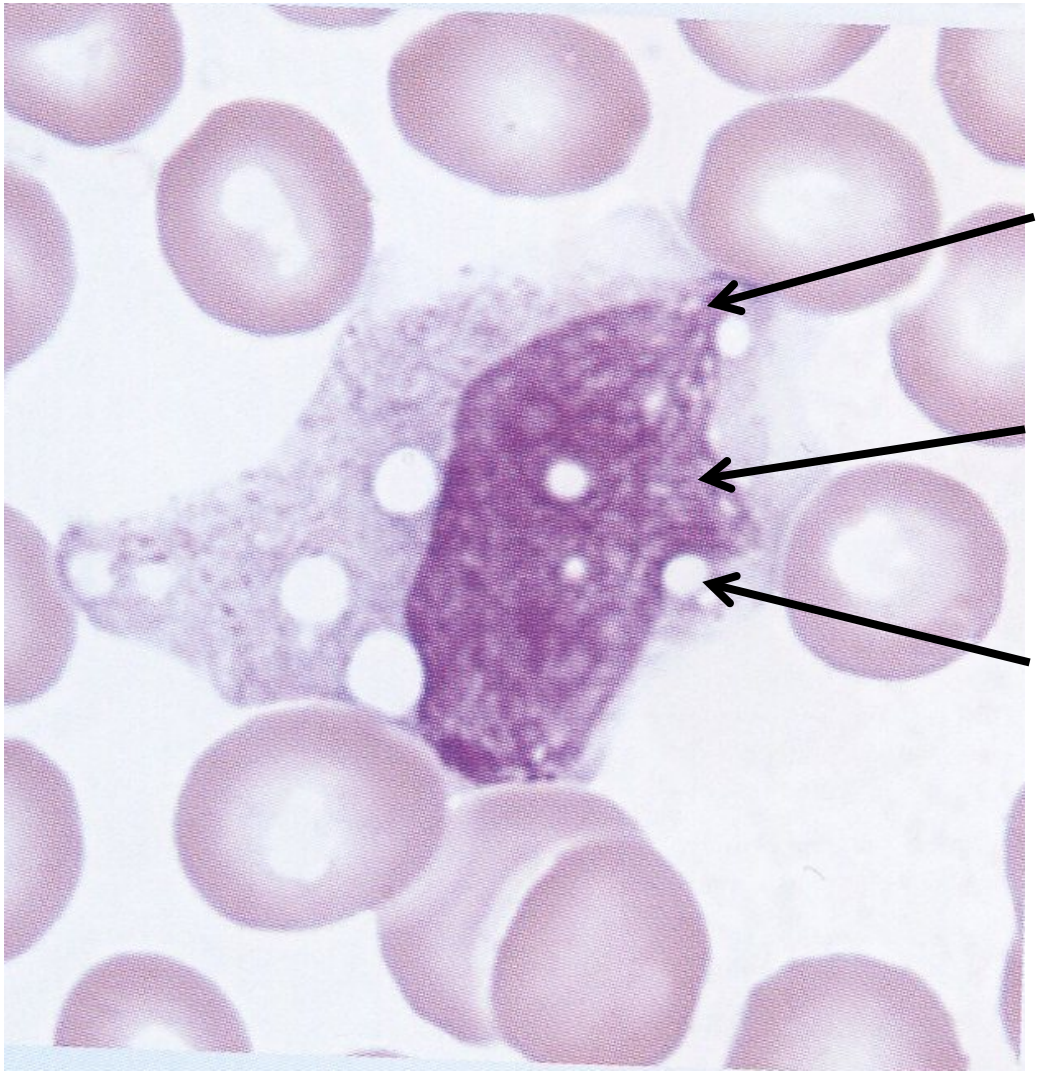


May resemble a monocyte

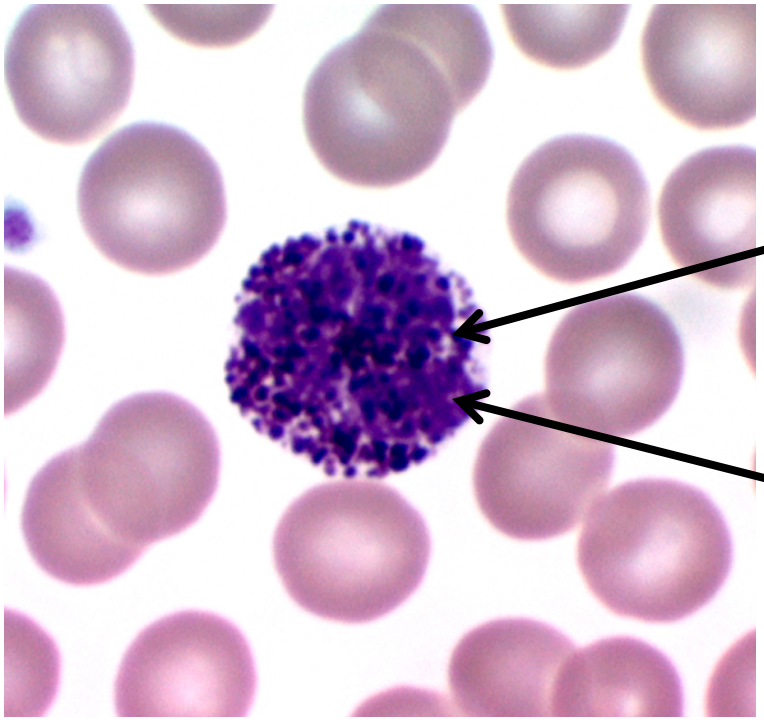
Eosinophil



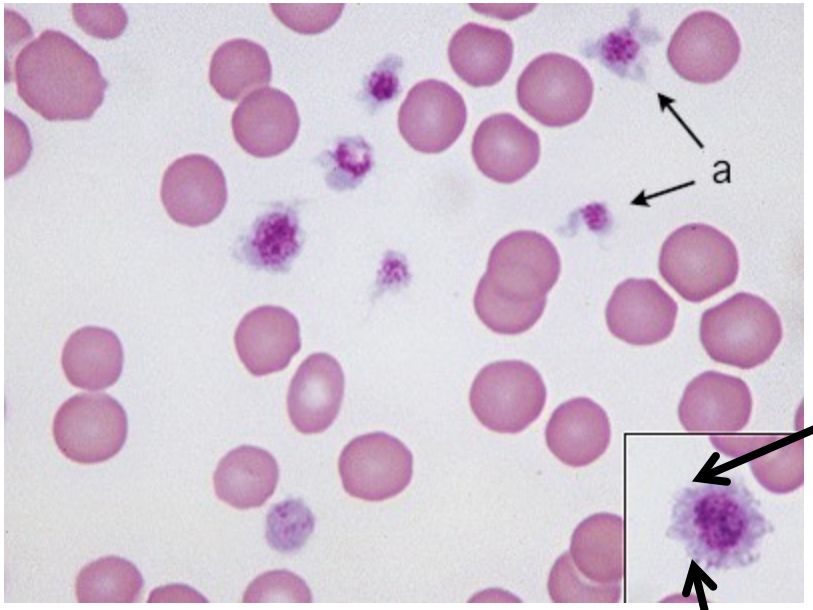
Monocyte


Granular cytoplasm
Large irregular nucleus
Phagocytic vacuoles

Basophil



Platelets

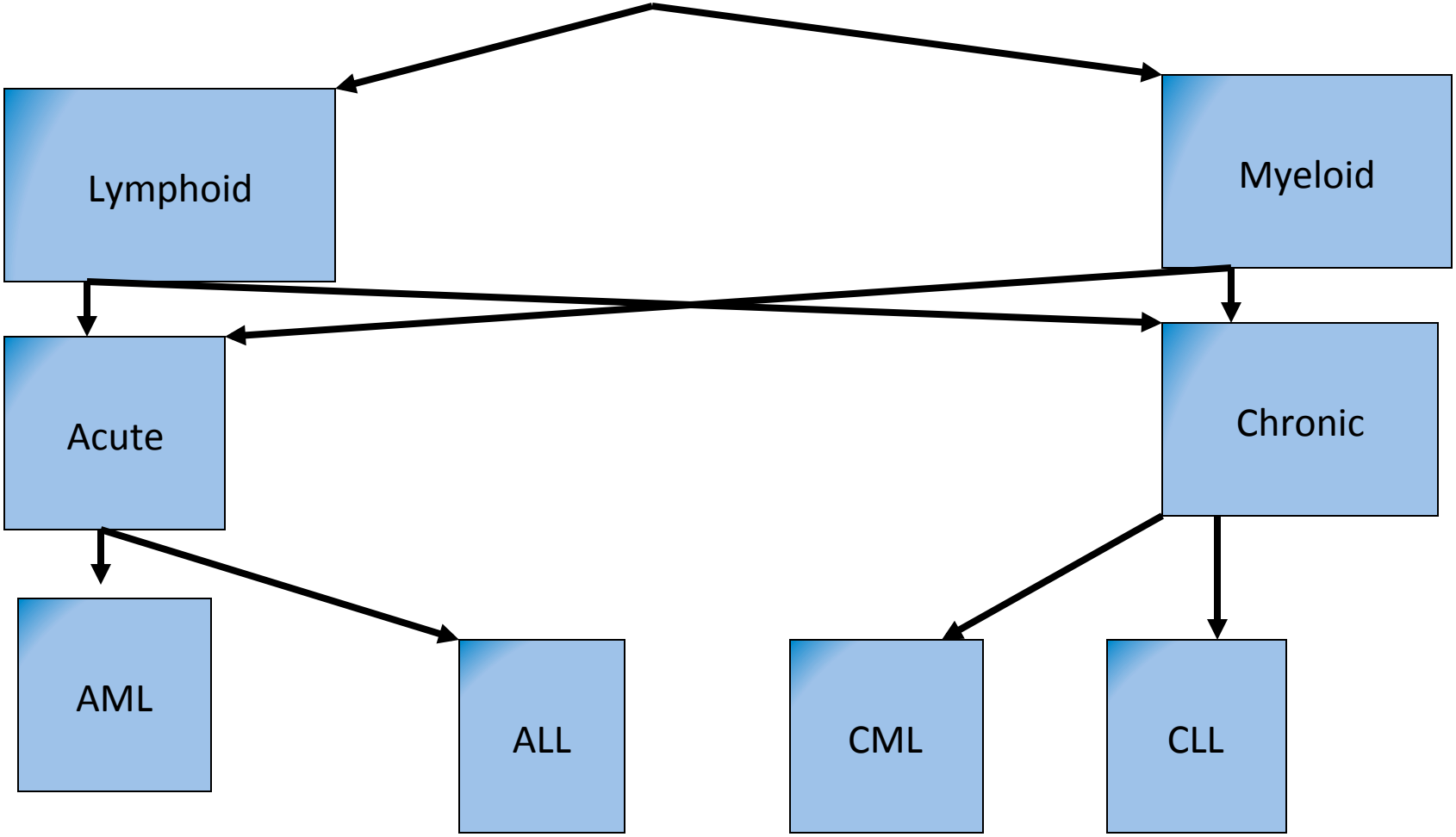


Cytoplasmic projections

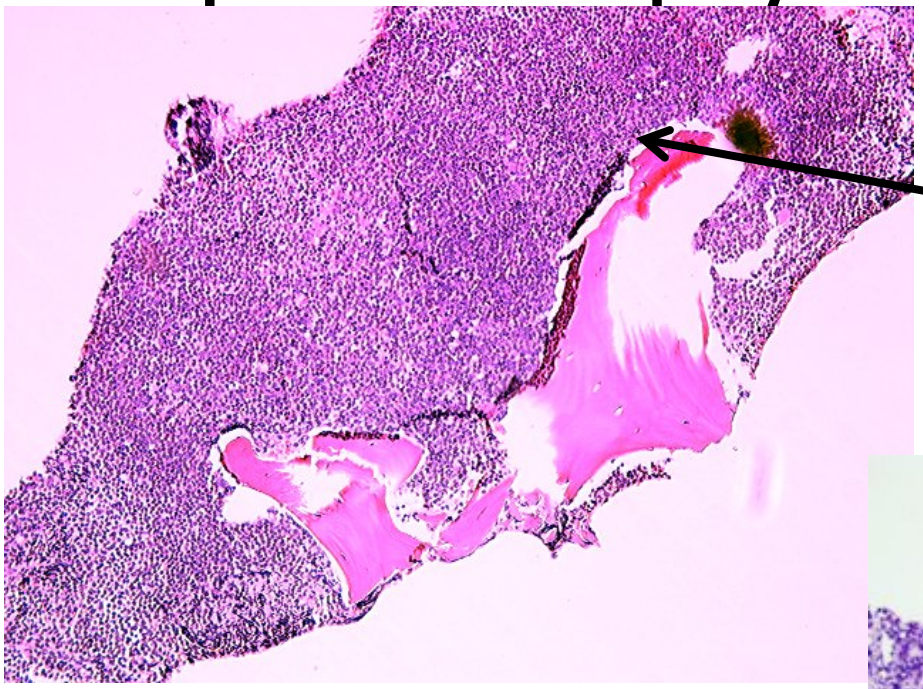
No nucleus

Granular cytoplasm

Leukaemia Classification

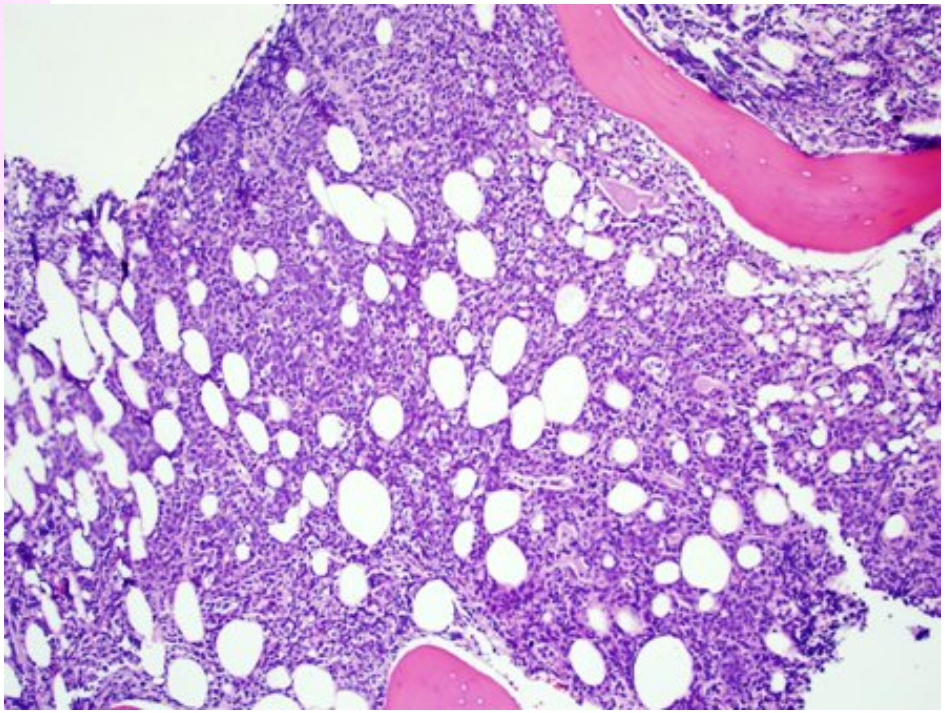


Trephine biopsy in acute leukaemia

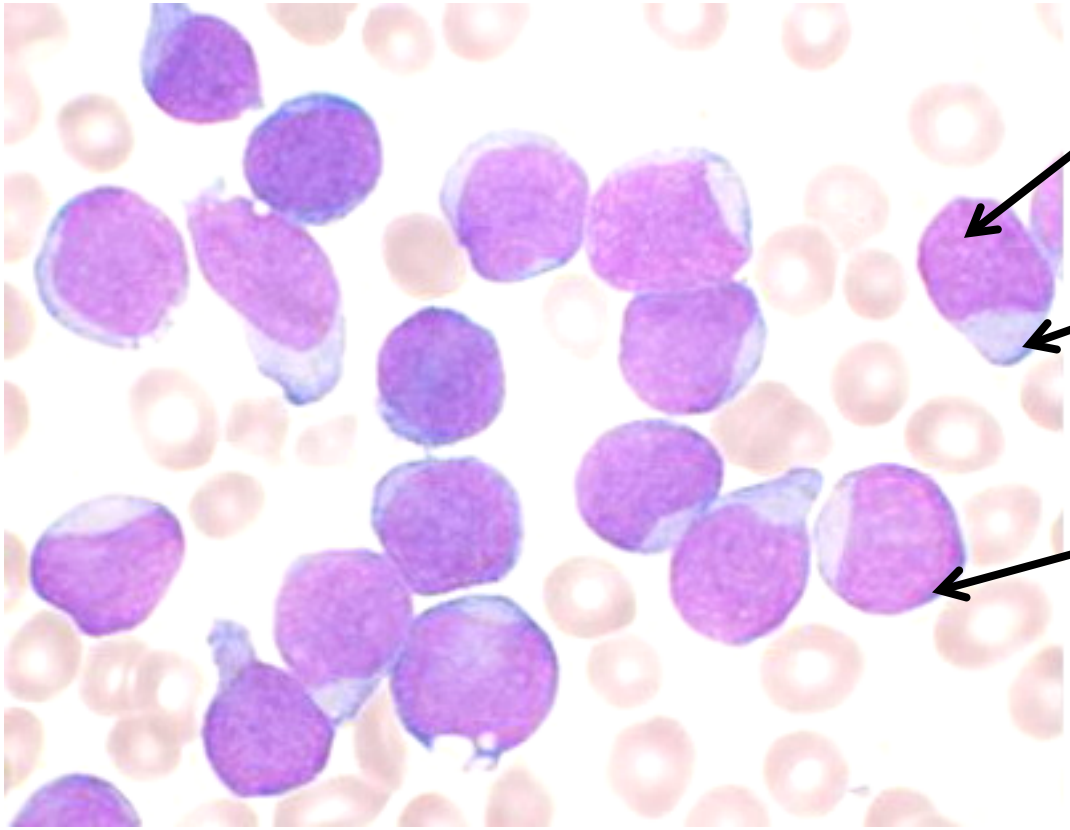


Inter trabecular spaces completely packed with cells.

Absent fat cells



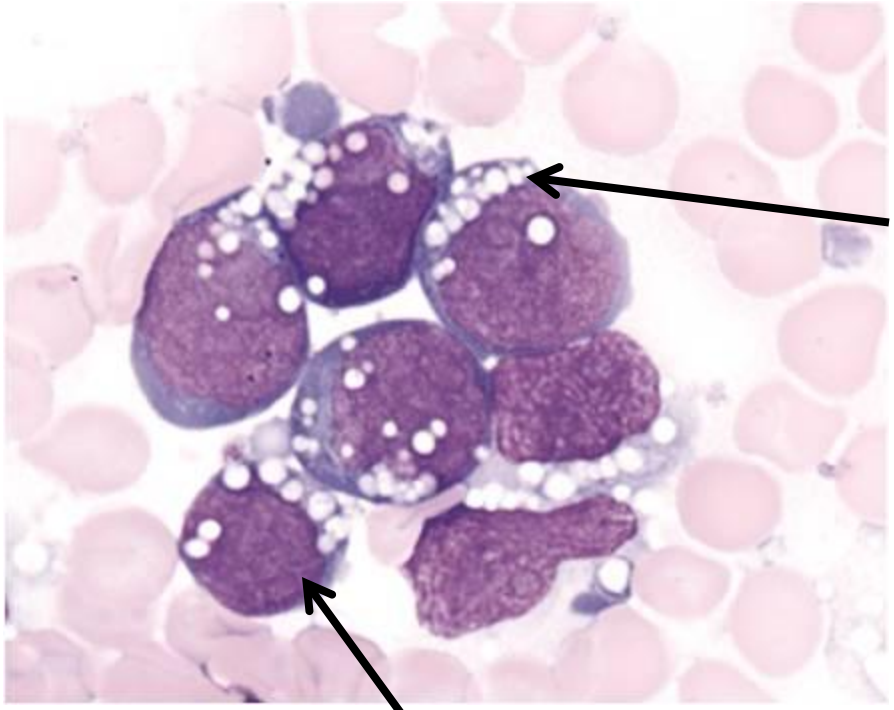
Acute lymphoblastic leukaemia



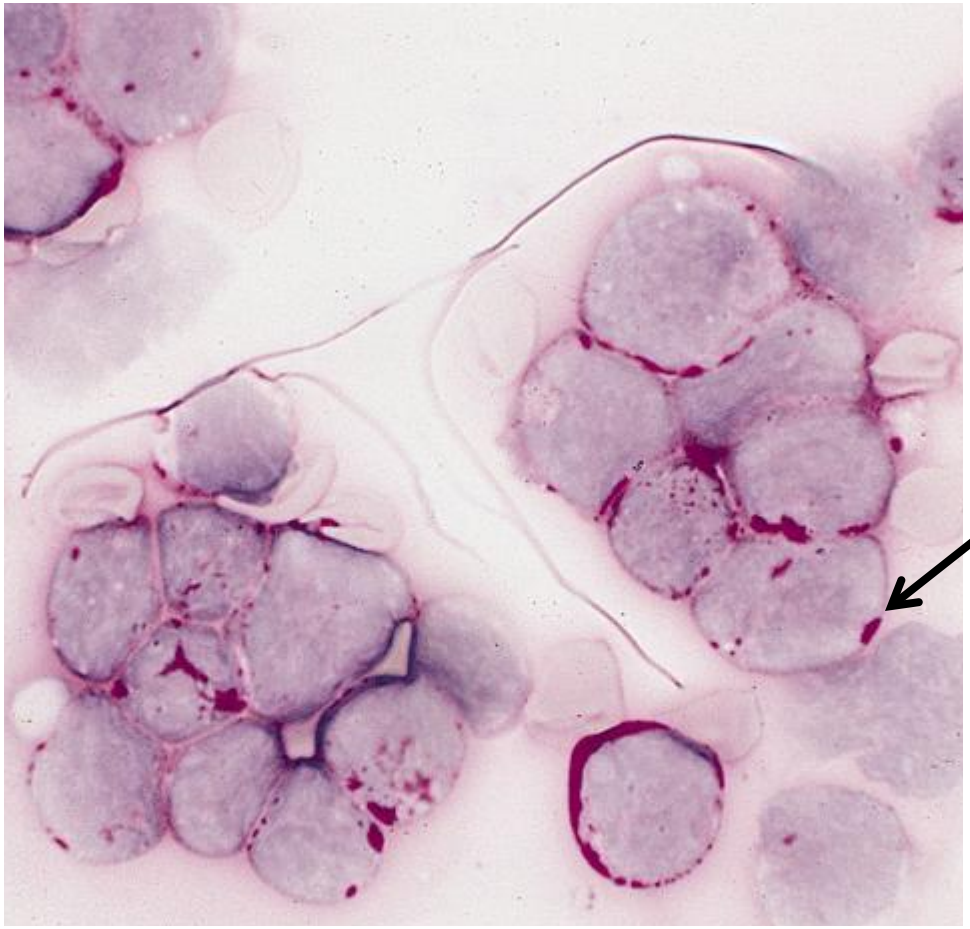
High nuclear cytoplasmic ratio

Monomorphic cells

Acute lymphoblastic leukaemia

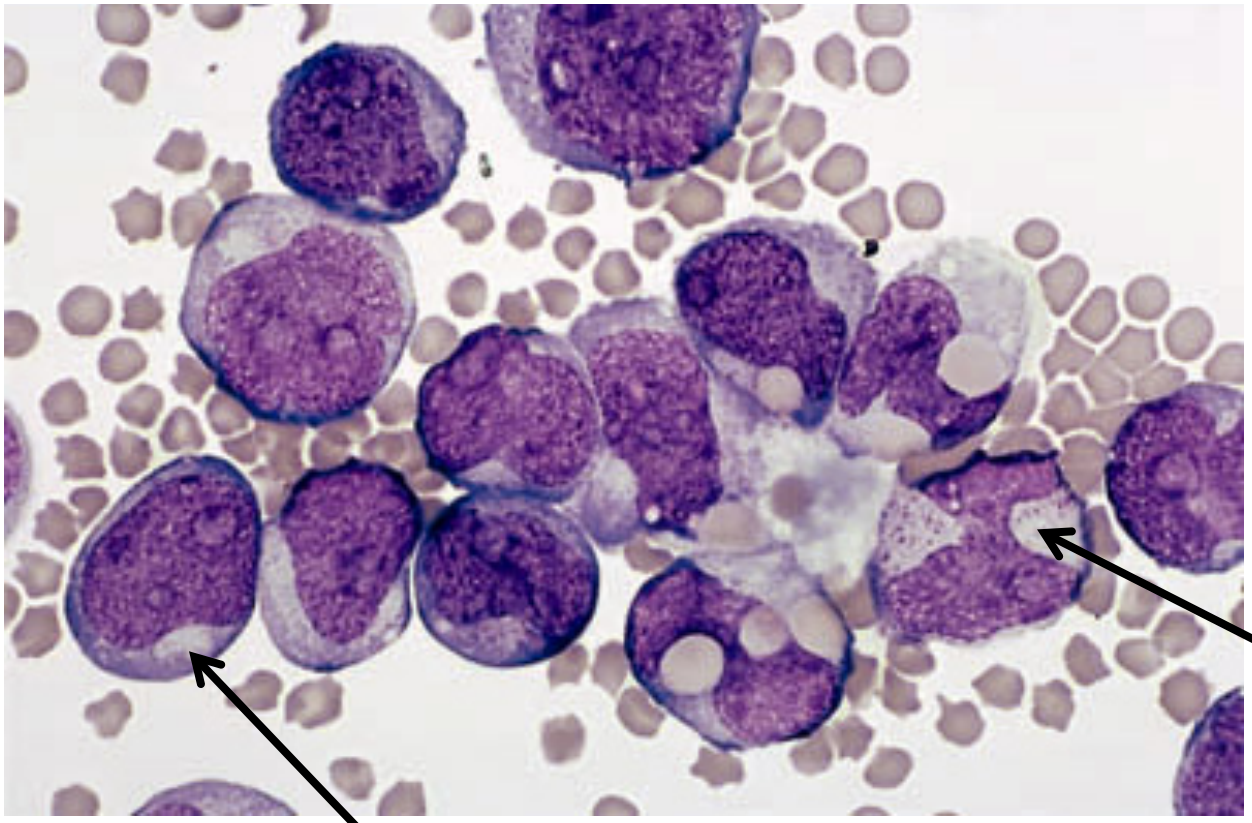


PAS stain

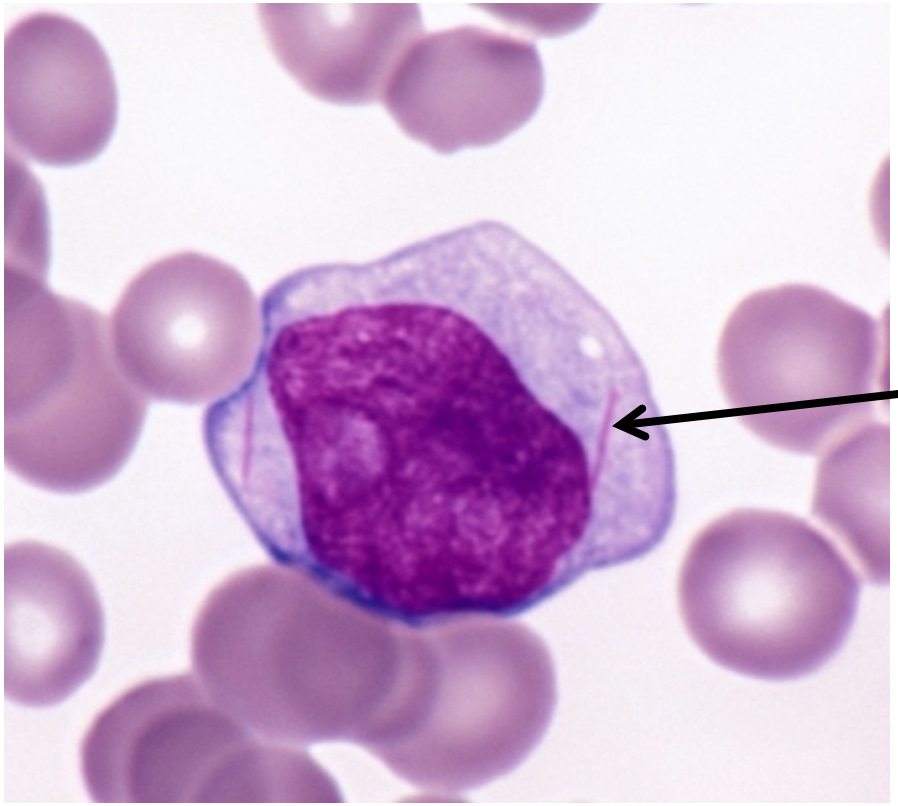


Block positivity in ALL
Blast cells

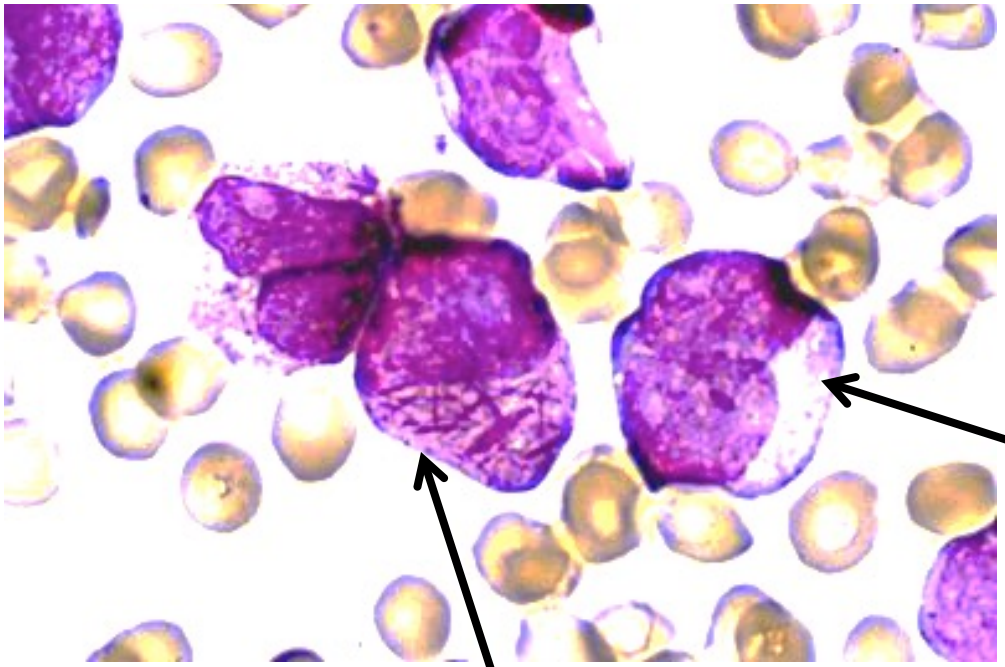
Acute myeloblastic leukaemia



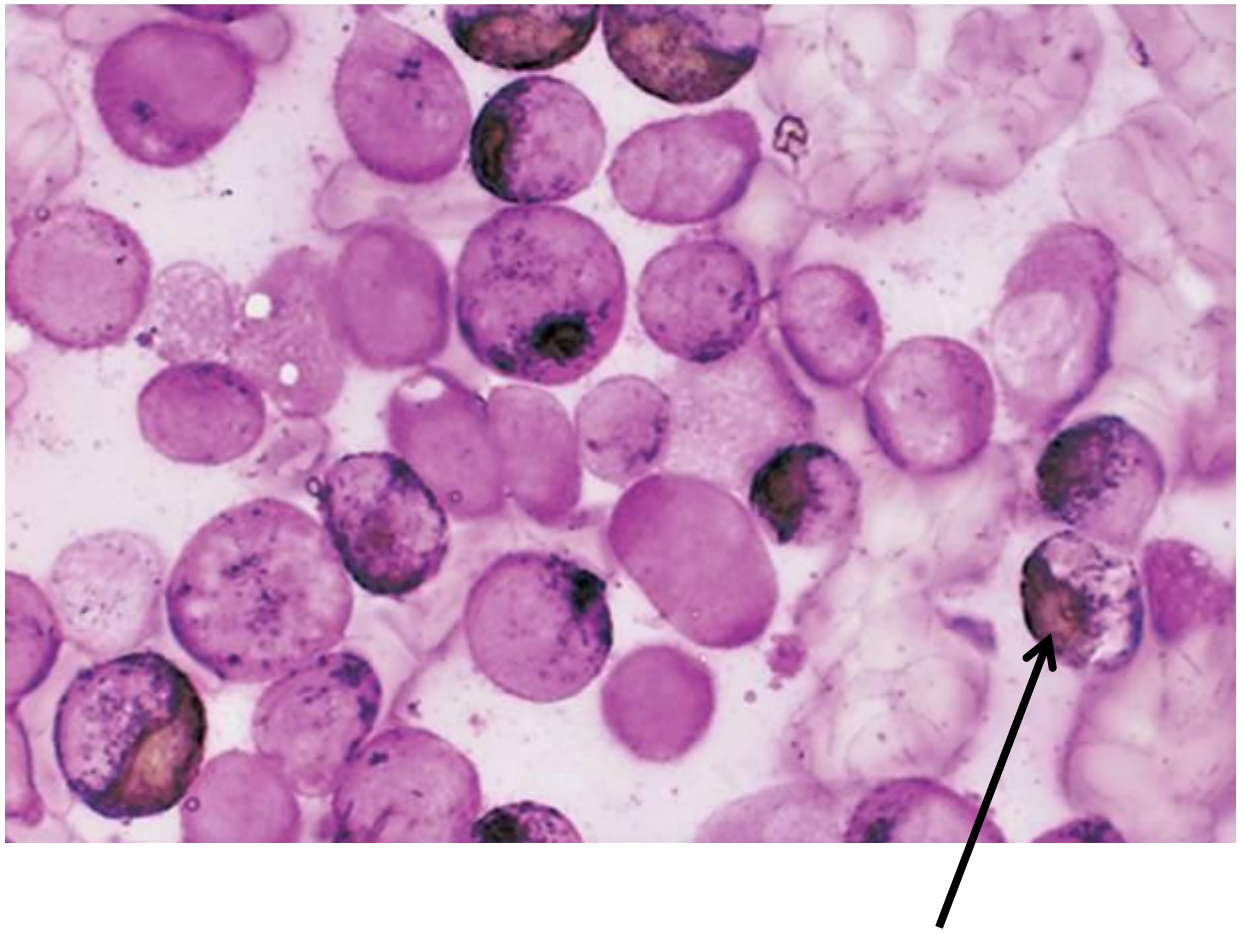
Myeloblast containing Auer rods



Acute promyelocytic leukaemia

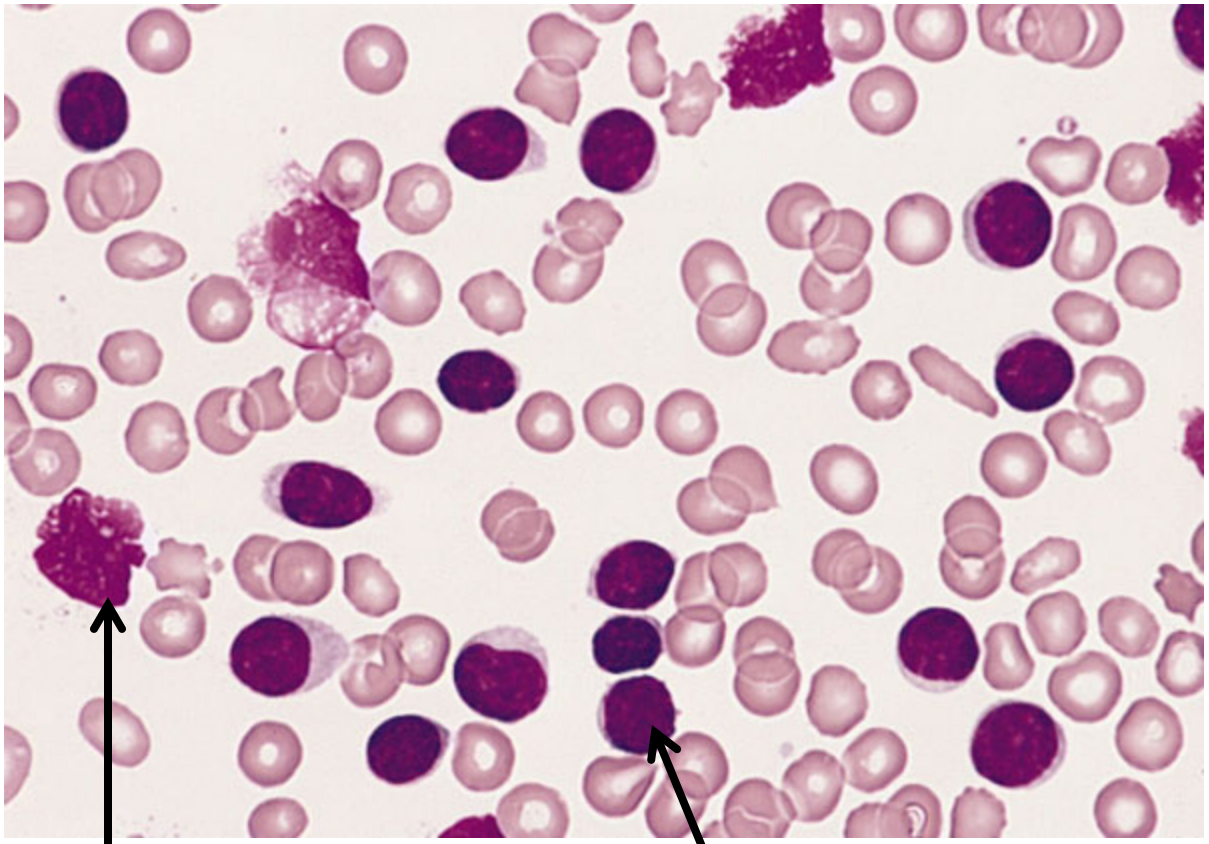


Sudan Black B stain



Myeloblast cytoplasmic granules stain with SBB

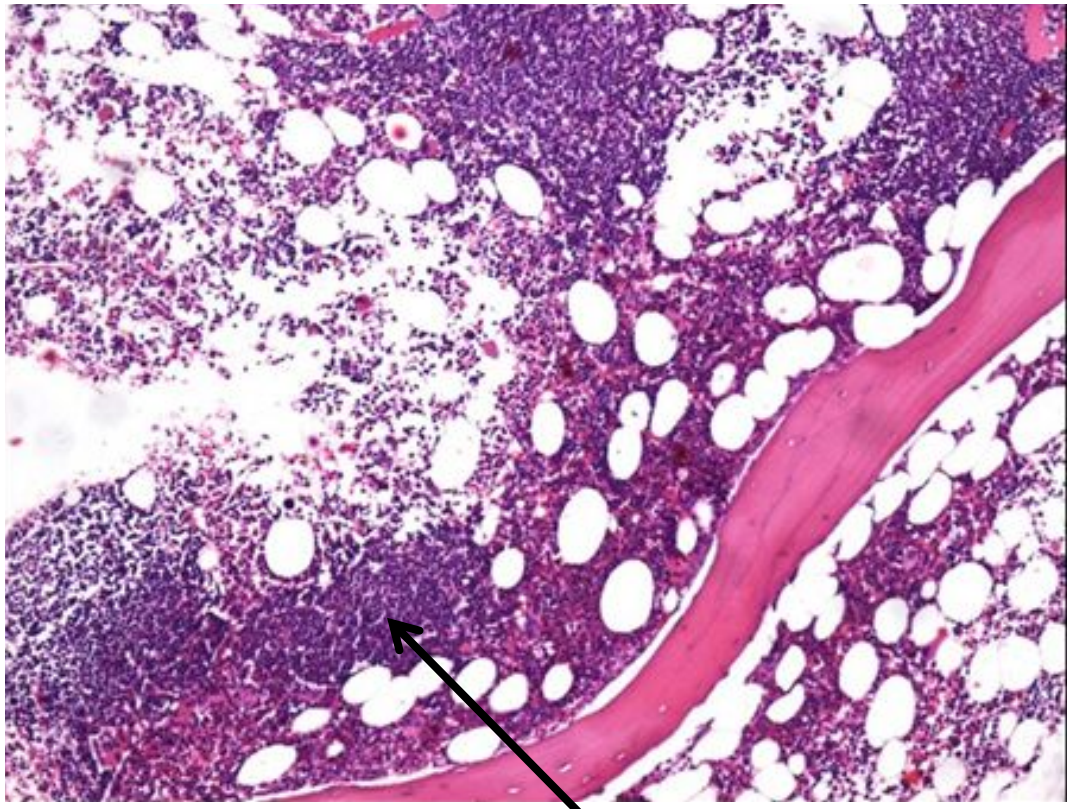
Chronic lymphocytic leukaemia



Smudge cells

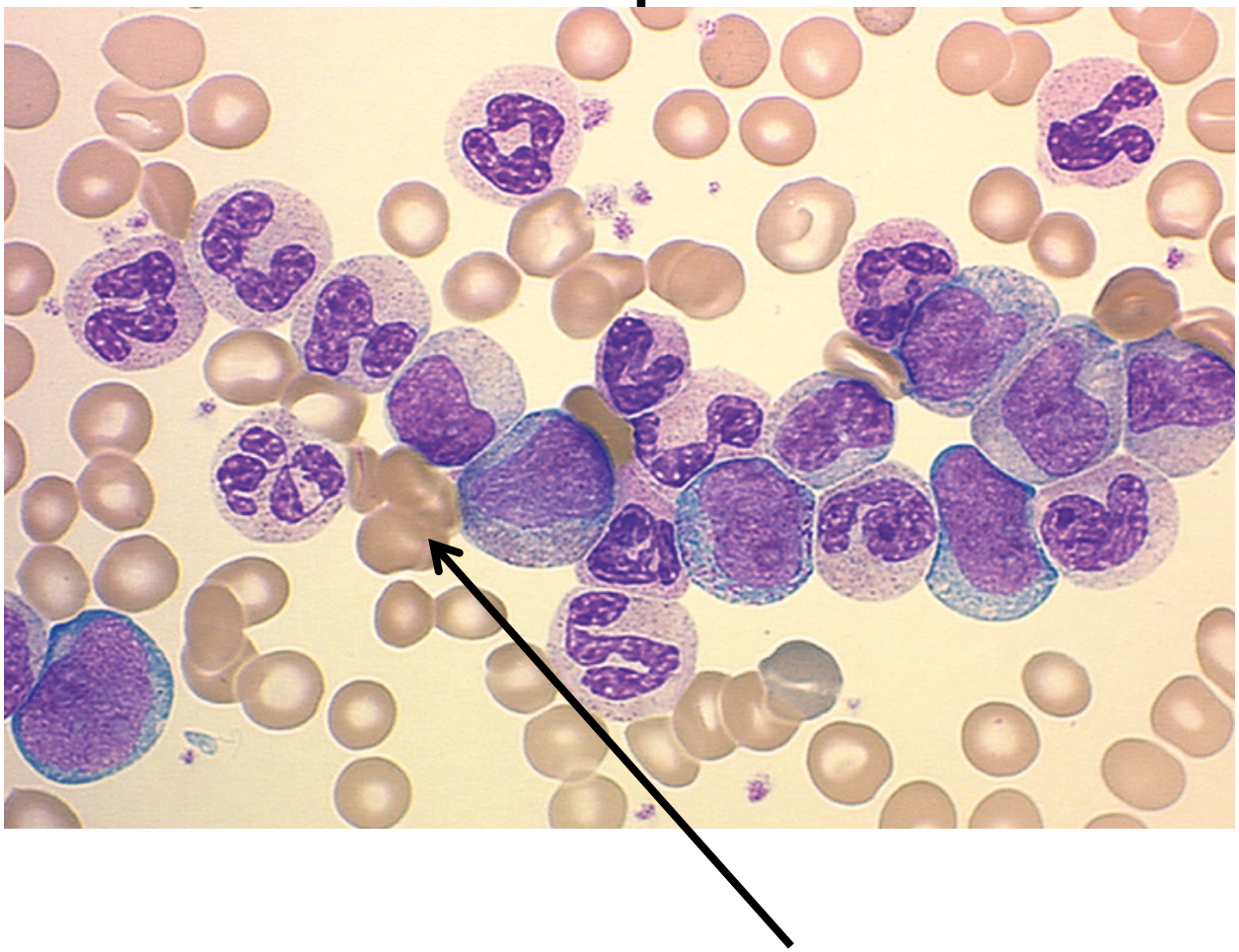
Small mature lymphocytes

CLL in trephine biopsy



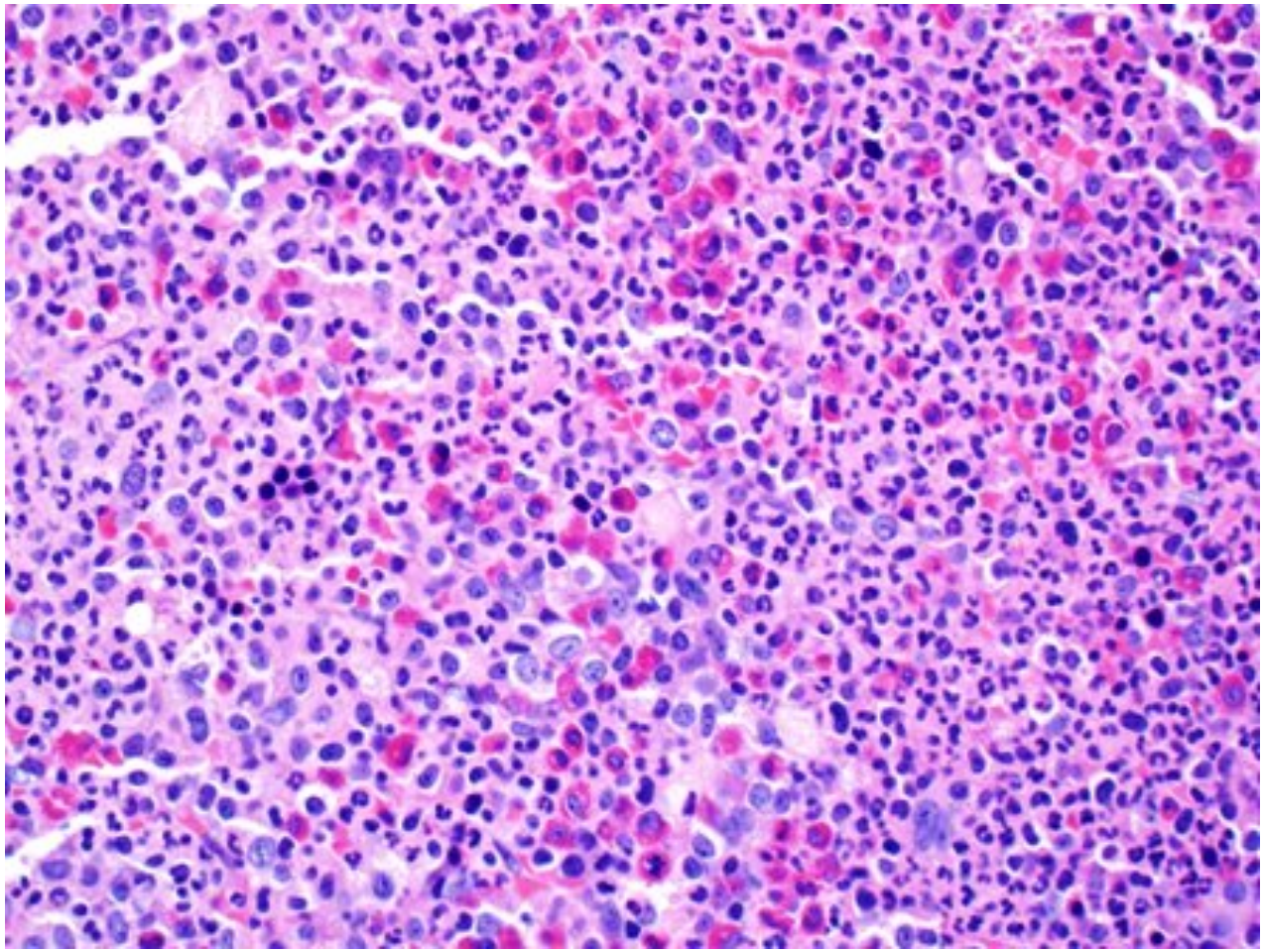
Dark areas of small lymphocyte infilration in CLL

Chronic myeloid leukaemia chronic phase



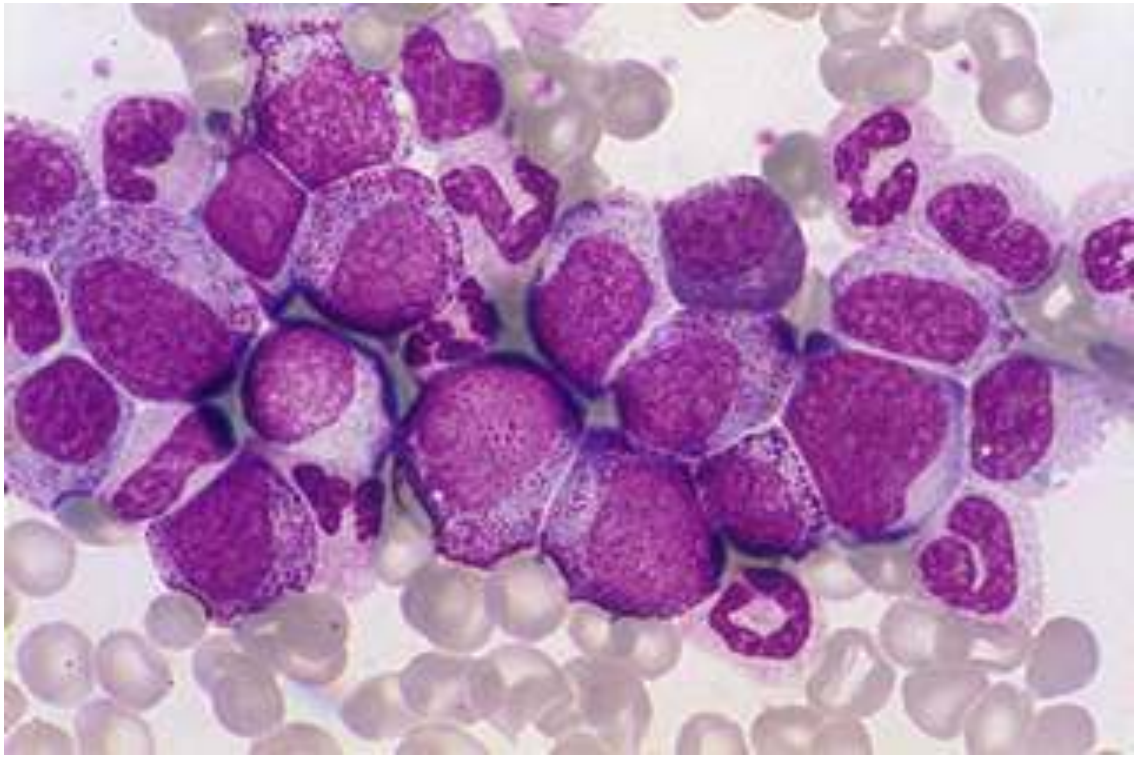
All stages of maturation present

Trephine biopsy in CML



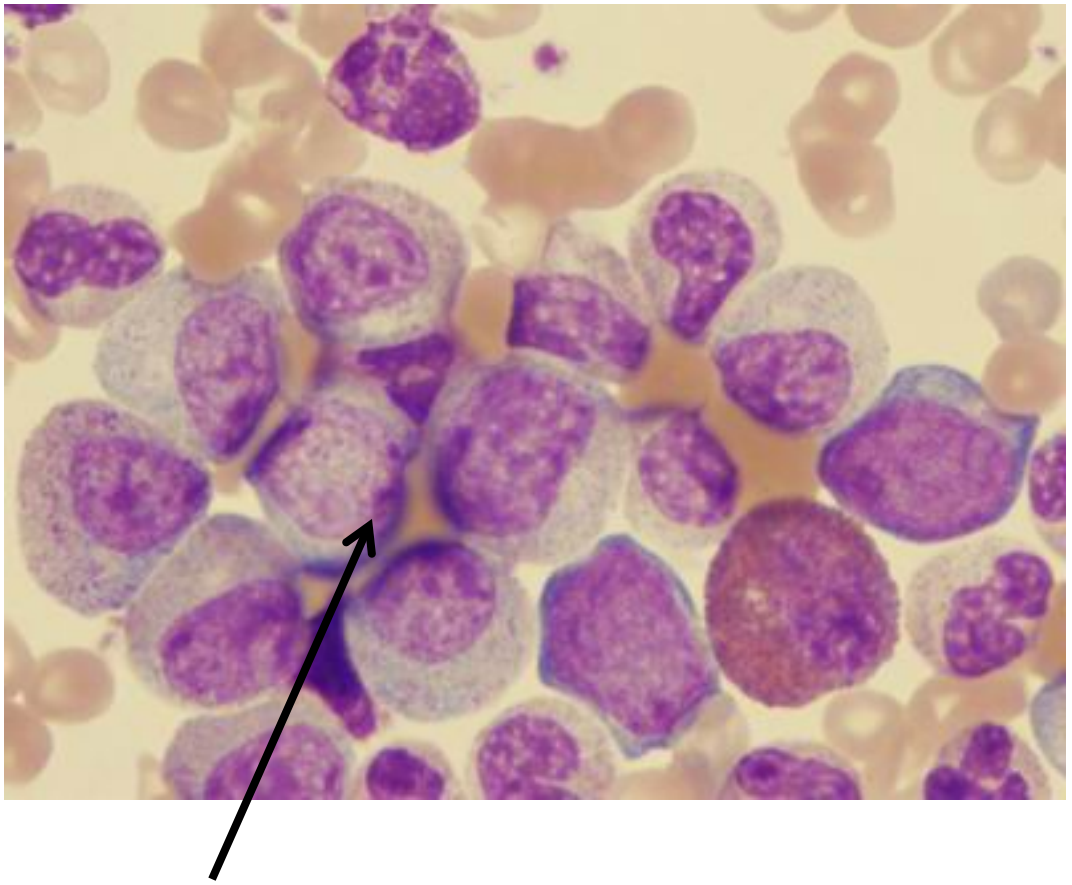
Prominent granulopoiesis with
eosinophil precursors

Chronic myeloid leukaemia accelerated phase



- Note increase of blast cells containing nucleoli
- Mature cells are also present

Chronic myeloid leukaemia blast crisis



Predominantly blast cells with occasional eosinophil precursors