Myelodysplastic syndrome-MDS

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Myelodysplastic Syndromes (MDS)

- **Definition: Myelo = marrow**
  Dys = irregular
  Plasia = proliferation

- **Normal bone marrow makes healthy blood cells (red, white and platelet cells)**

What happens in MDS?

- In MDS, the bone marrow makes the blood cells badly (dysplasia), causing low blood counts and cells that don’t work very well

- Group of clonal stem cell disease
- Abnormal proliferation
- Asynchronous and delayed maturation
- Early apoptosis
- Ineffective hematopoiesis
- Hypercellular BM+ peripheral blood (PB) cytopenia.
- Quantitative & qualitative abnormalities
- Progressive BM failure
- Increased risk of AML

MDS

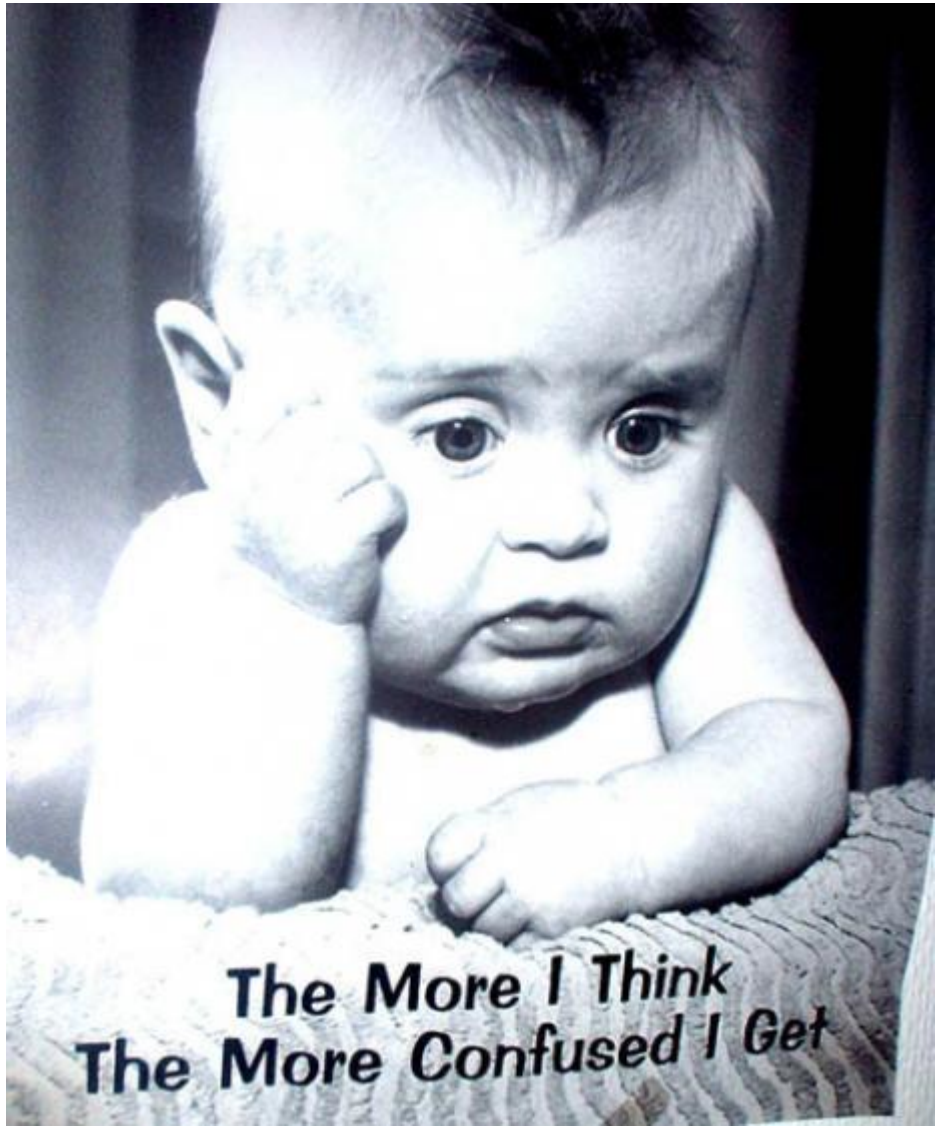
PRIMARY

SECONDARY

- Chemotherapy
- Radiotherapy

Pathogenesis

- Poorly understood



Clinical features

- Disease of old age-median 70y
- Asymptomatic
- Related to cytopenias
- anaemia> other cytopenias
- Organomegaly -infrequent

DD

- Excess alcohol
- Megaloblastic anaemia
- Infections-Parvovirus/HIV
- Recovery from Chemotherapy
- GCSF treatment

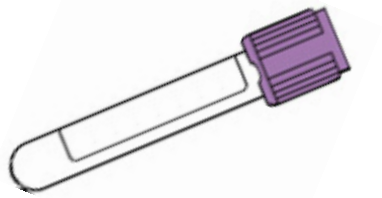
Investigations

Rule out other causes

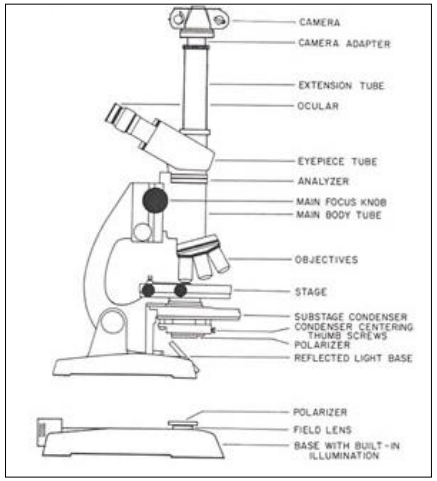
EX:B 12/folate def

confirm the diagnosis of MDS

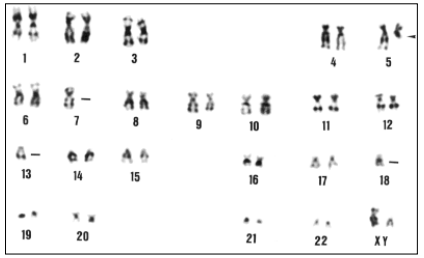
FBC+BP



BM + iron stain



Cytogenetic



1.Peripheral blood

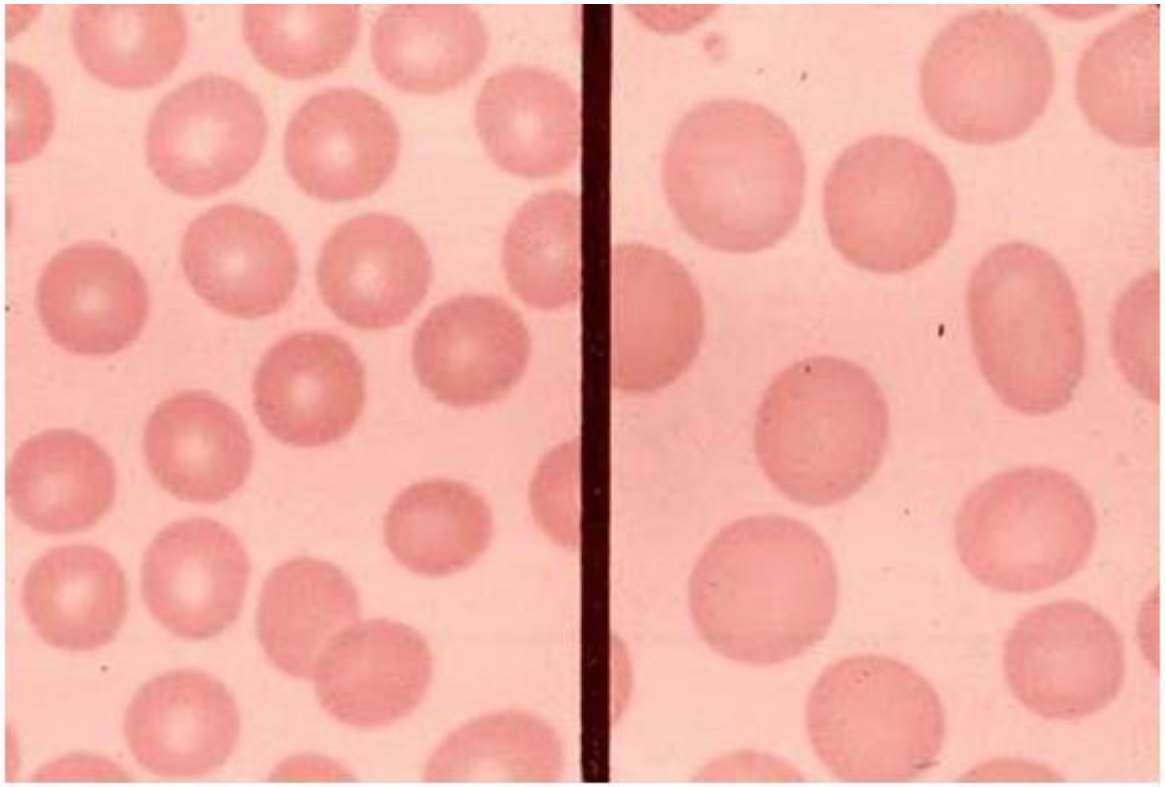
1.Cytopenias

2.Dyspalstic features

3.Immature cells

MDS-Red cells

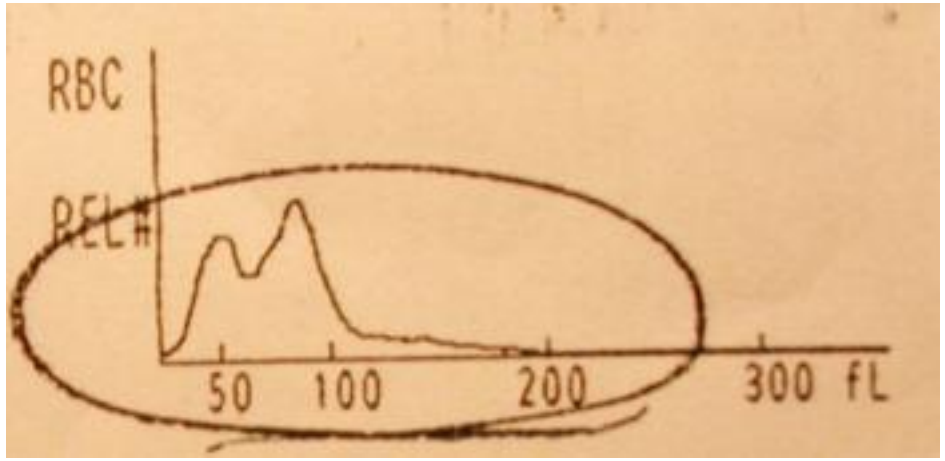
- **Macrocytes**

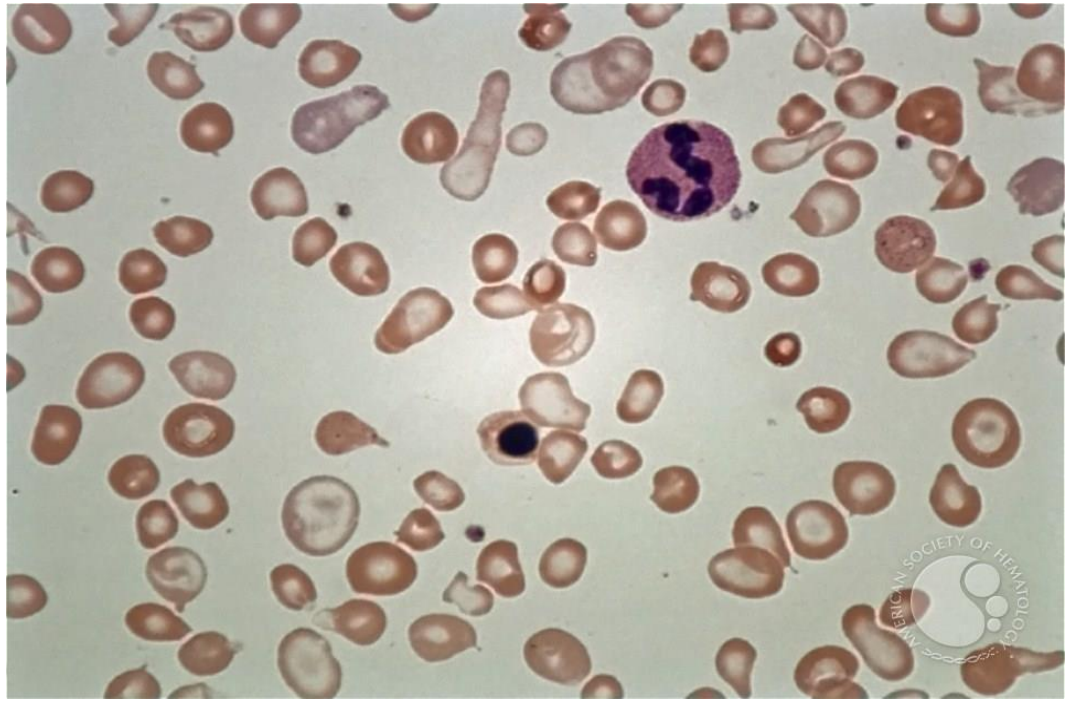


normal red cells macrocytic red cells

MDS –Red cells

Dimorphic
Hypochromic-occasionally
NRBC
Low reticulocyte count

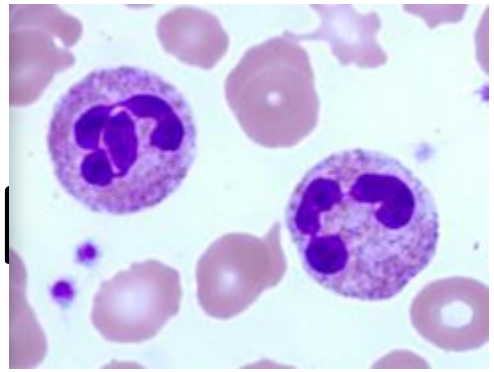


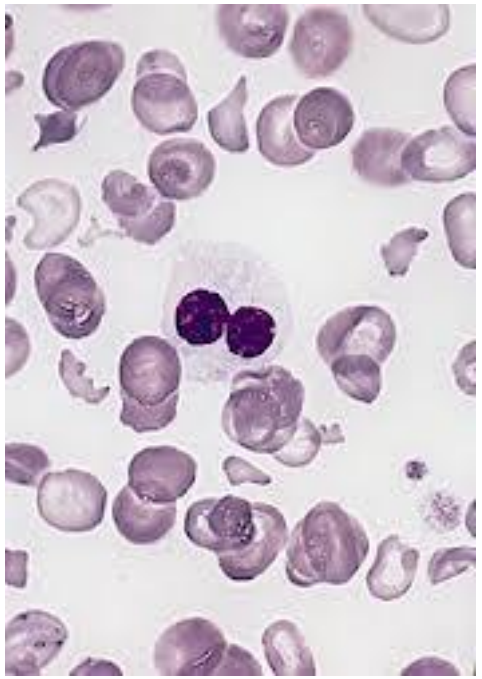


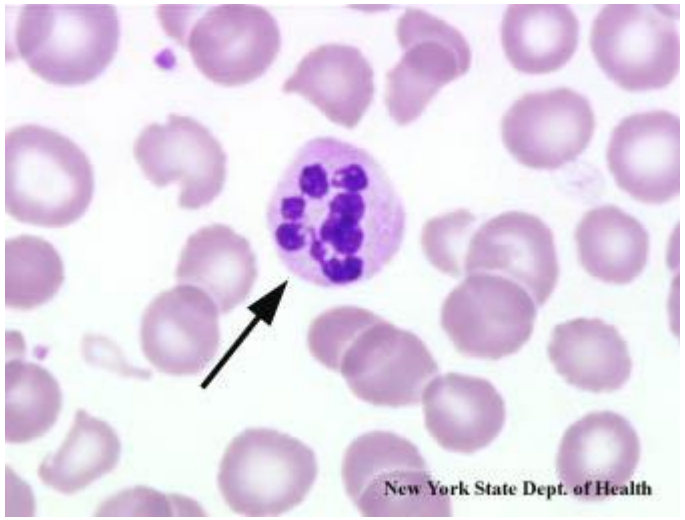
Dimorphic populations

White cells

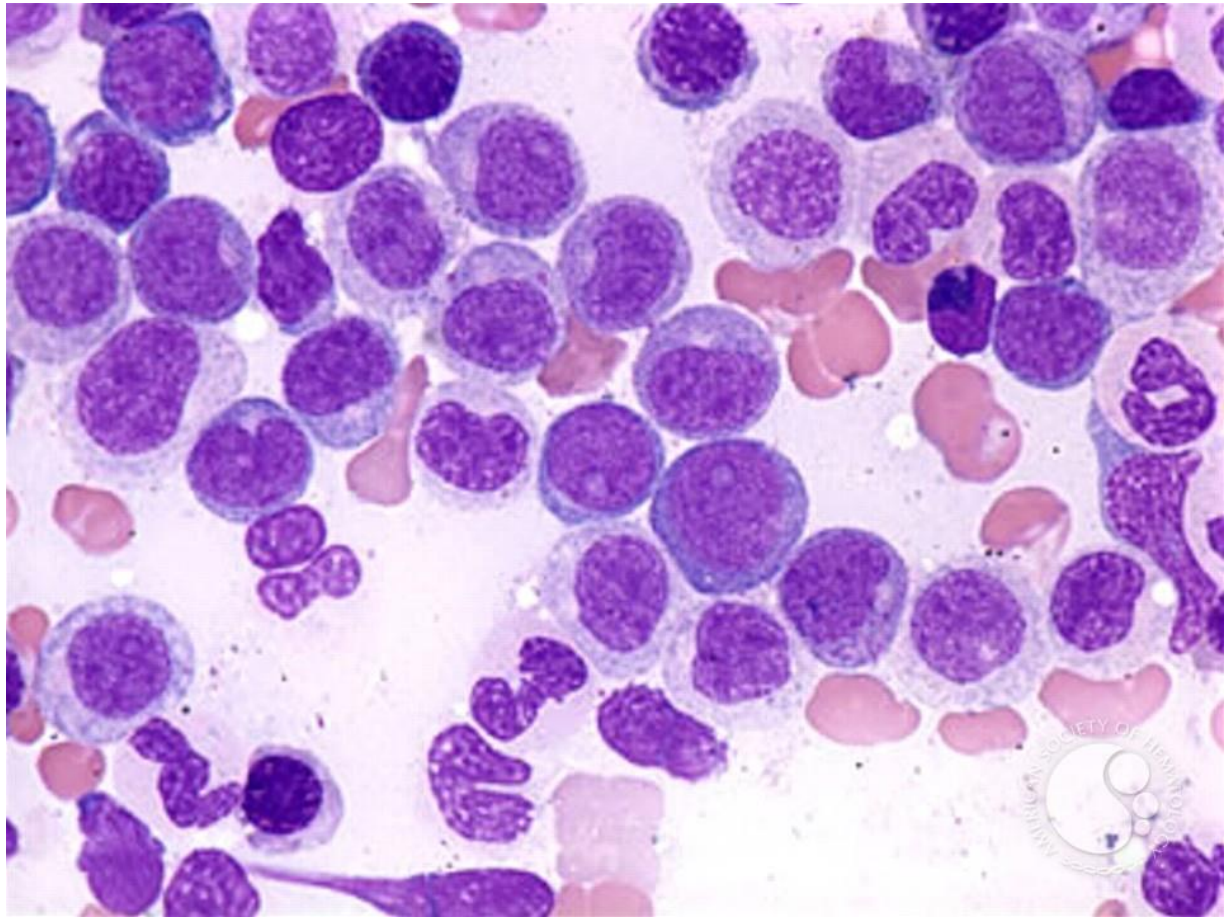
- Leucopenia
- Granulation-frequently lack of granulation
- Lobes-Hypolobated-**Pelger abnormality**
- Immature forms-Myeloblasts
- Function-Impaired





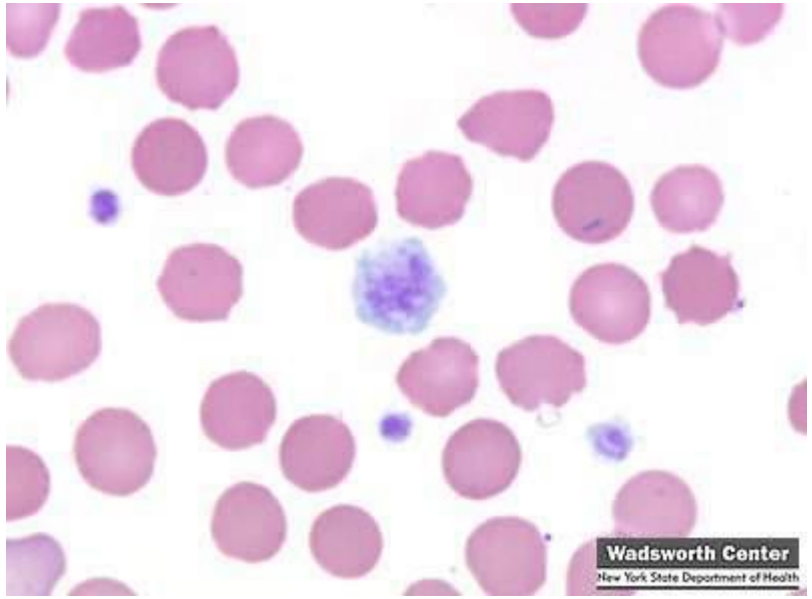


Blast cells



Platelets

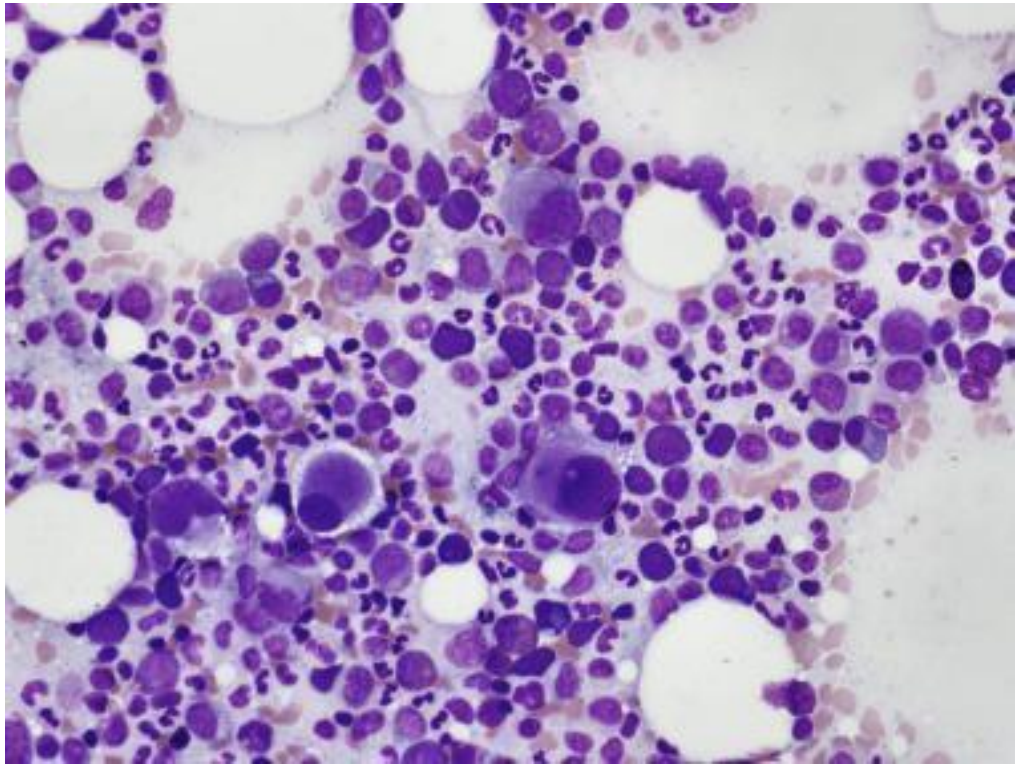
- Low
- 10%-Thrombocytosis
- Unduly large or small



BM aspiration and trephine biopsy

Hypercellular

10% of the cells in a lineage should be dysplastic



Erythropoiesis

Hypercellular

Dyserythropoietic features

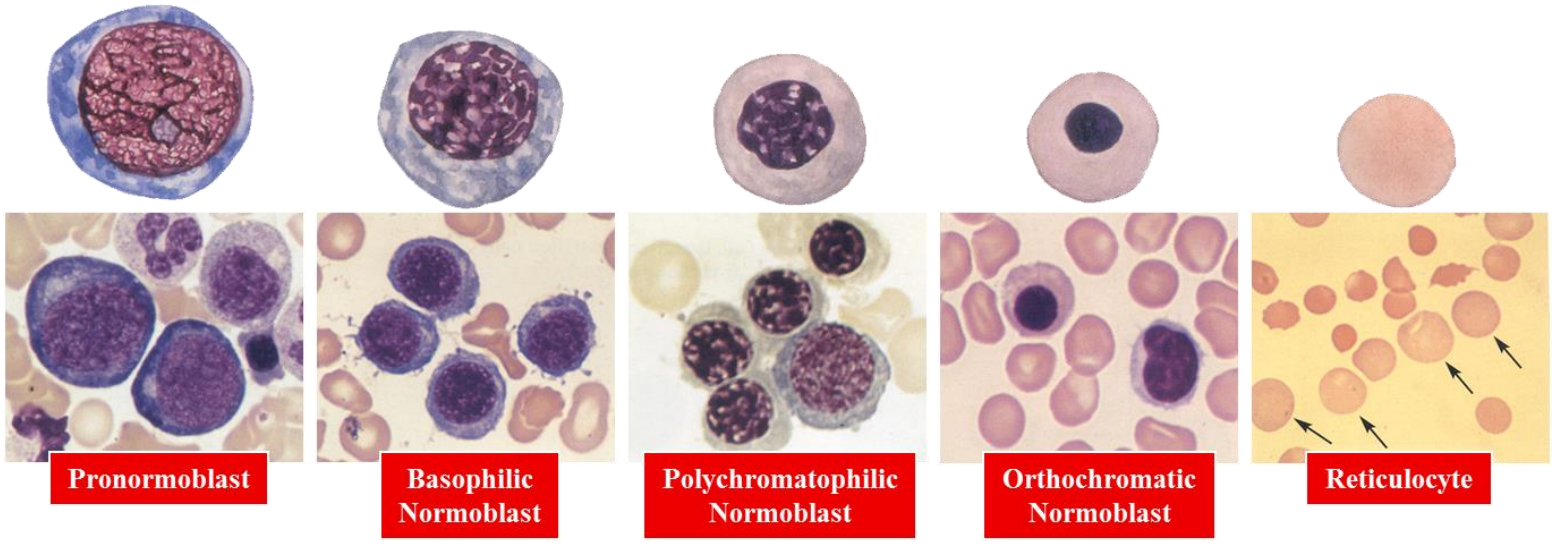
Multinucleate erythroblasts

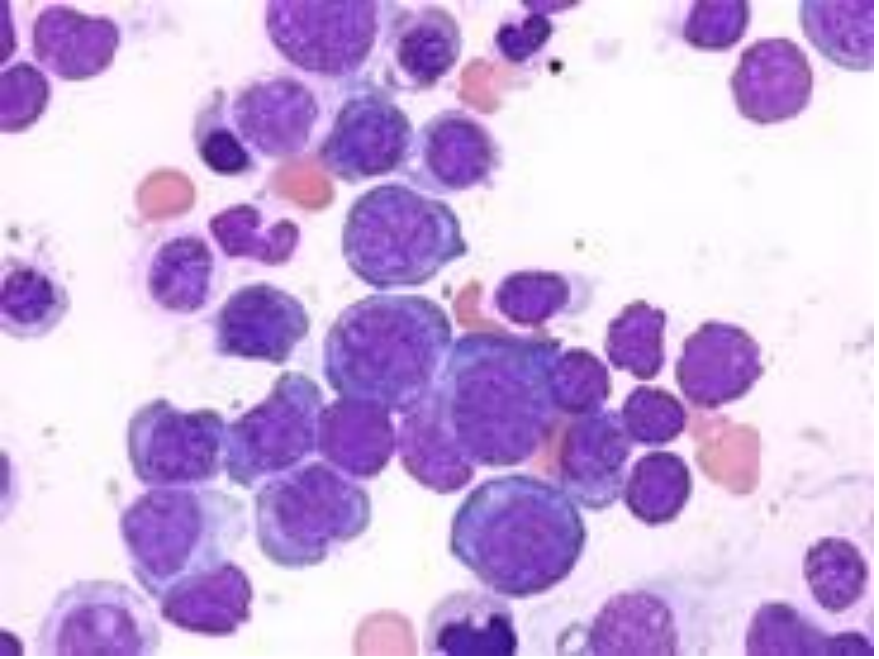
Internuclear,Intercytoplasmic bridges

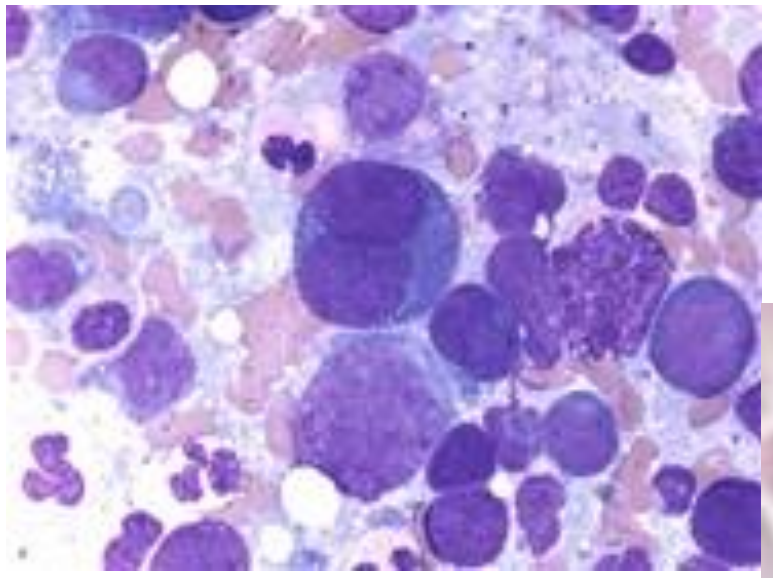
Nuclear budding

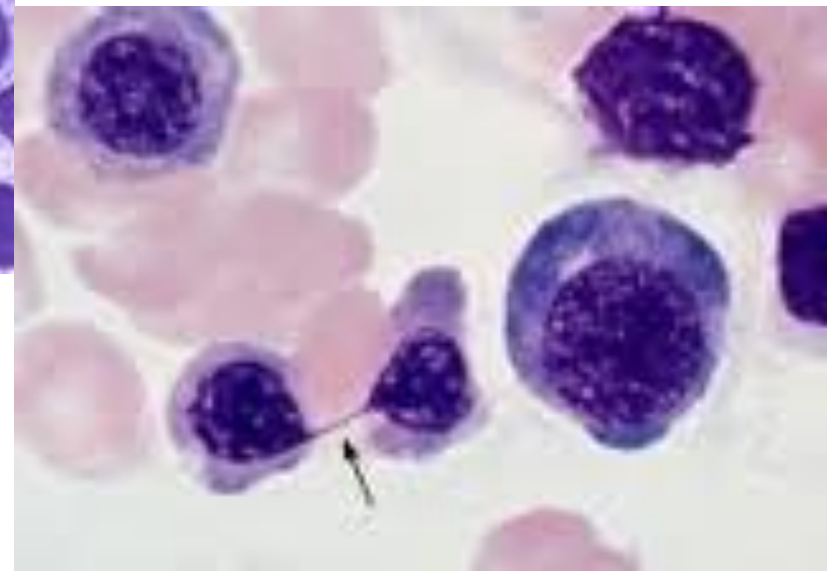
Megaloblasts

Iron stain –Ring sideroblasts

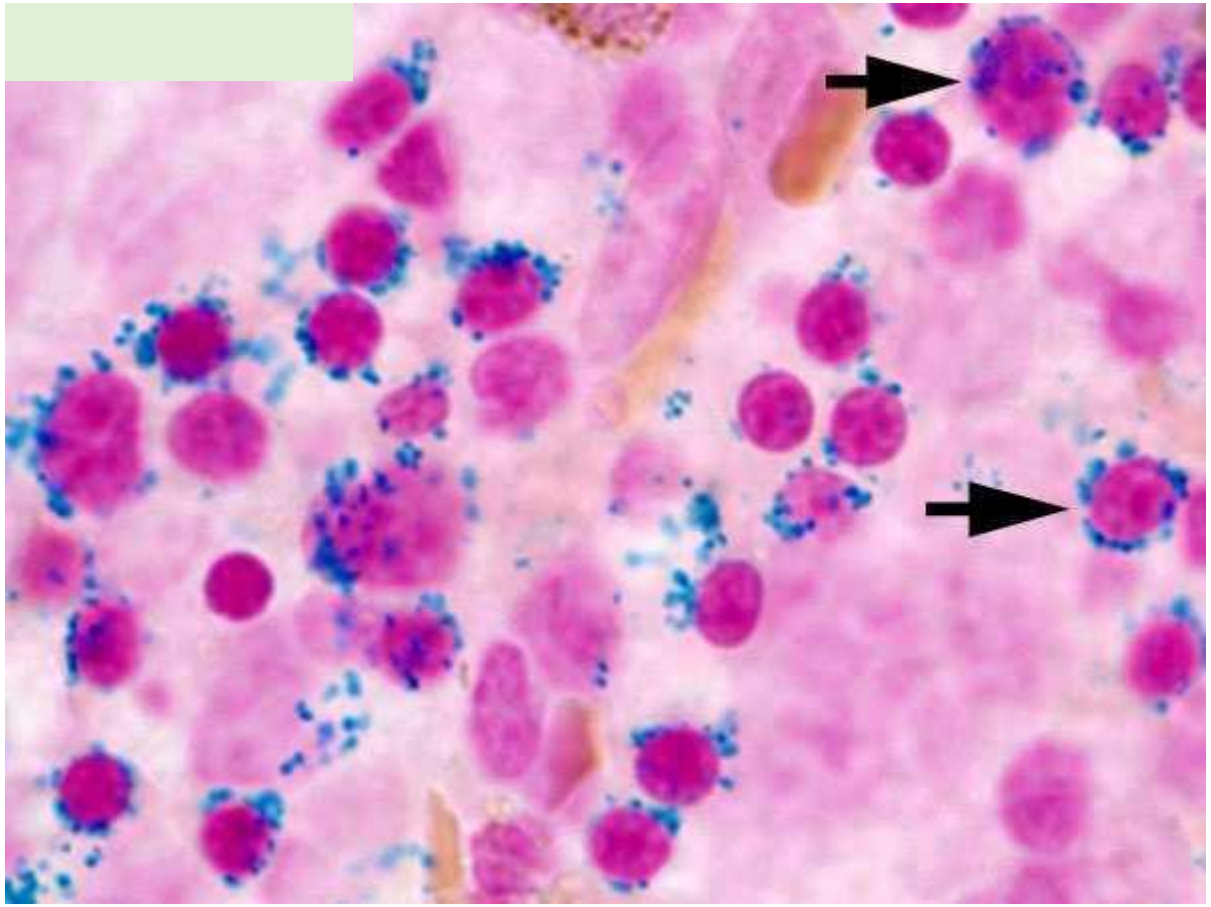




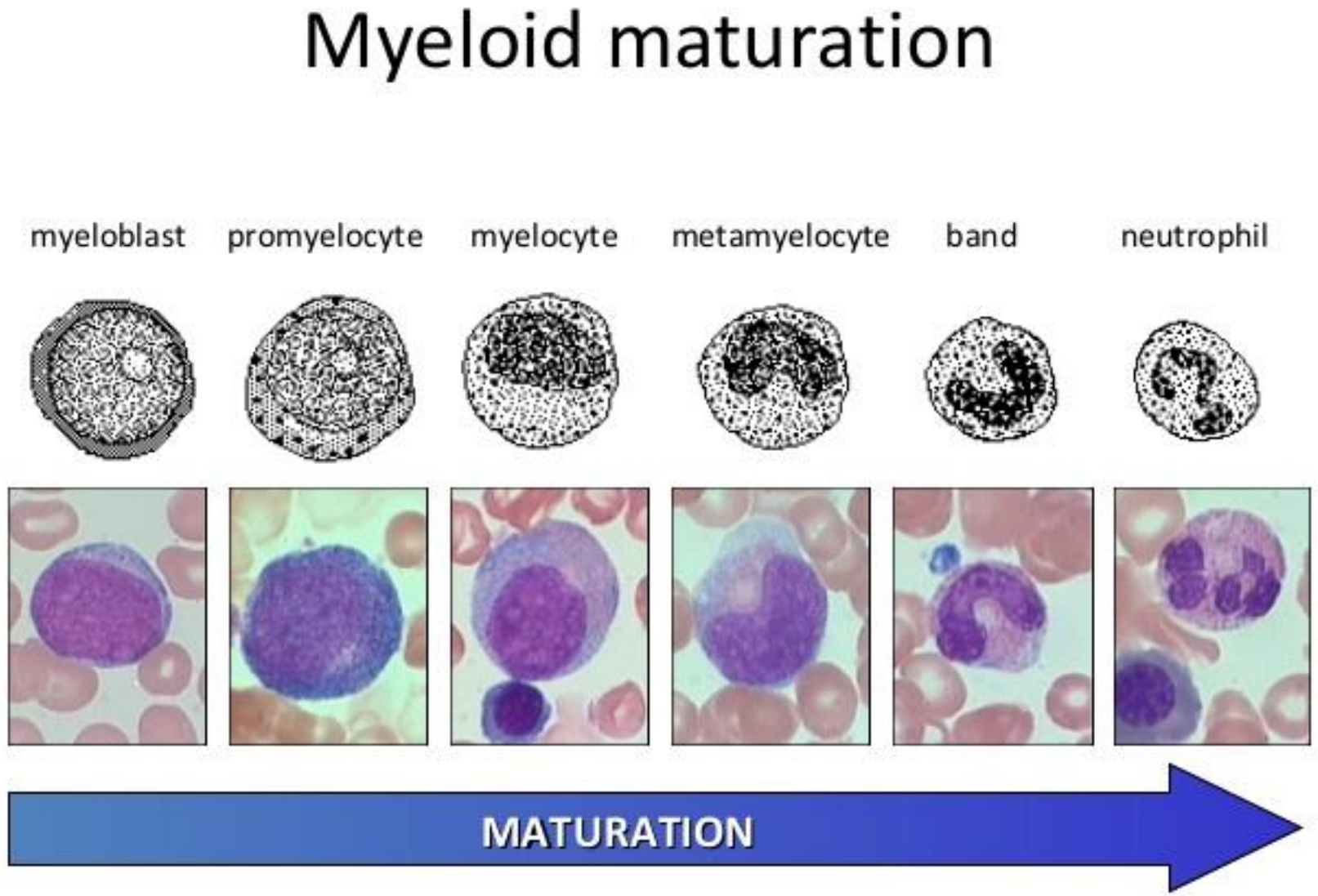




Iron stain-Ringed sideroblasts

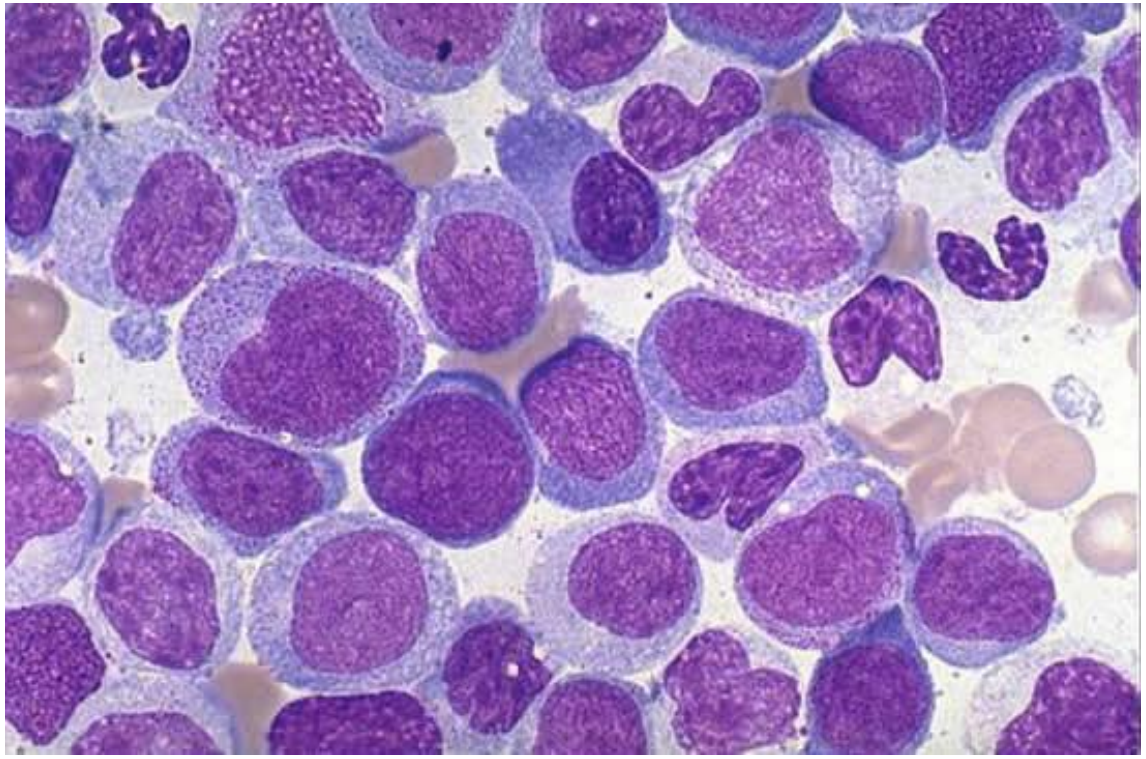


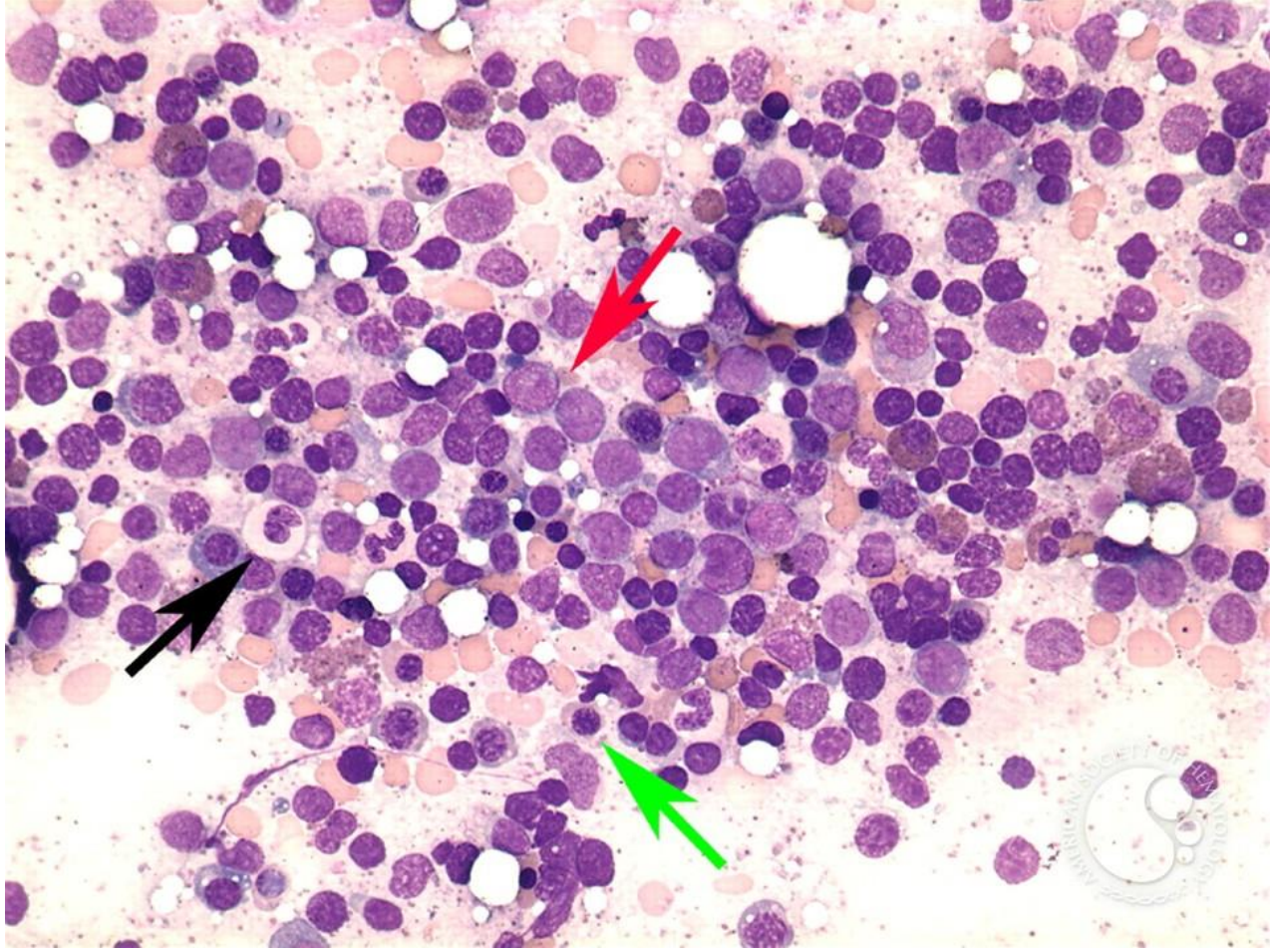
Granulopoiesis



Granulopoiesis

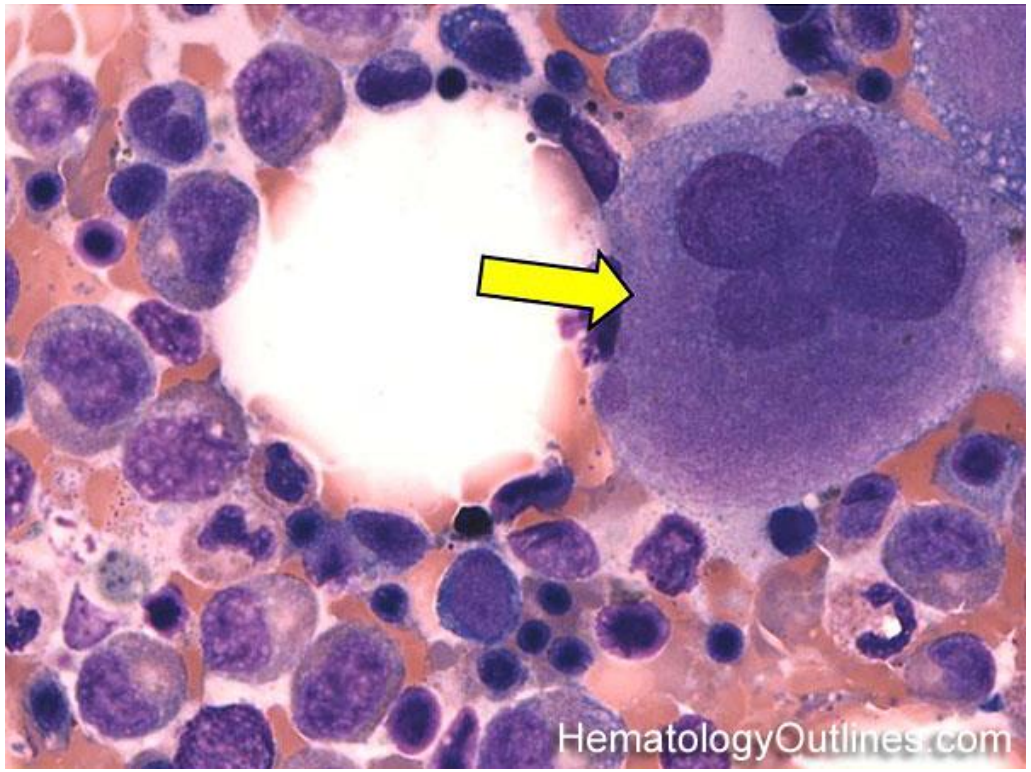
- Hyper cellular
- Defective granulation in precursors
- Increased blast cells

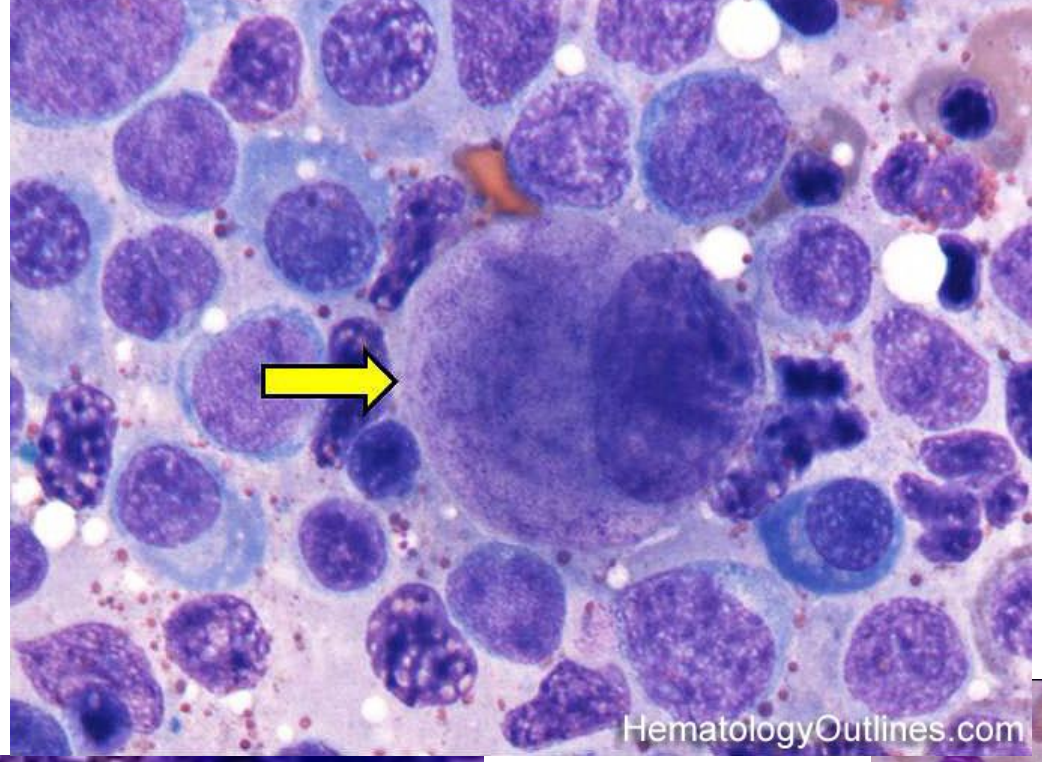


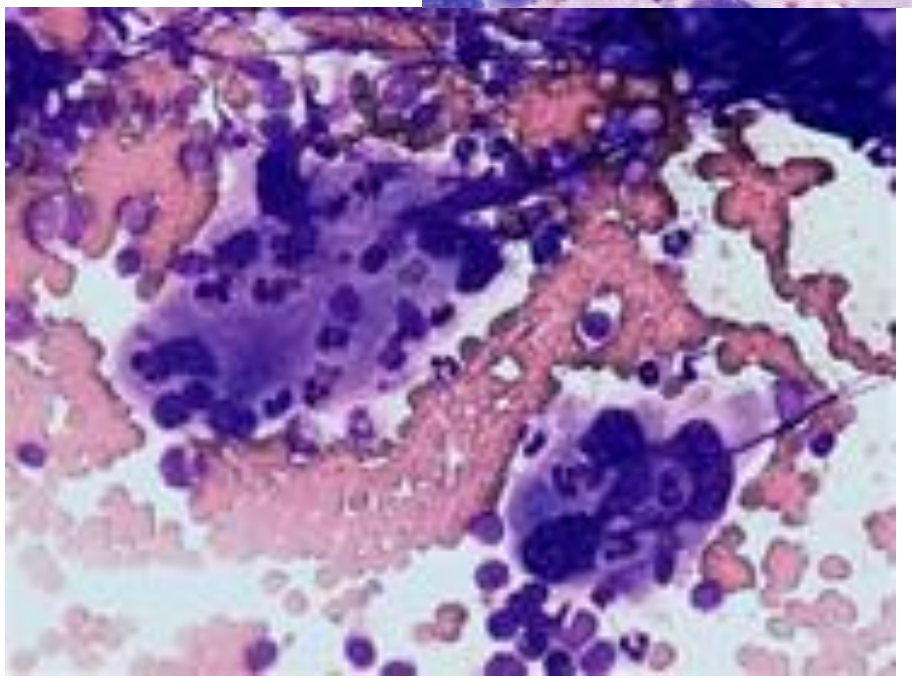


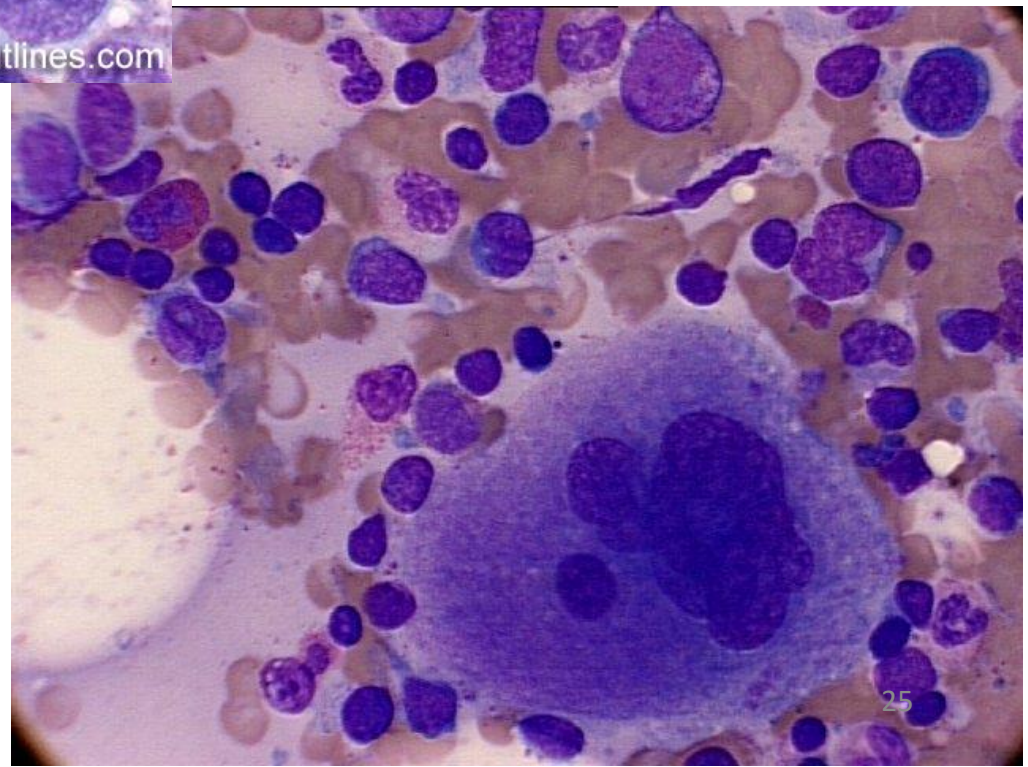
Thrombopoiesis

- Abnormal megakaryocytes
- Micronuclear, small binuclear, polynuclear forms
- Separation of nuclear lobes

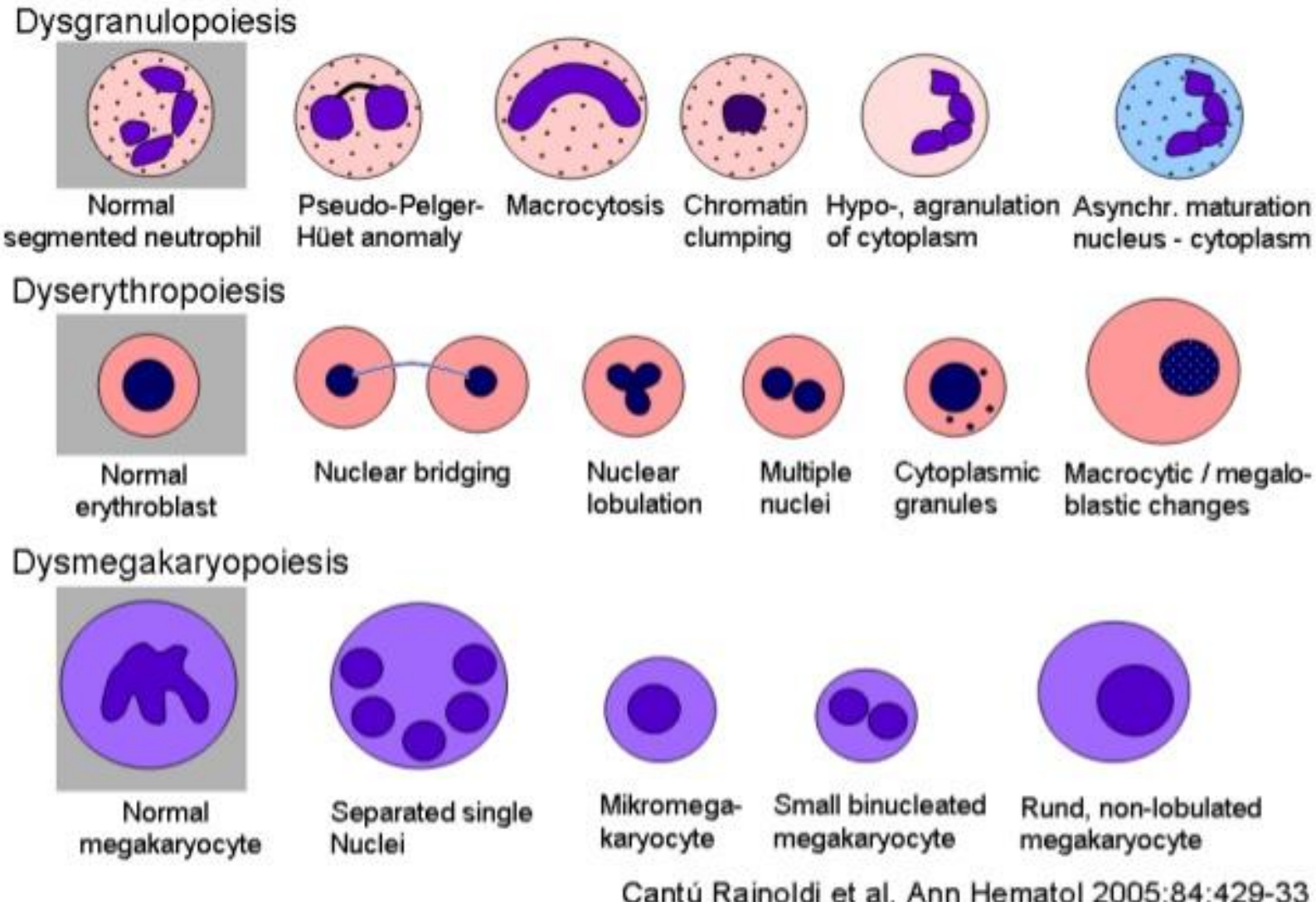



HematologyOutlines.com





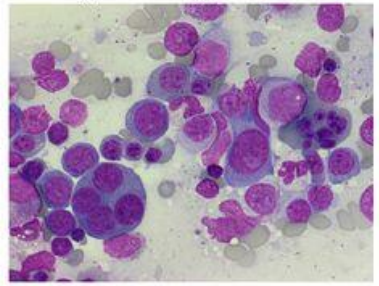
Dysplasia in Myelodysplastic Syndrome



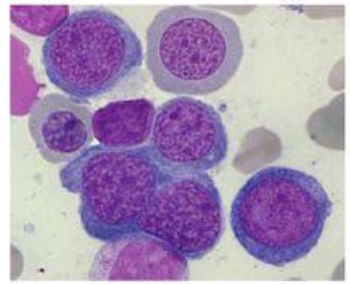
Cantú Rajnoldi et al. Ann Hematol 2005;84:429-33

Erythroid lineage

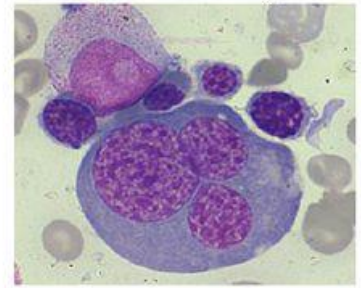
Erythroid hyperplasia



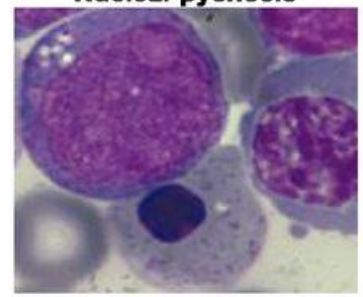
Megaloblastoid changes



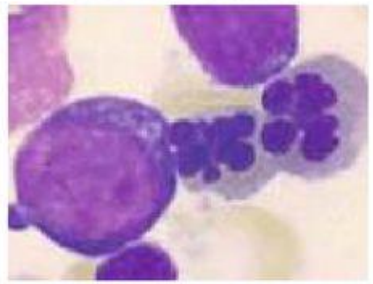
Multinuclearity



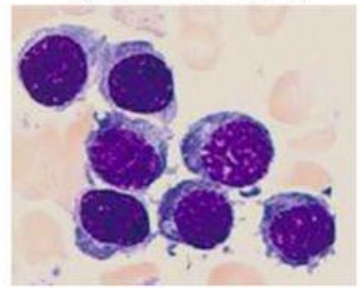
Nuclear pycnosis



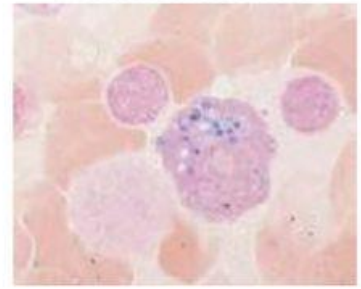
Nuclear lobulation



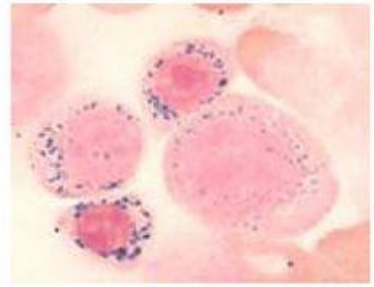
Cytoplasmic fraying



Ferritin sideroblast

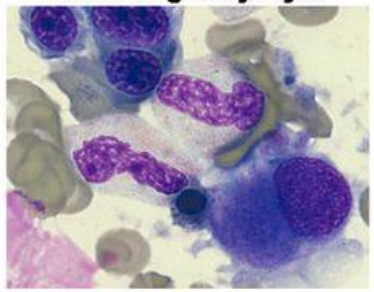


Ring sideroblasts

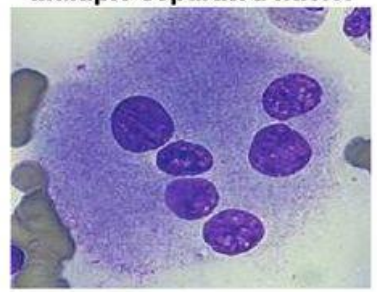


Megakaryocyte lineage

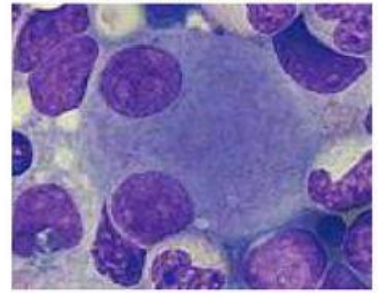
Micromegakaryocyte



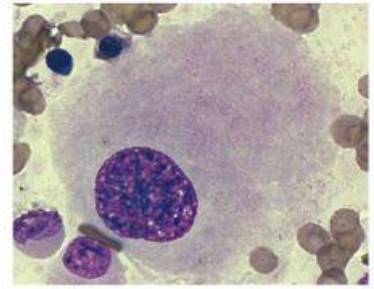
Multiple separated nuclei



Small binucleated cell

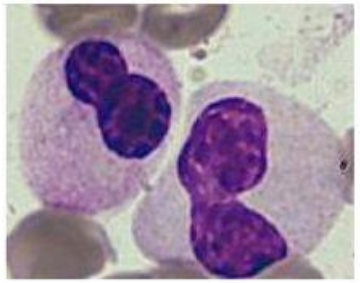


Monolobar cell

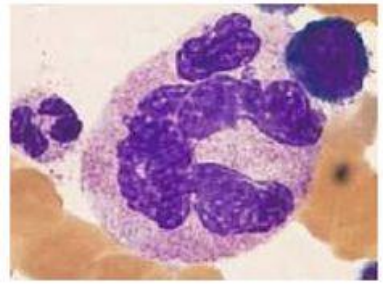


Granulocytic lineage

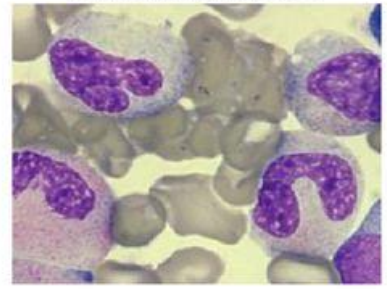
Pseudo-Pelger anomaly



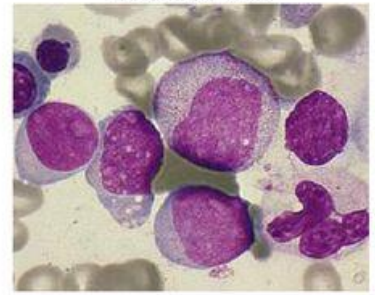
Abnormal nuclear shape



Hypo-degranulation



Myeloblasts



Cytogenetics

- More in secondary
- Chromasome 5/7-partial or total loss
- Trisomy 8
- Rearrangements
- Complex karyotype

WHO Classification

- FBC-Cytopenias
- BP-Dysplasia+ blast count
- BM-Dysplasia+ Blast count
- Iron stain
- Cytogenetics

WHO Categories of MDS

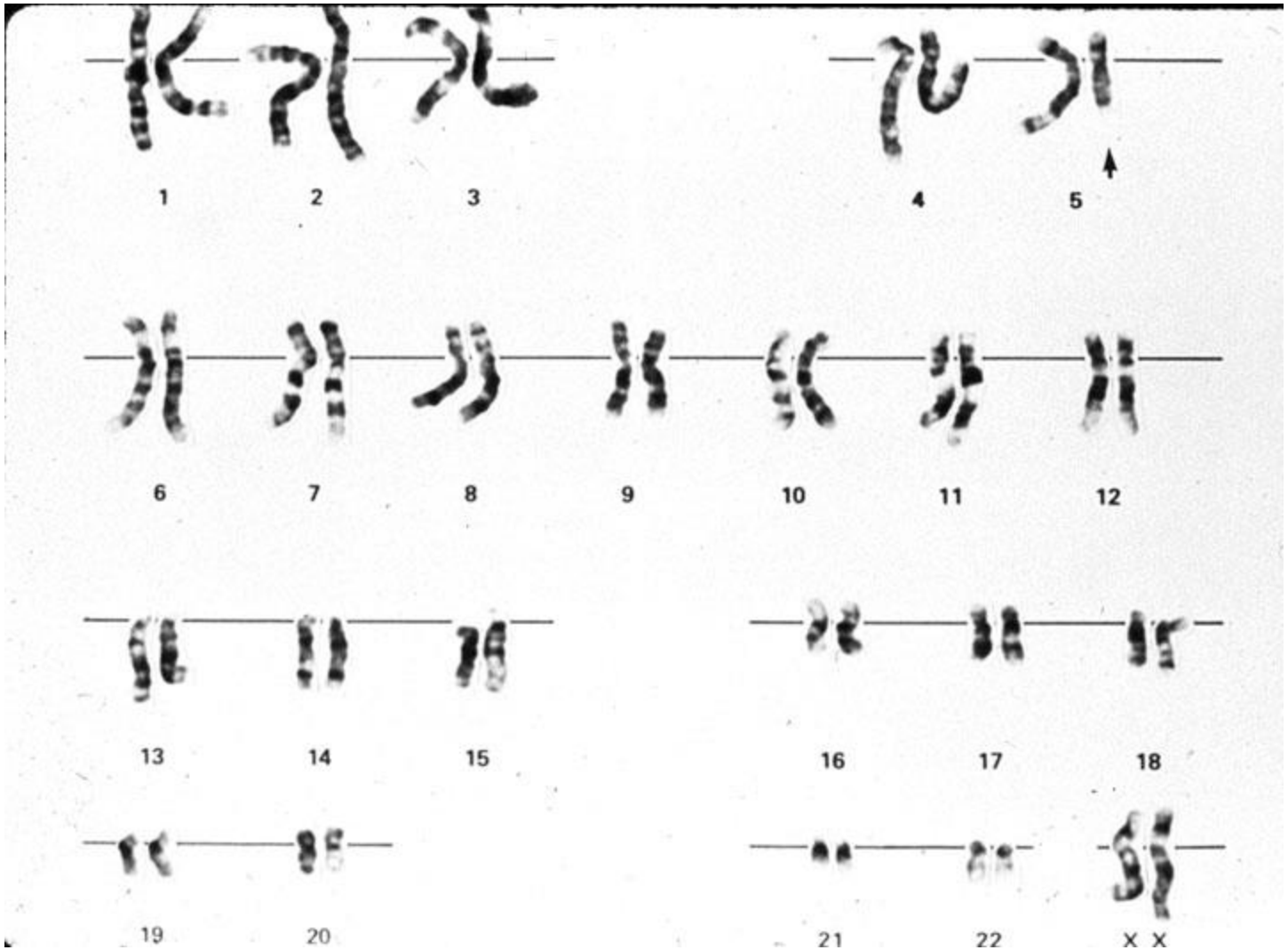
- MDS with single lineage dysplasia
- MDS with **ring sideroblasts** (MDS-RS)

  MDS-RS and single lineage dysplasia

  MDS-RS and multilineage dysplasia
- MDS with multilineage dysplasia
- MDS with excess blasts
- MDS with isolated del(5q) MDS
- unclassifiable Provisional entity: Refractory cytopenia of childhood Myeloid neoplasms with germ line predisposition

5q- Syndrome

- Common in female
- Macrocytosis
- Thrombocytosis
- Good prognosis
- Hypolobated/ monolobated megakaryocytes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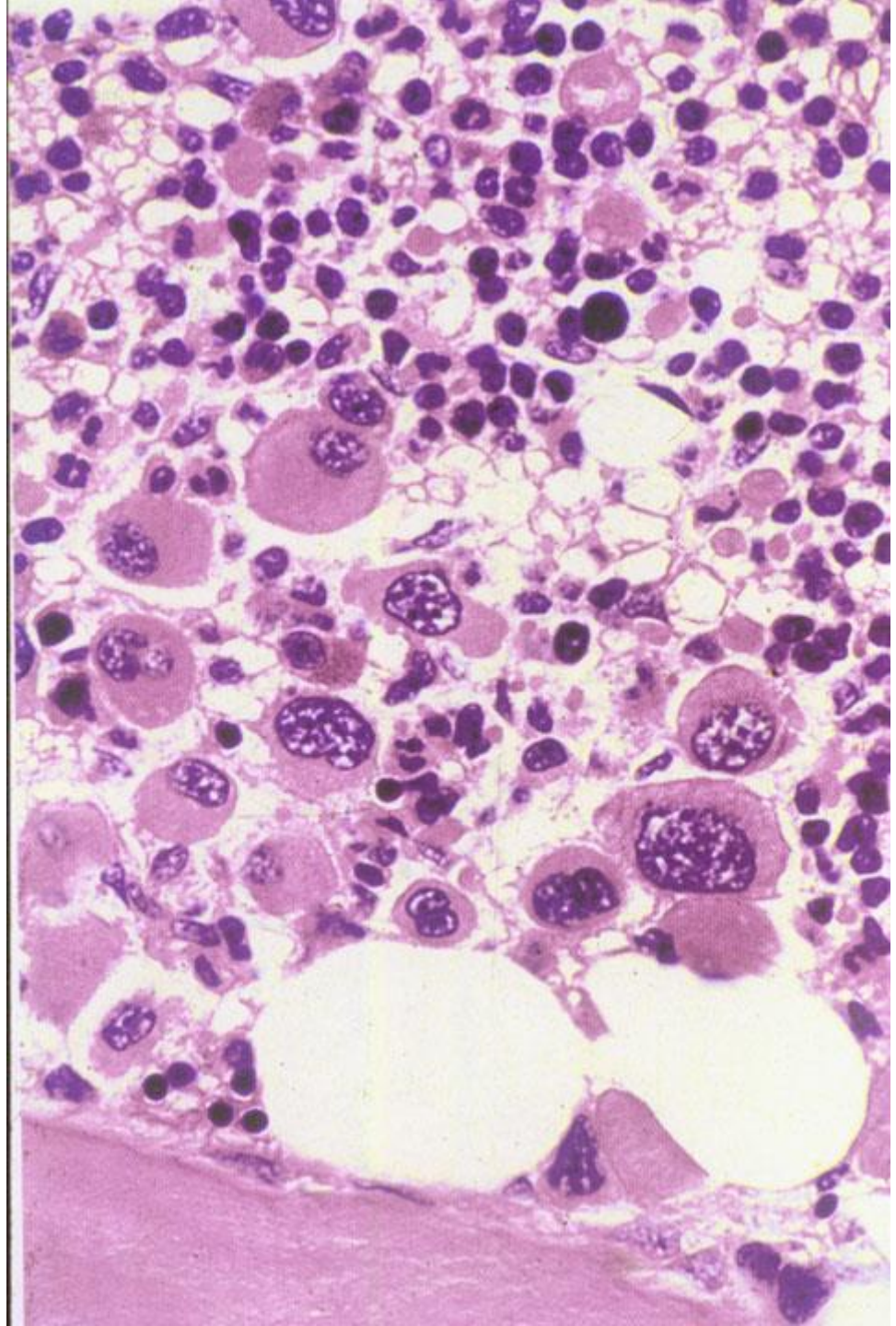
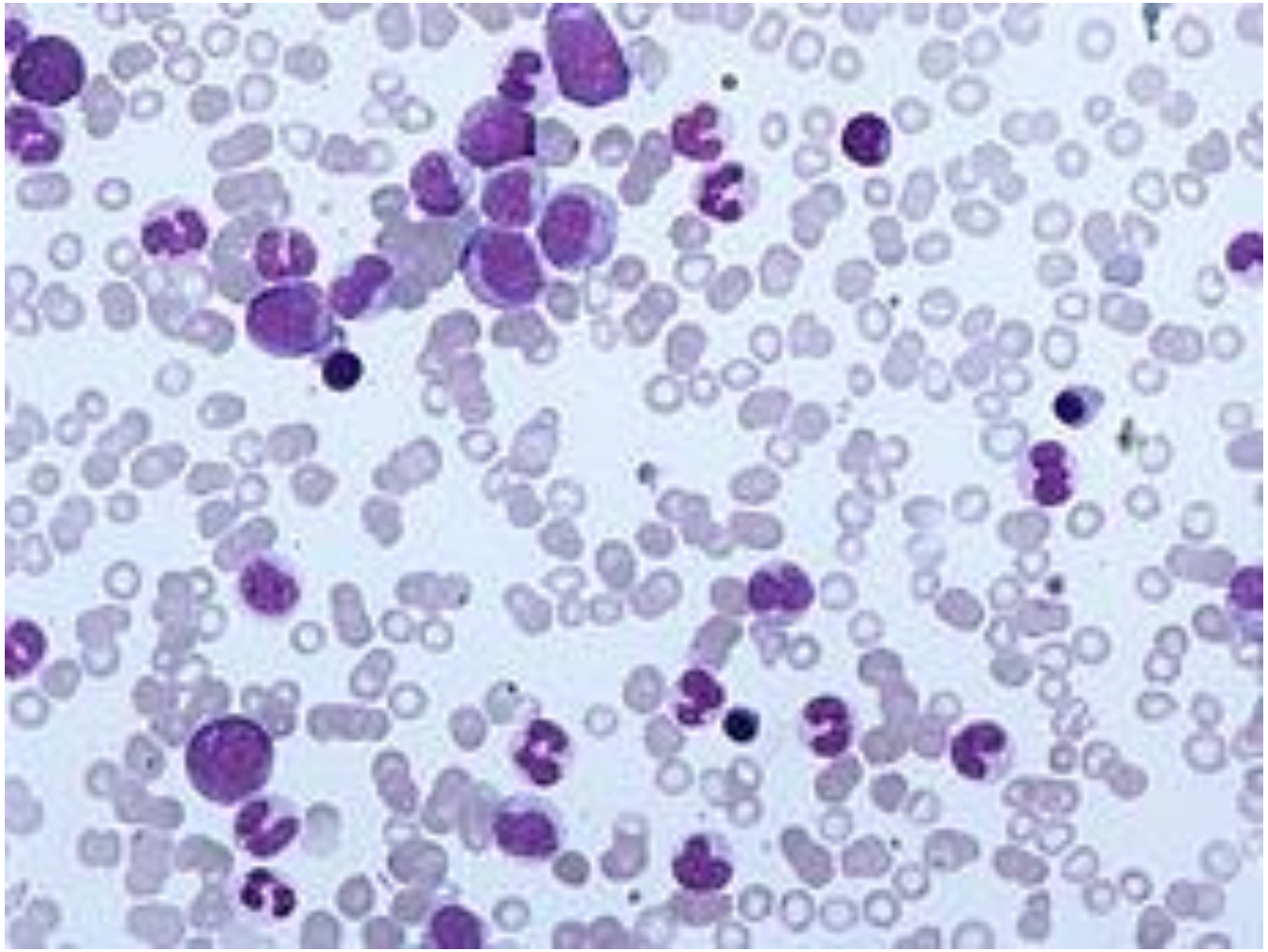


CMML

- Monocytosis
- Blasts < 20%
- Dysplasia



Treatment

- Options:
  - ➢Observation

Supportive care

blood and blood products

Antibiotics

Growth factors-Erythropietin , GCSF

Drugs-

Lenolidomide-5q- Xn

Hypomethylating agents (Azacitidine,Decitabine)

Chemotherapy

Revlimid® (lenalidomide) capsules

Myelodysplasia
Bone marrow transplantation

BMT is not for everyone

High mortality rates.

BMT is applicable in ‘selected’ older adults

MDS

- At the end of this lecture student should be able to:
- Define MDS
- Describe the clinical features of MDS
- List the investigations needed for the diagnosis MDS
- Describe the blood and BM abnormalities in MDS
- Describe the principles of management of MDS

Summary

1. **MDS** is not one disease, but a group of disorders that cause the bone marrow to fail

2. **Diagnosis**-FBC+BP,BM+Iron stain,Cytogenetics

3. **Treatments** range from ‘supportive’ to the ‘intensive’.

Thank you

- 60 year old man presented with tiredness. His Hb is 9g/dl.MCV is 110fl.

What are the differential diagnosis

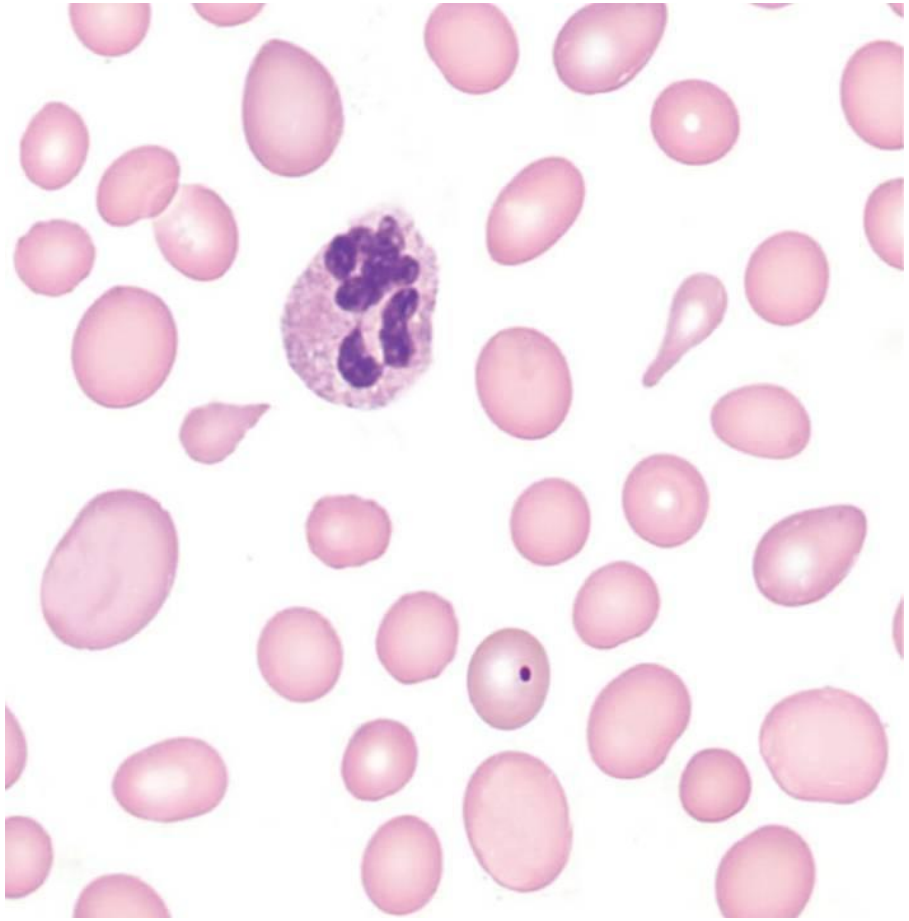
- B12/folate deficiency
- Liver disease
- Hypothyroidism
- Iron deficiency
- Anaemia of chronic disease.

- 60 year old man presented with tiredness. His Hb is 9g/dl. MCV is 110fl.WBC-1.5X10^3/L,Platelet-80,000/cumm

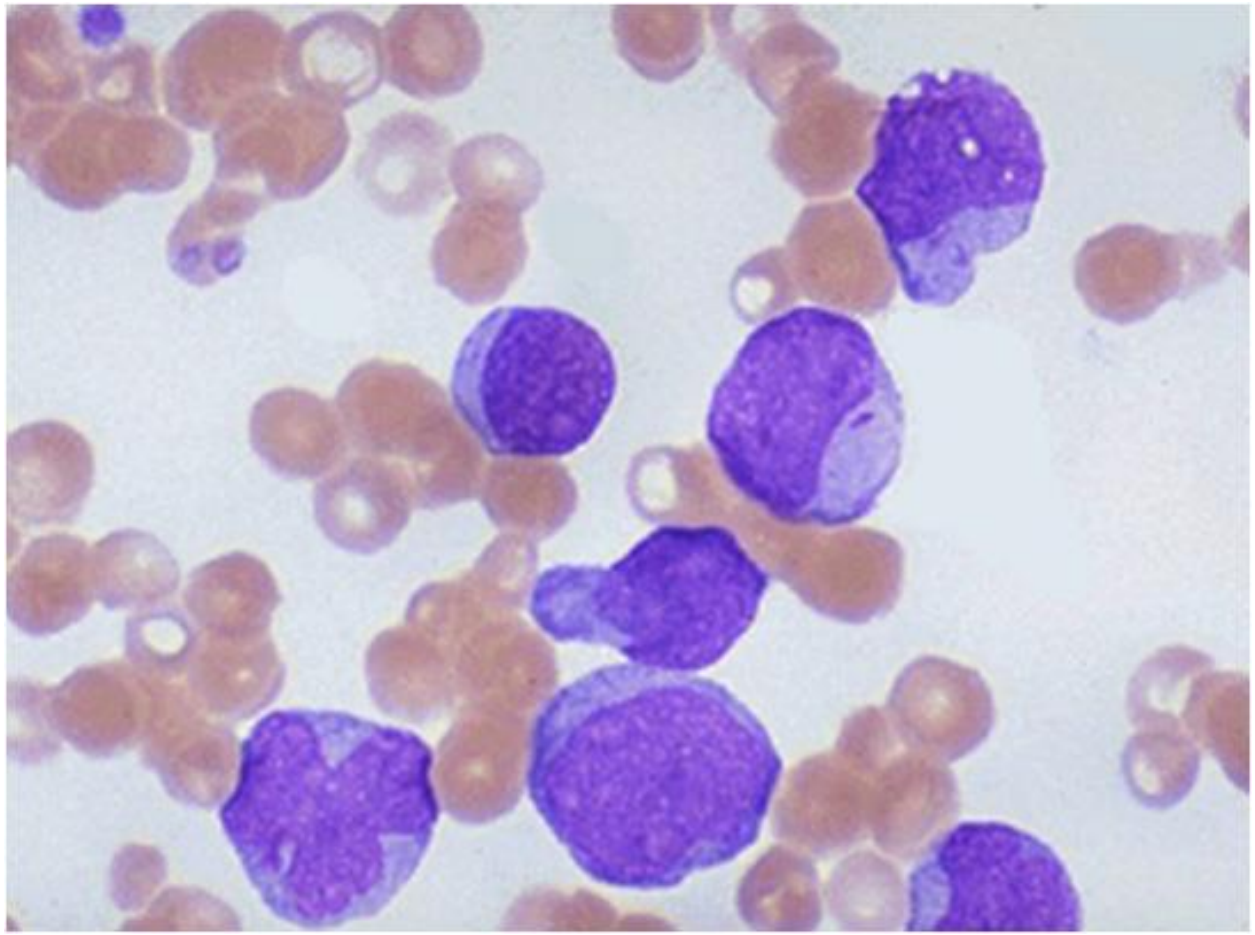
What are the differential diagnoses?

- B12/folate deficiency
- Liver disease
- Hypothyroidism
- Multiple myeloma
- Aplastic anaemia.

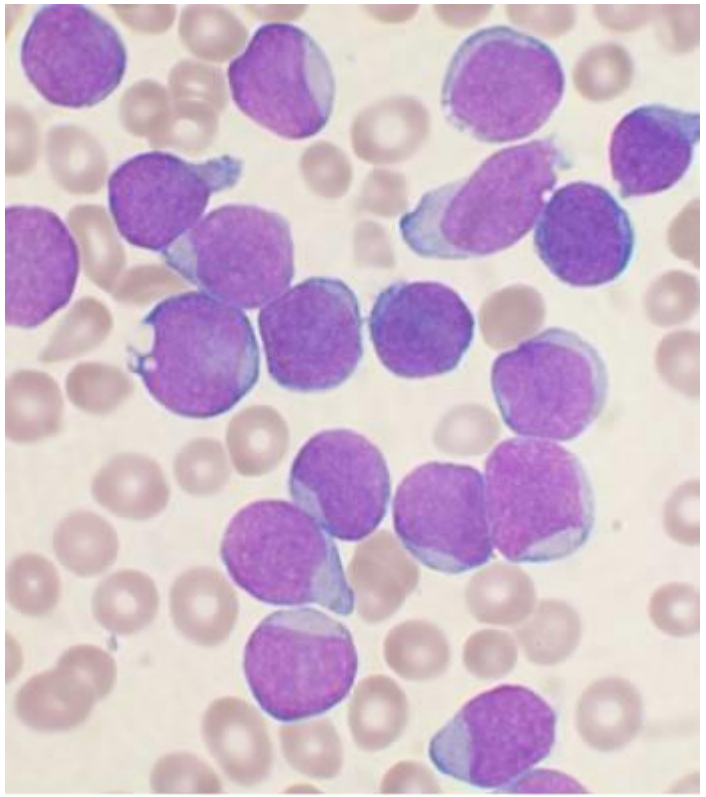
This is his blood picture.
What is the most likely diagnosis?



- 60 year old woman presented with tiredness. She had a breast cancer which was treated with chemotherapy 7 years back. Her BP is provided. What is the diagnosis?



- 2 year old child presented with petechiae all over the body. His BP is provided. What other tests would you request?



a.Sudan black B
b.PAS
c.Flow cytometry
d.Serum ferritin
e.Cytogenetics