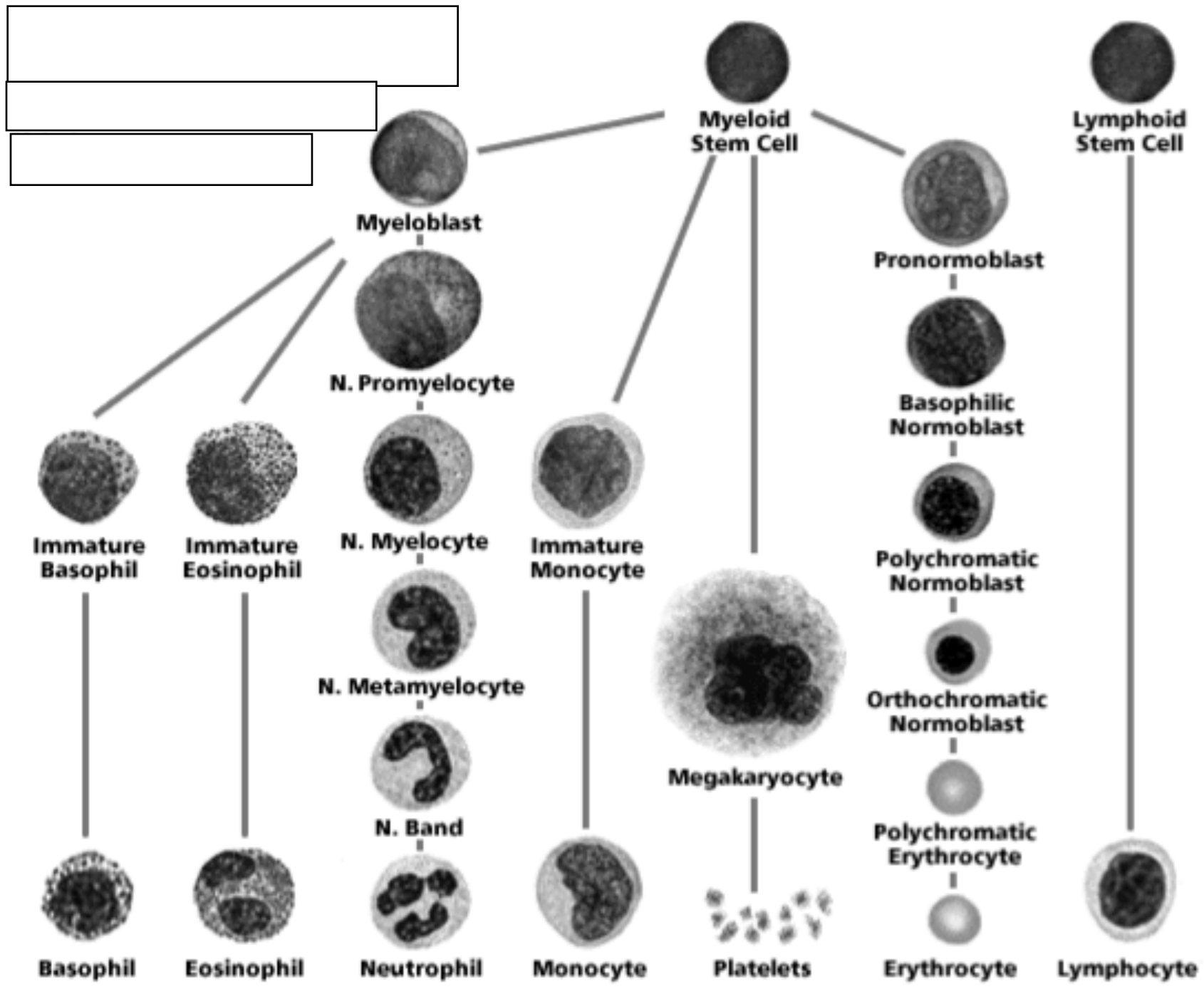


Acute Leukemia
Kristine Krafts, M.D.



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Hematologic Malignancies

Leukemia

- Malignancy of hematopoietic cells
- Starts in bone marrow, can spread to blood, nodes
- Myeloid or lymphoid
- Acute or chronic

Lymphoma

- Malignancy of hematopoietic cells
- Starts in lymph nodes, can spread to blood, marrow
- Lymphoid only
- Hodgkin or non-Hodgkin

Hematologic Malignancies

Leukemias

- Acute leukemias
- Chronic leukemias

Lymphomas

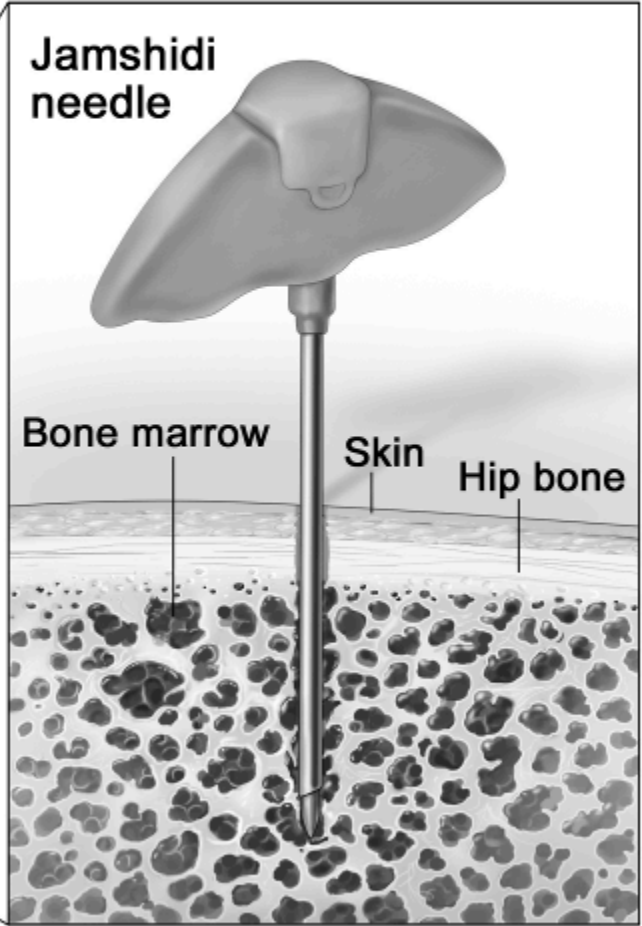
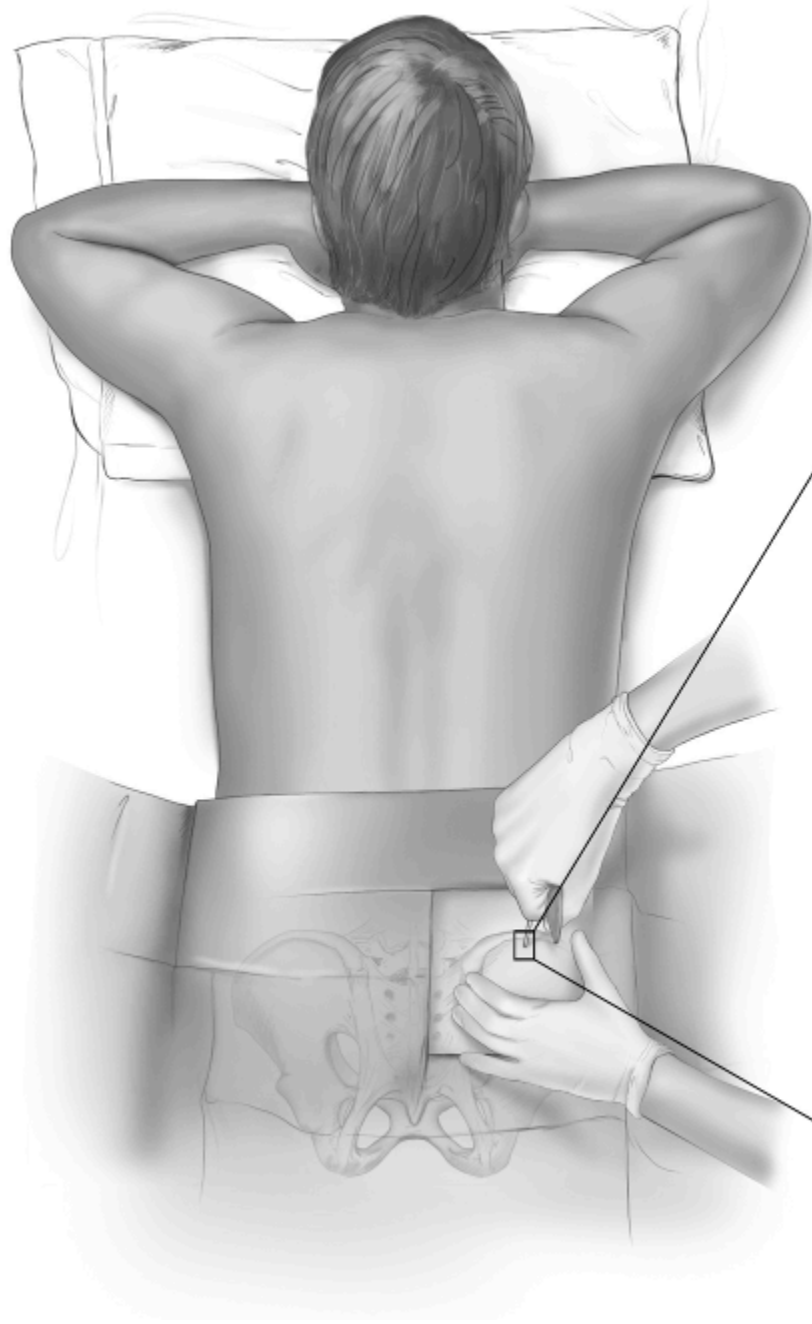
- Hodgkin lymphoma
- Non-Hodgkin lymphoma

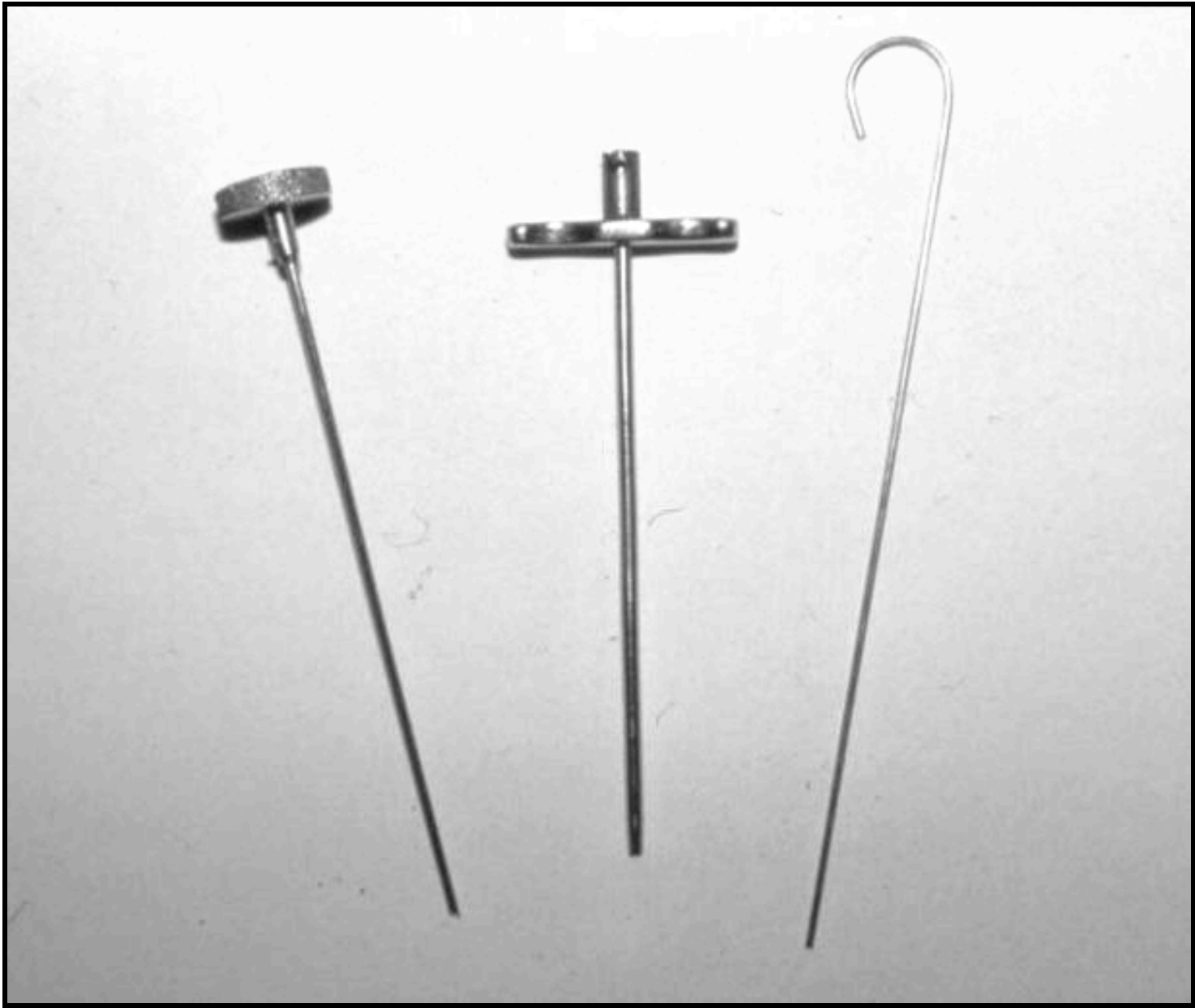
Plasma cell disorders

- Multiple myeloma

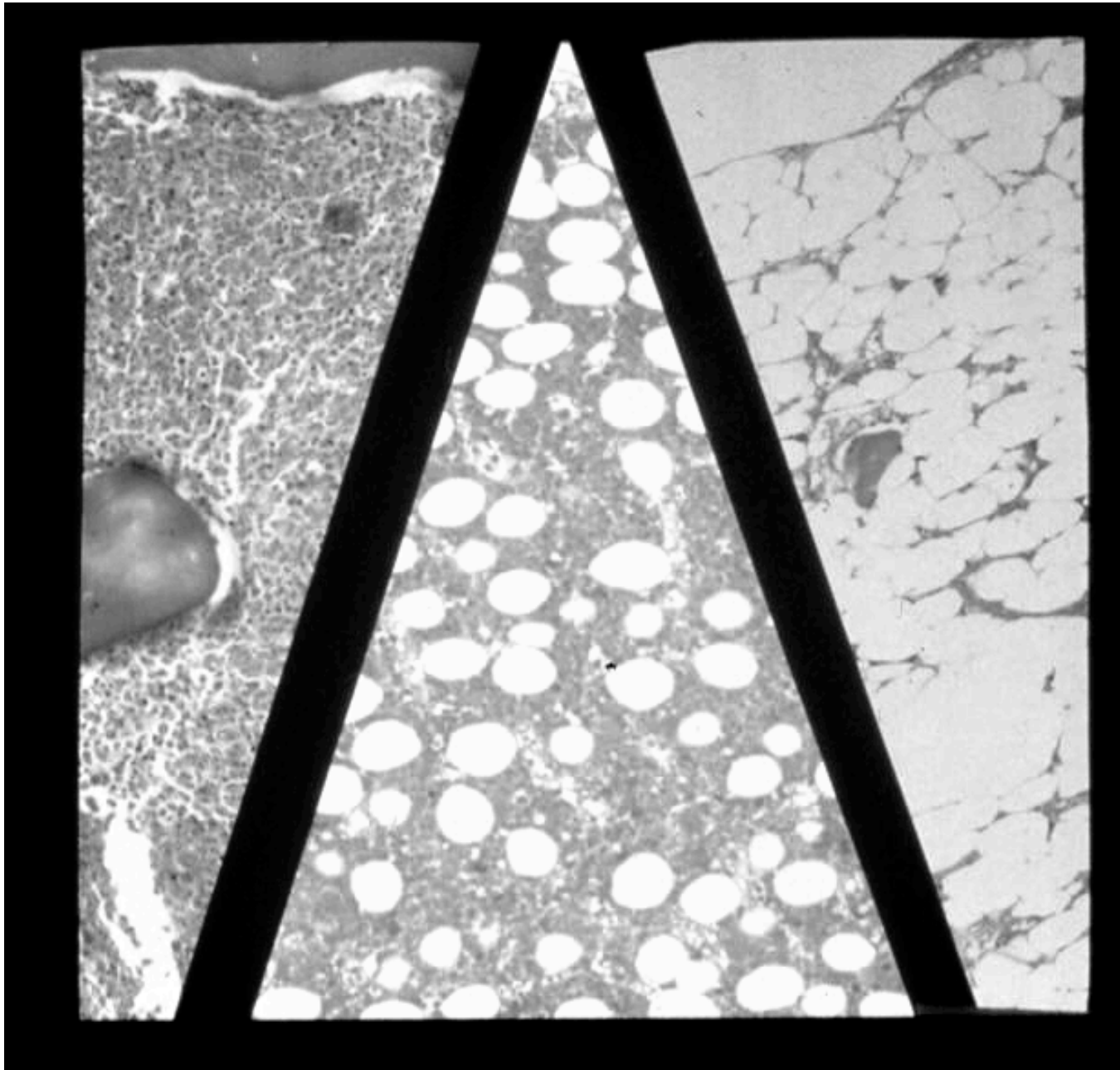
How is a diagnosis made?

- Clinical setting
- Morphology
- Immunophenotyping
- Molecular studies
- Cytogenetics

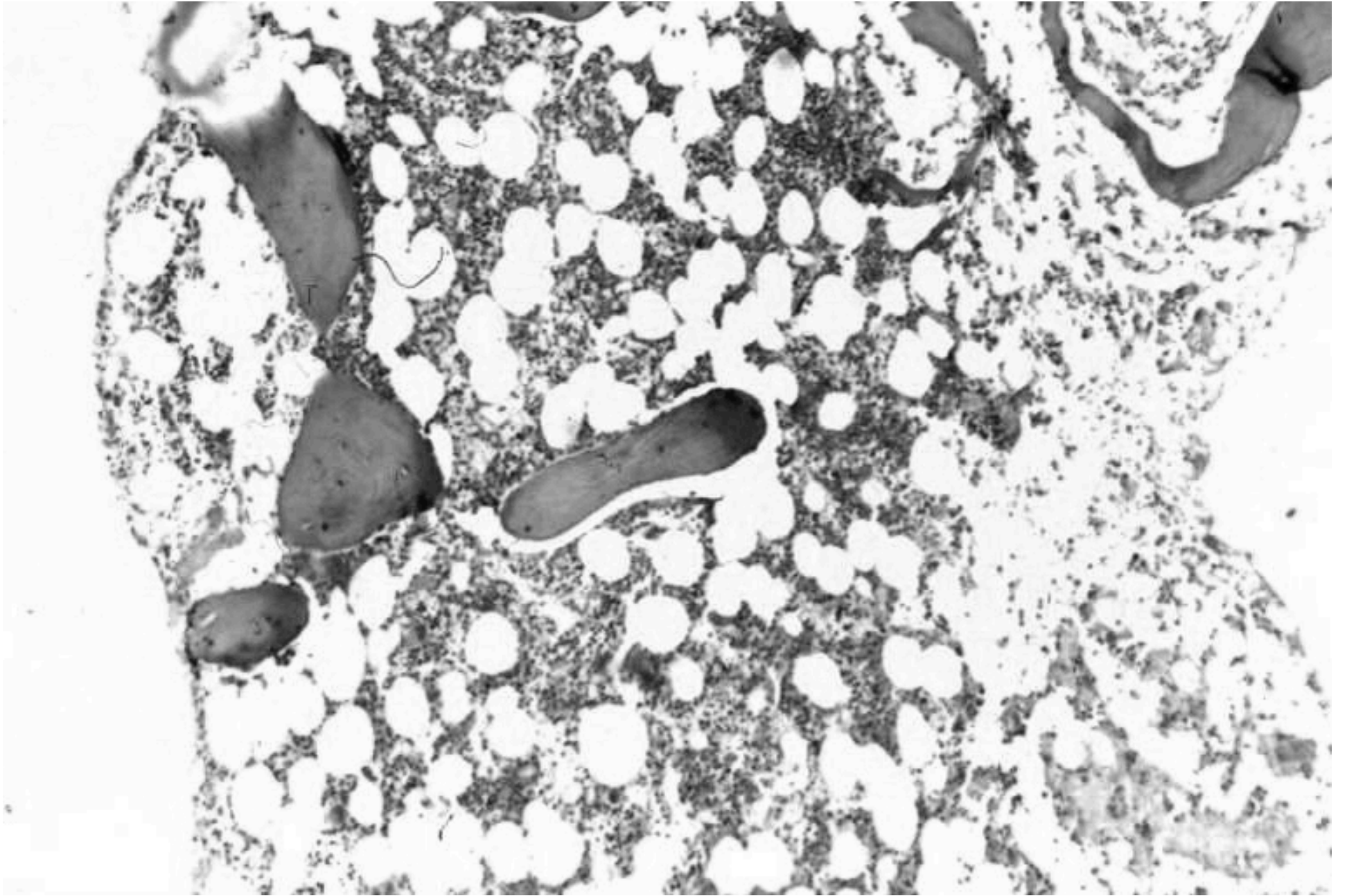




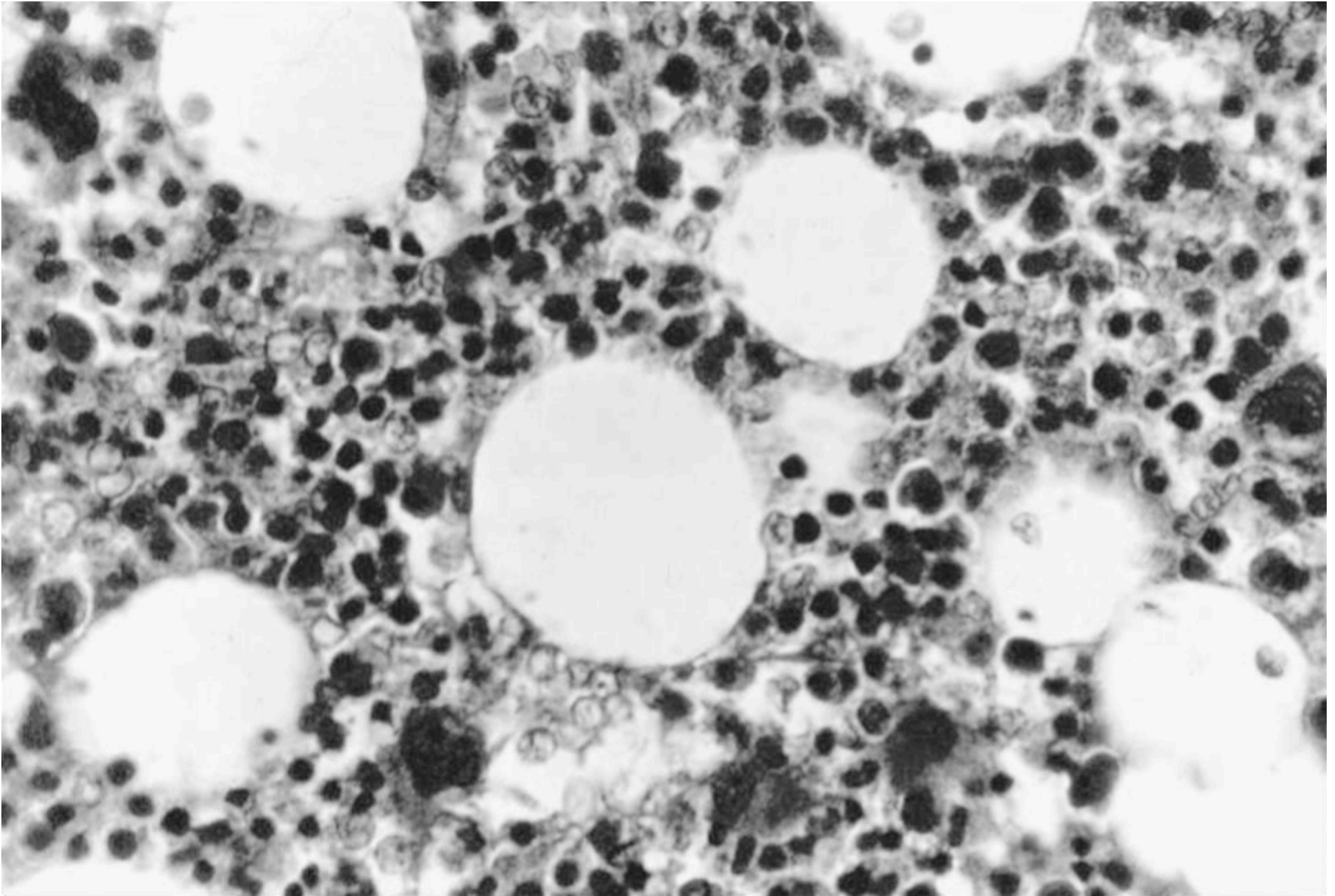
Bone marrow biopsy needle



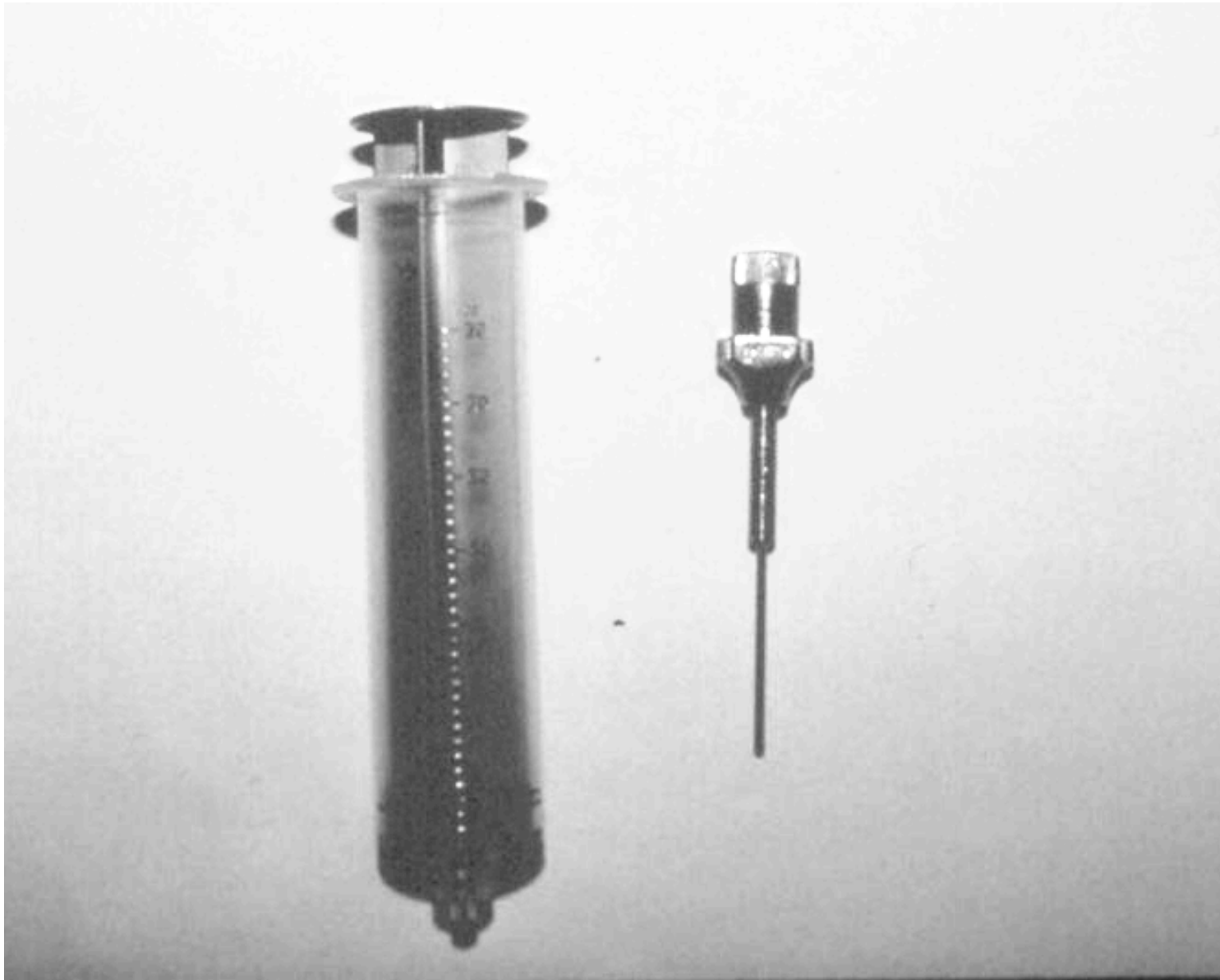
Bone marrow biopsy: cellularity



Normal bone marrow biopsy



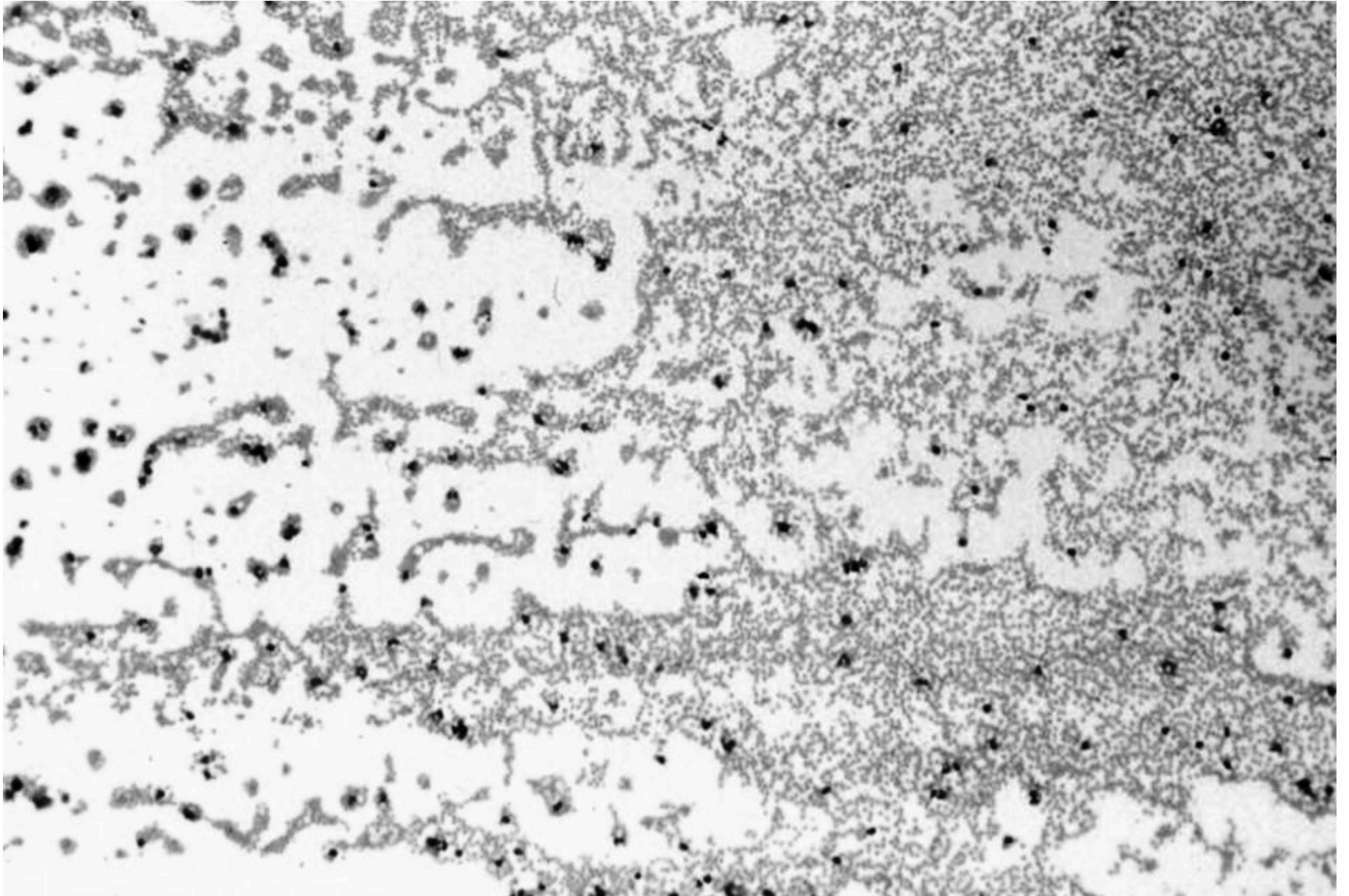
Normal bone marrow biopsy



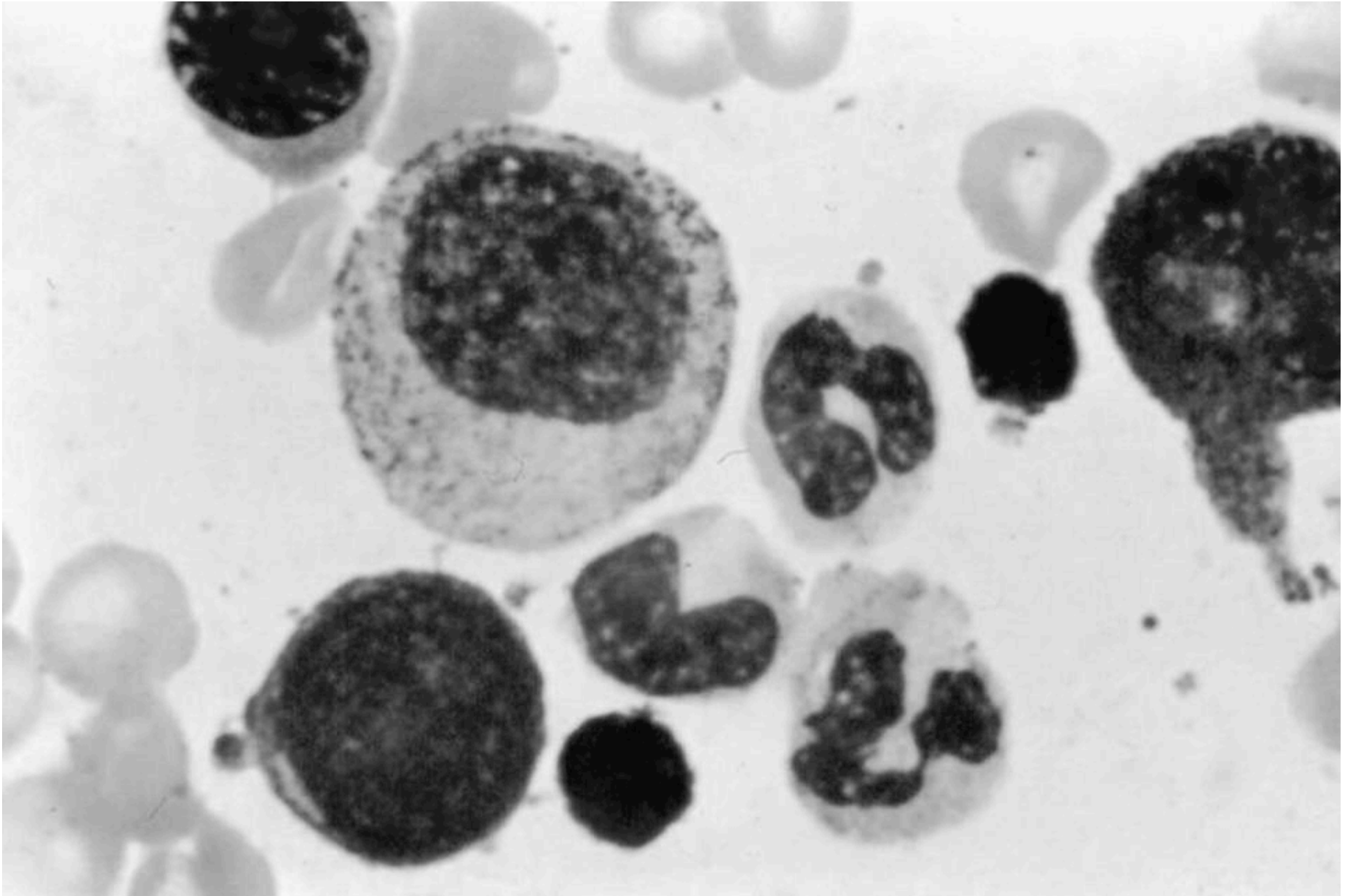
Bone marrow aspiration needle



Bone marrow aspiration

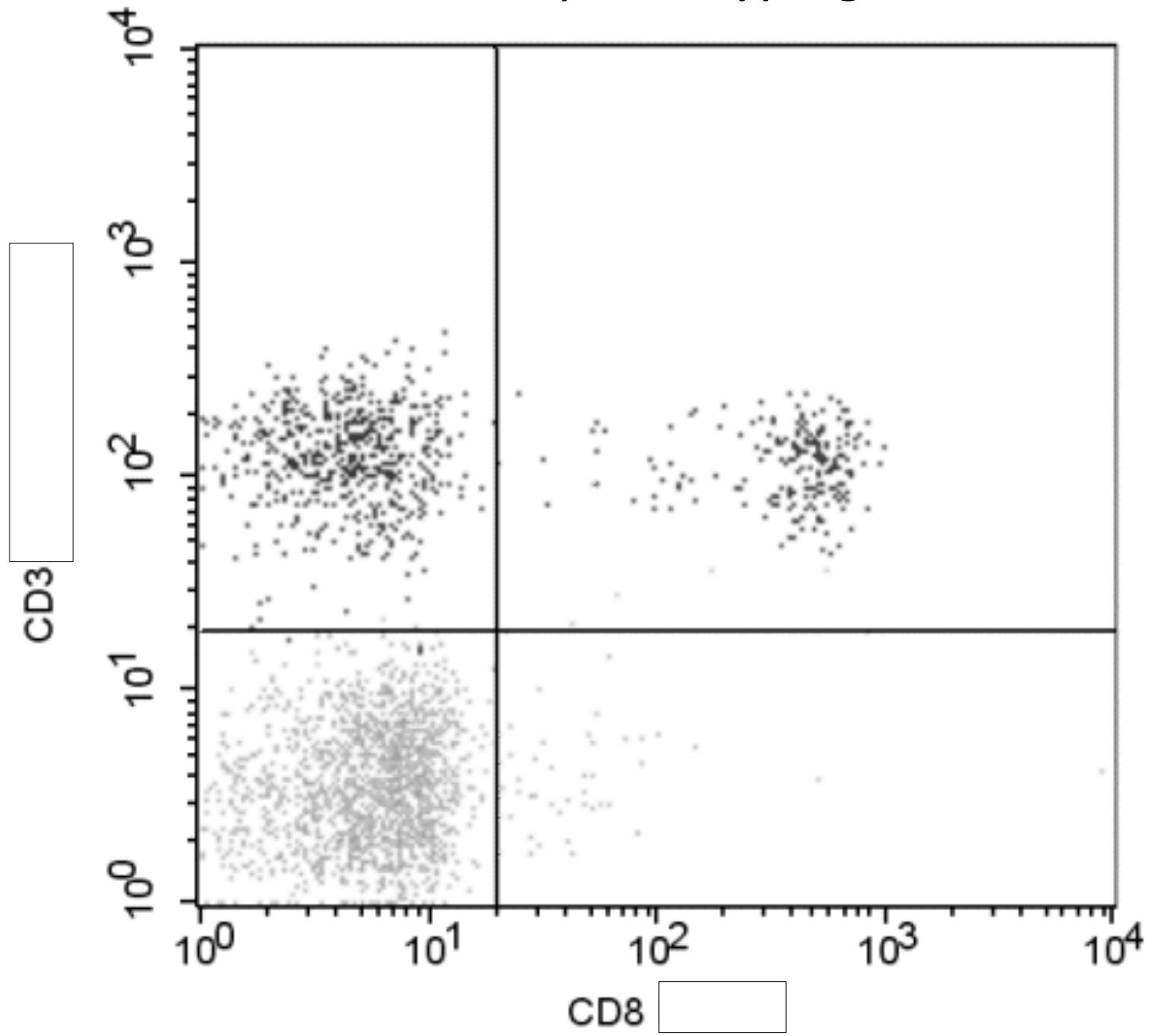


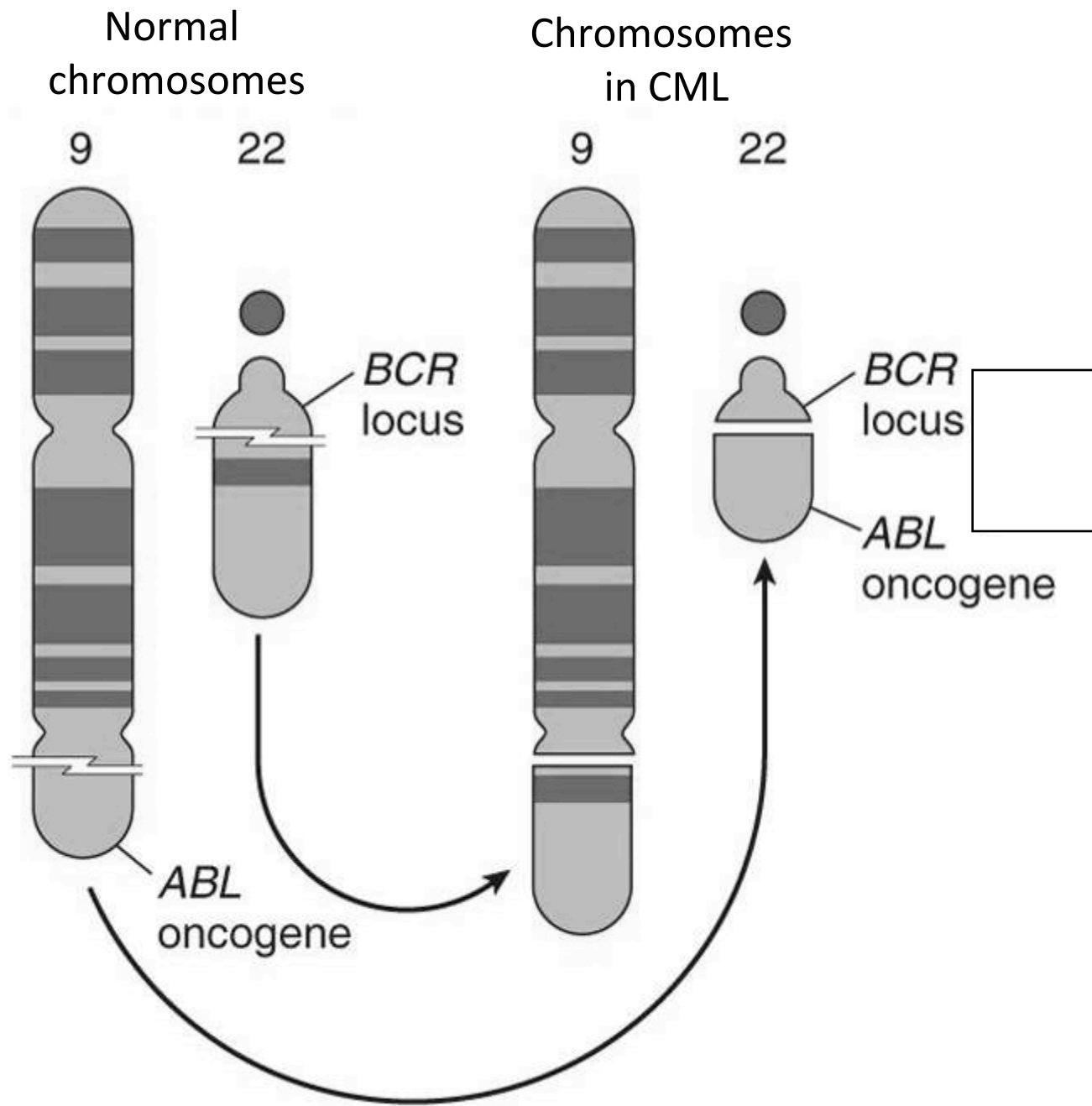
Normal bone marrow aspirate



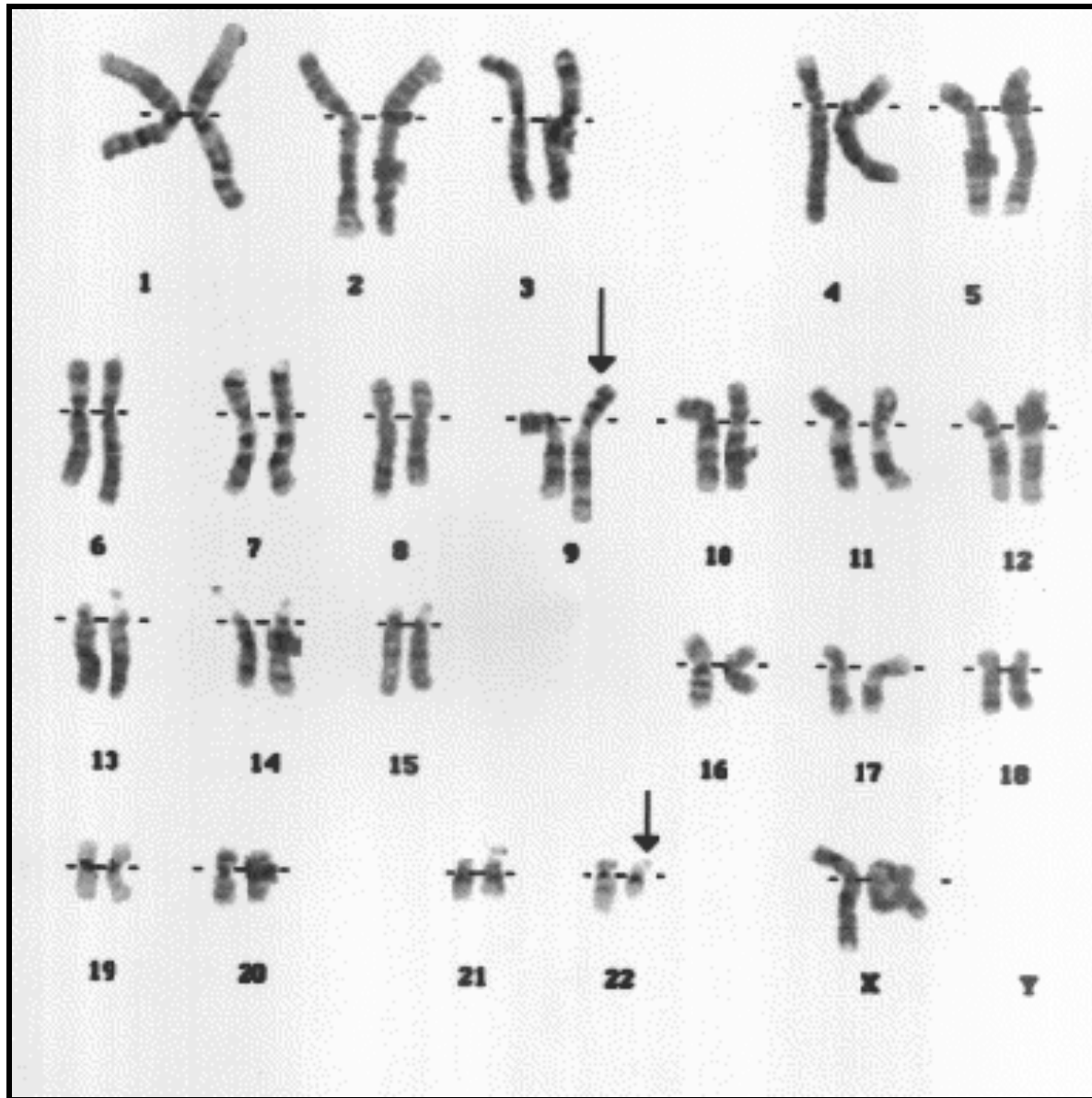
Normal bone marrow aspirate

Immunophenotyping

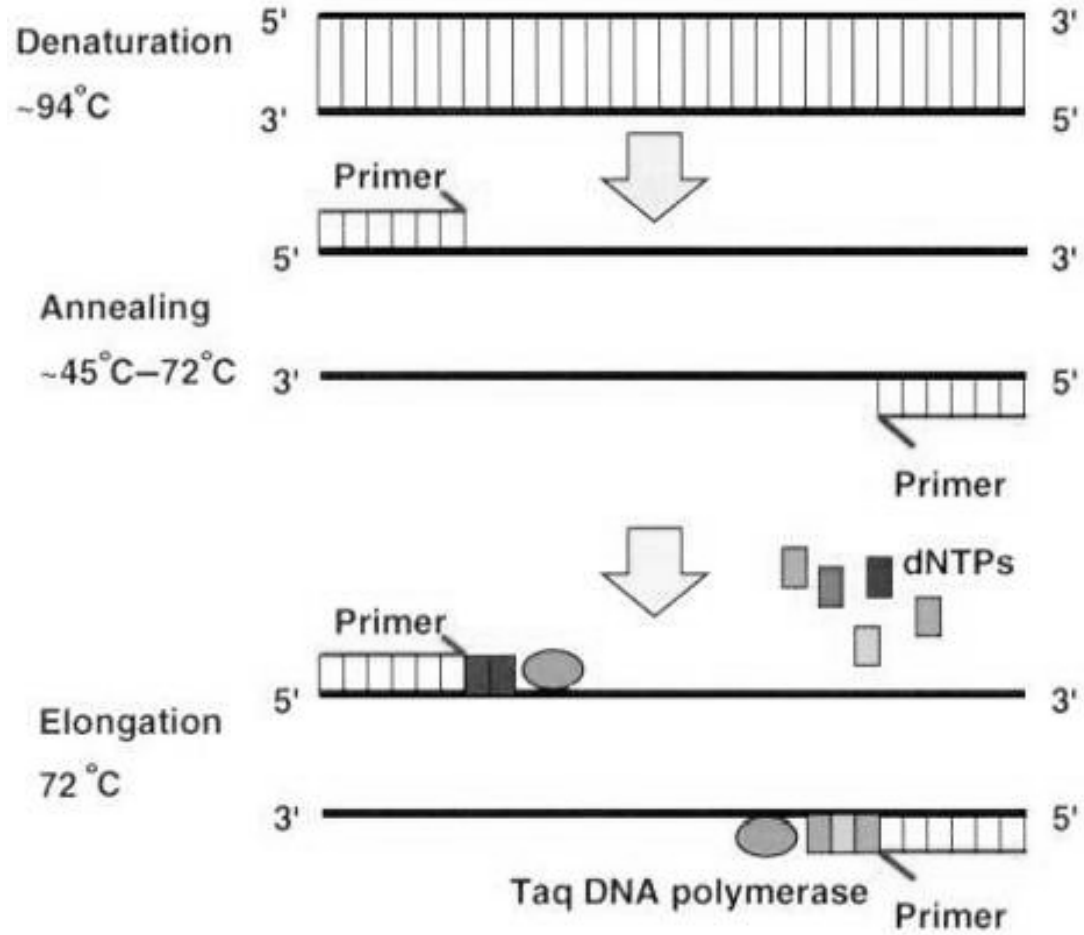




Cytogenetics



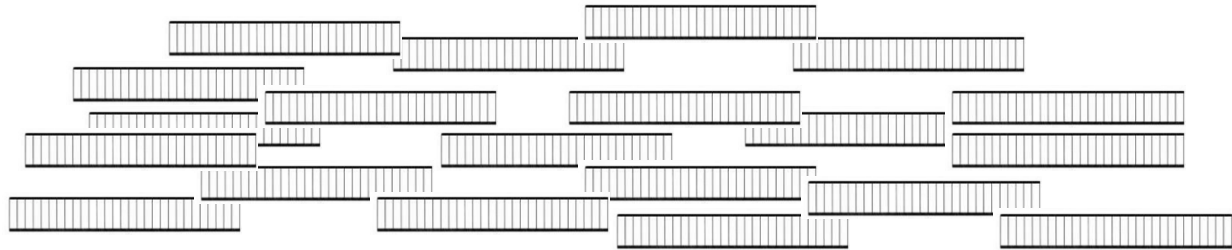
Molecular Studies



cut

paste

amplify



Hematologic Malignancies

Leukemias

- Acute leukemias
- Chronic leukemias

Lymphomas

- Hodgkin lymphoma
- Non-Hodgkin lymphoma

Plasma cell disorders

- Multiple myeloma

Hematologic Malignancies

Leukemias

- Acute leukemias
- Chronic leukemias

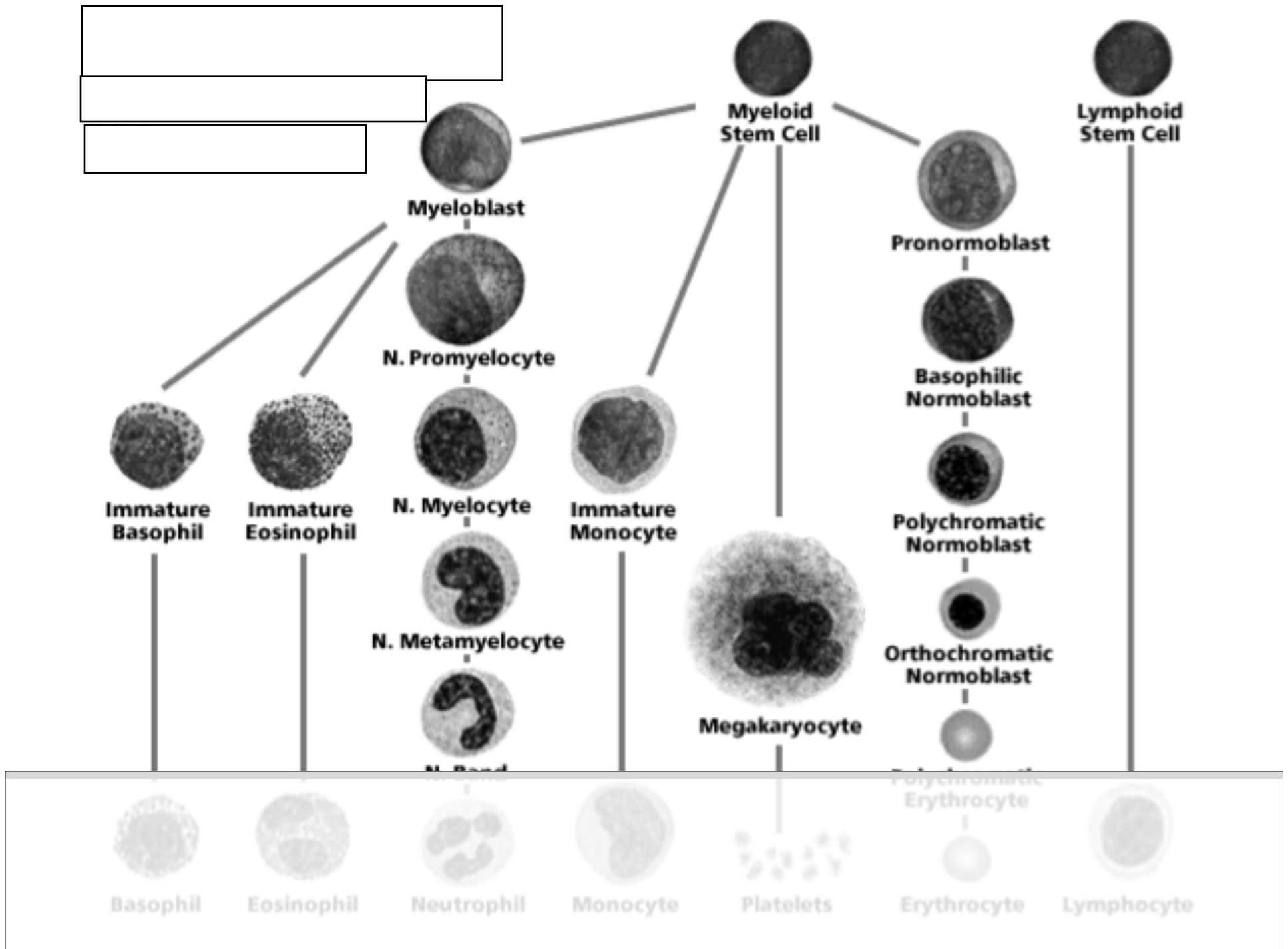
Acute vs. chronic leukemia

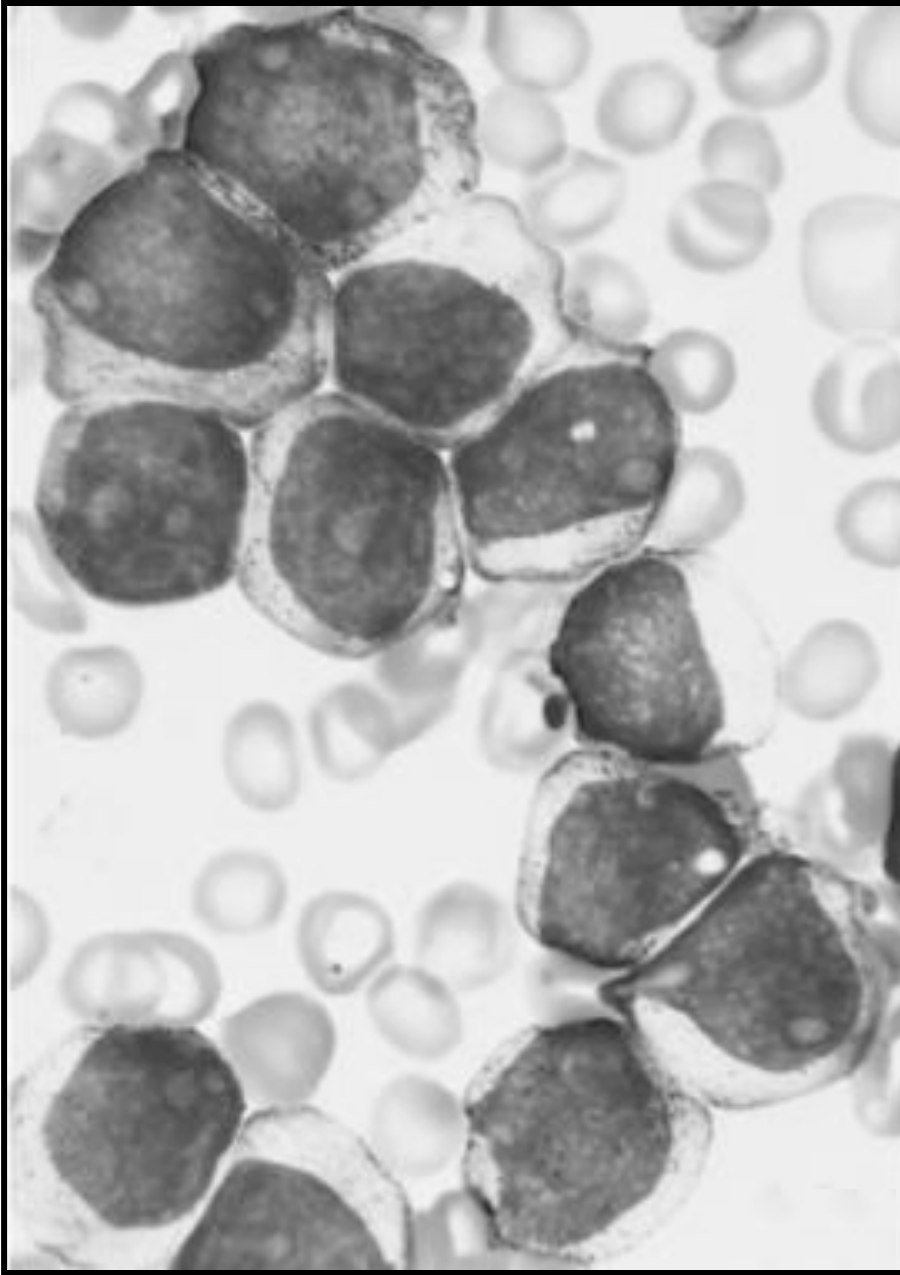
Acute leukemia

- Sudden onset
- Can occur in either adults or children
- Rapidly fatal without treatment
- Composed of immature cells (blasts)

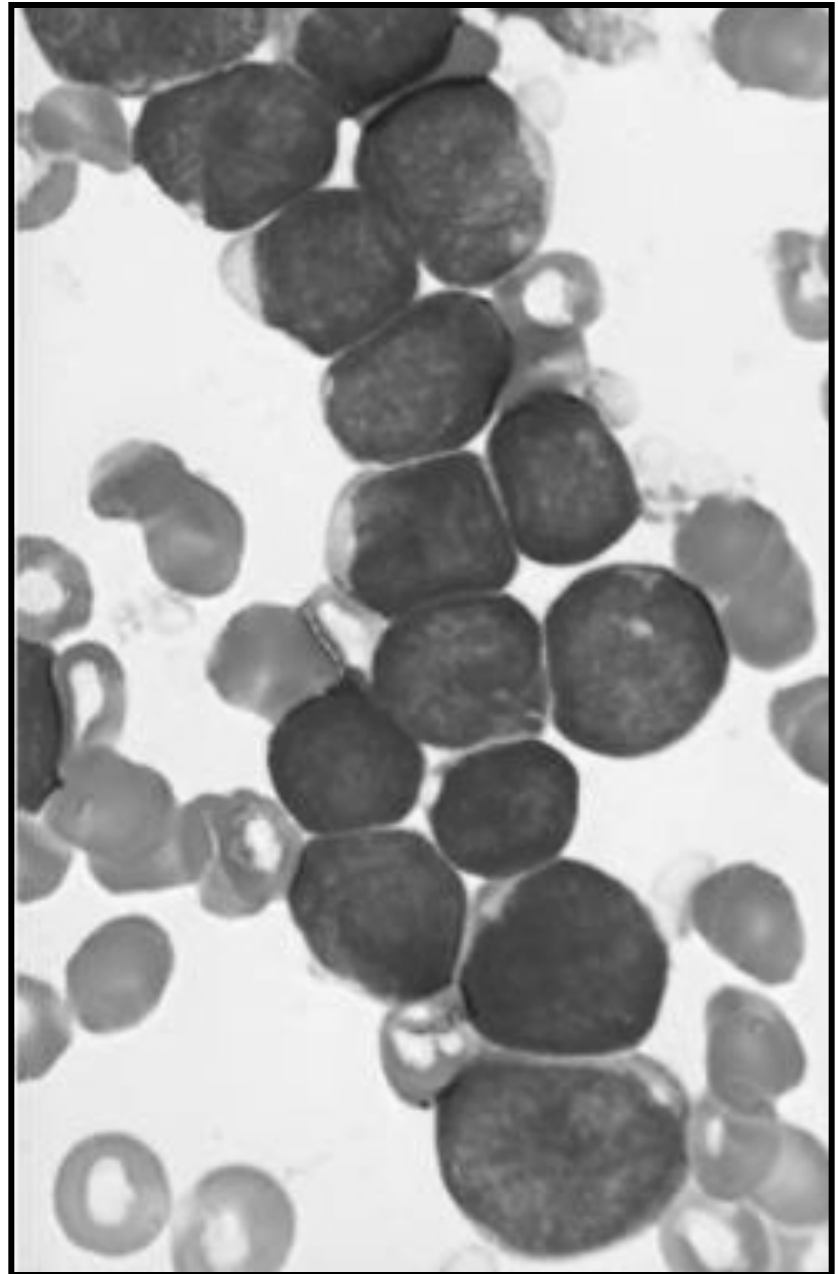
Chronic leukemia

- Slow onset
- Occurs only in adults
- Longer course
- Composed of mature cells

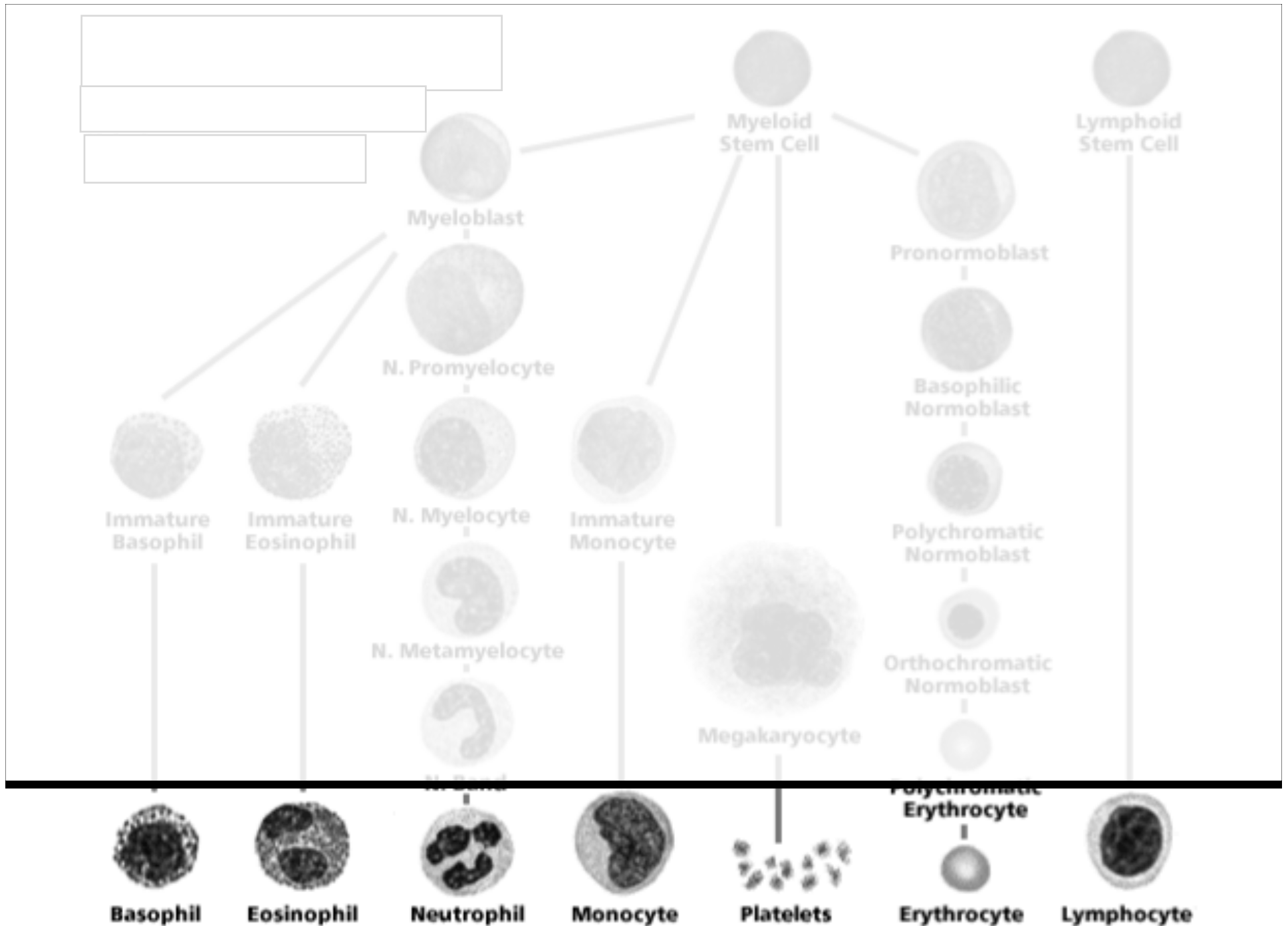


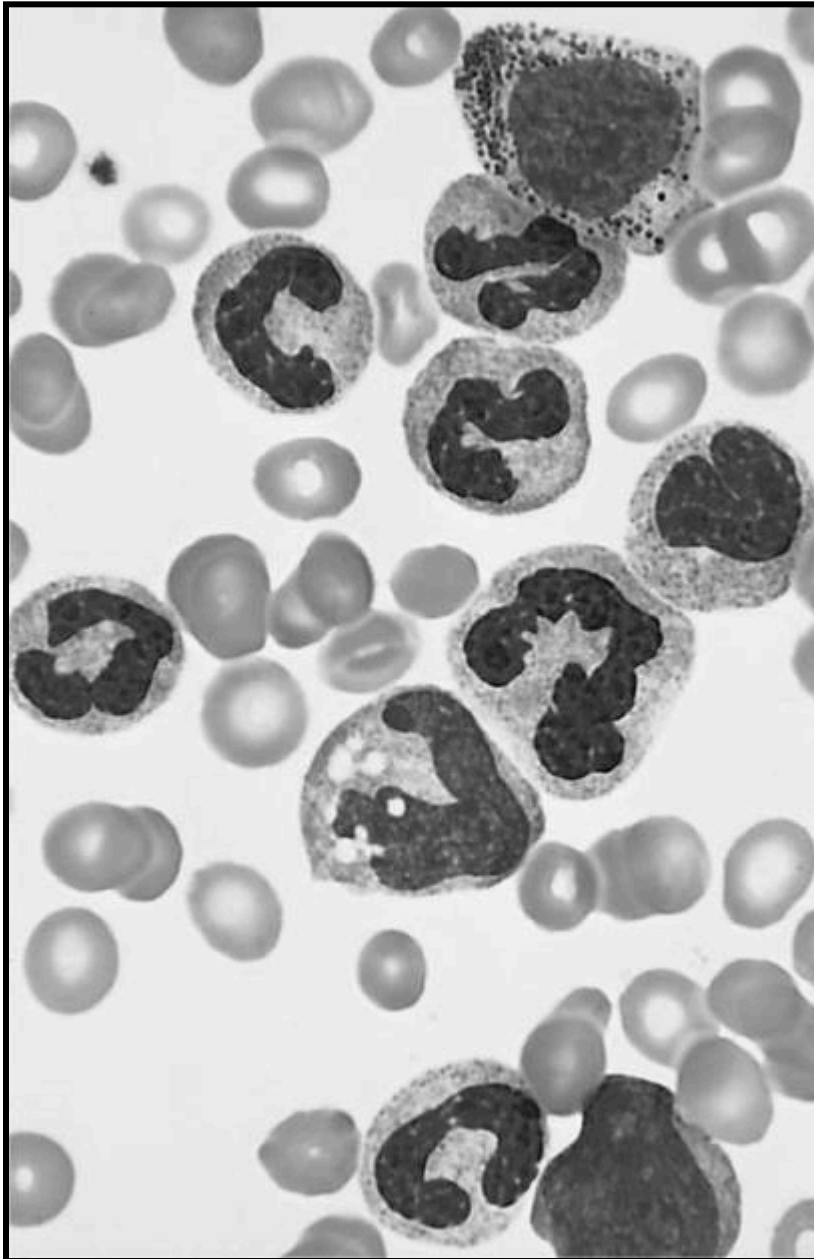


Acute myeloid leukemia

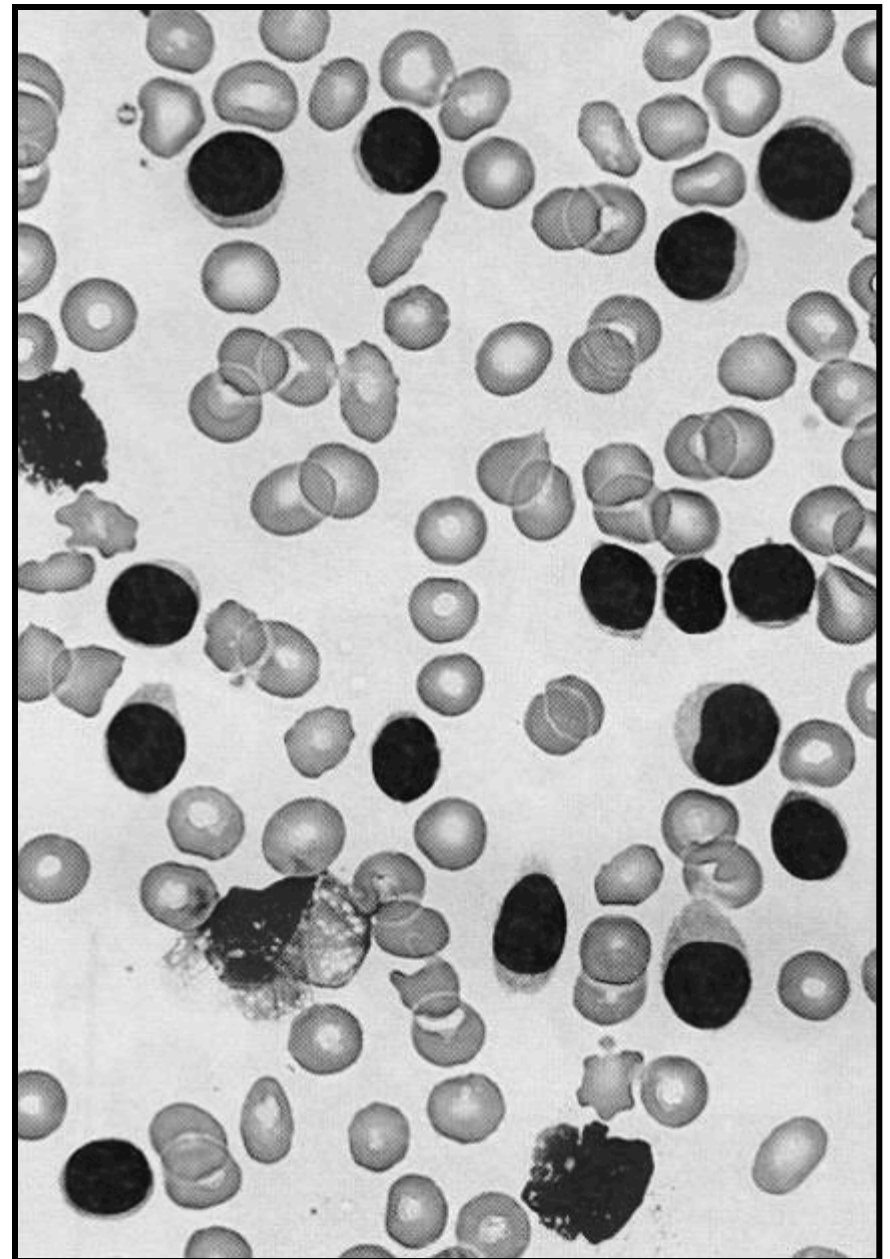


Acute lymphoblastic leukemia





Chronic myeloid leukemia



Chronic lymphocytic leukemia

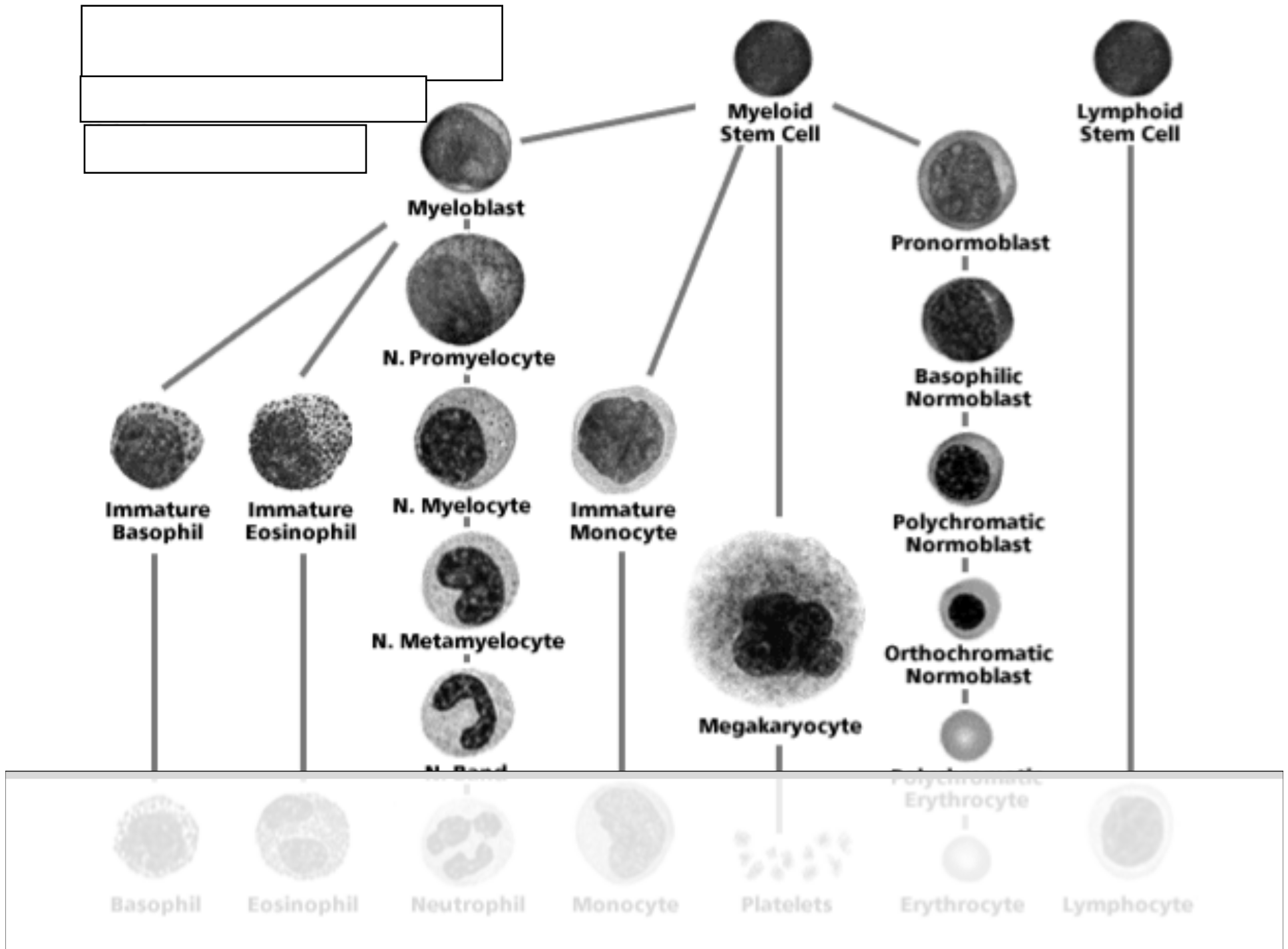
Hematologic Malignancies

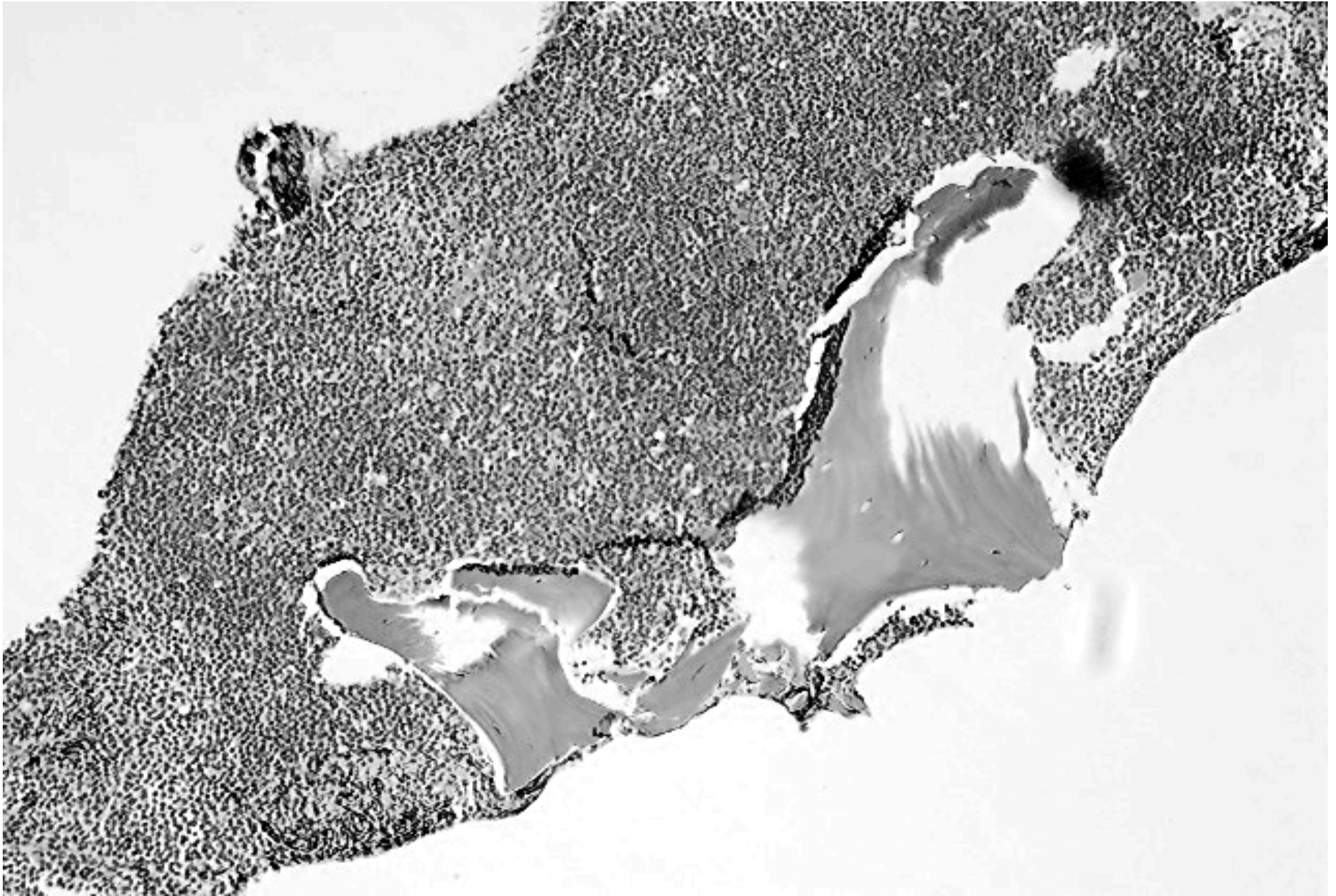
Leukemias

- Acute leukemias

Pathophysiology of Acute Leukemia

- Definition: malignant proliferation of immature myeloid or lymphoid cells in the bone marrow
- Cause
 - Clonal expansion
 - Maturation failure
- Badness
 - Crowd out normal cells
 - Inhibit normal cell function
 - Infiltrate other organs





Acute leukemia: bone marrow biopsy

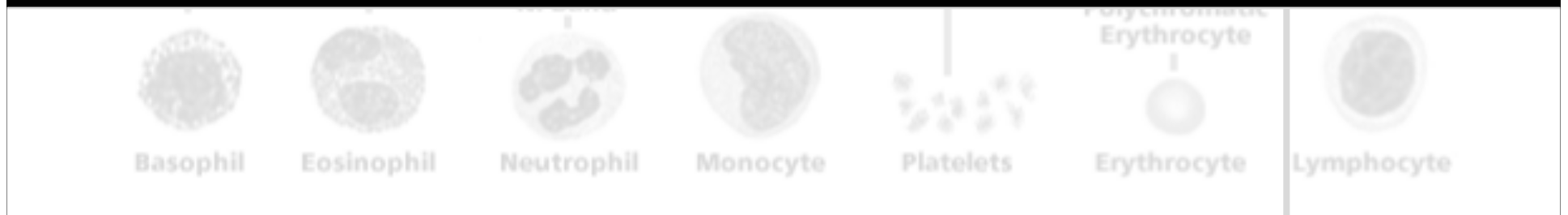
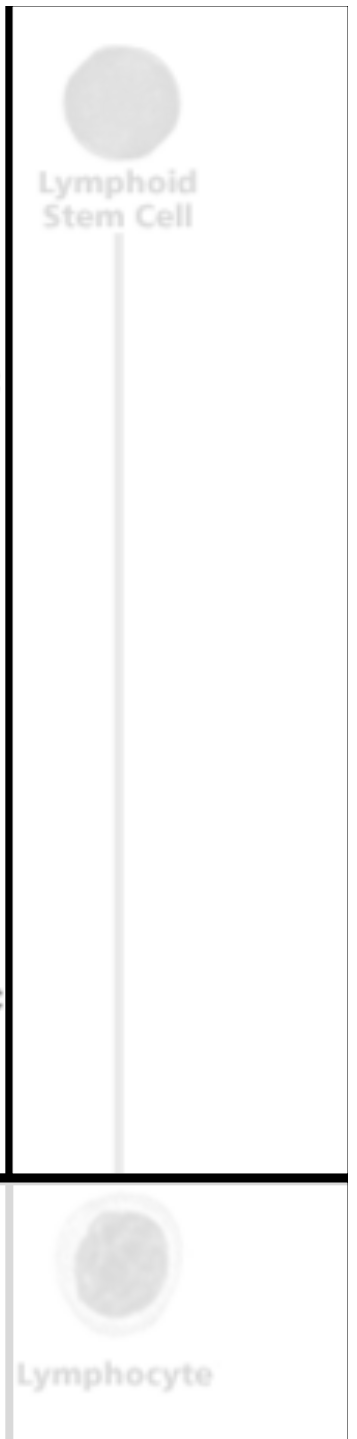
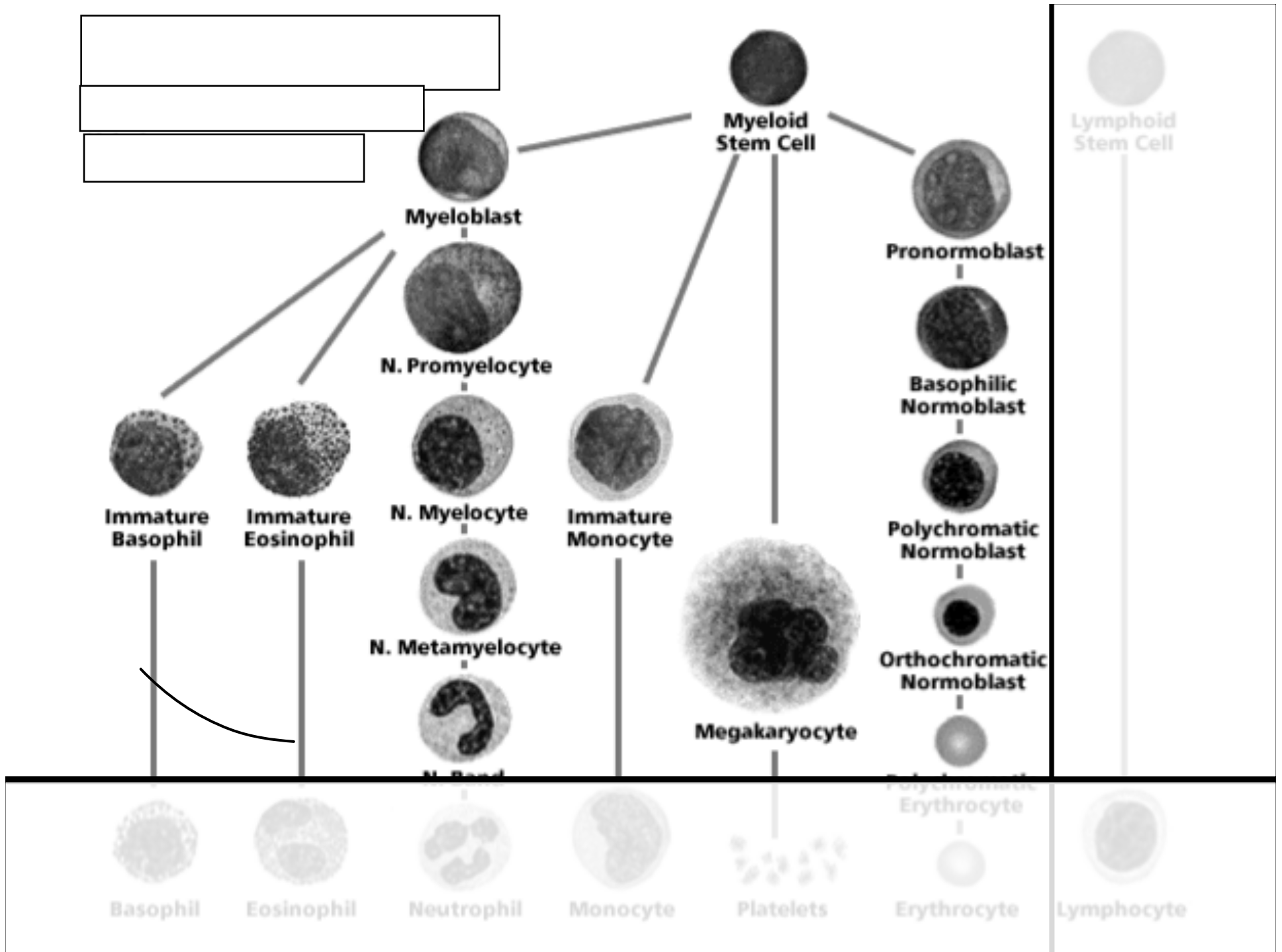
Clinical Findings in Acute Leukemia

- Sudden onset (days)
- Symptoms of bone marrow failure
 - Fatigue
 - Infections
 - Bleeding
- Bone pain (expanding marrow)
- Organ infiltration (liver, spleen, brain)

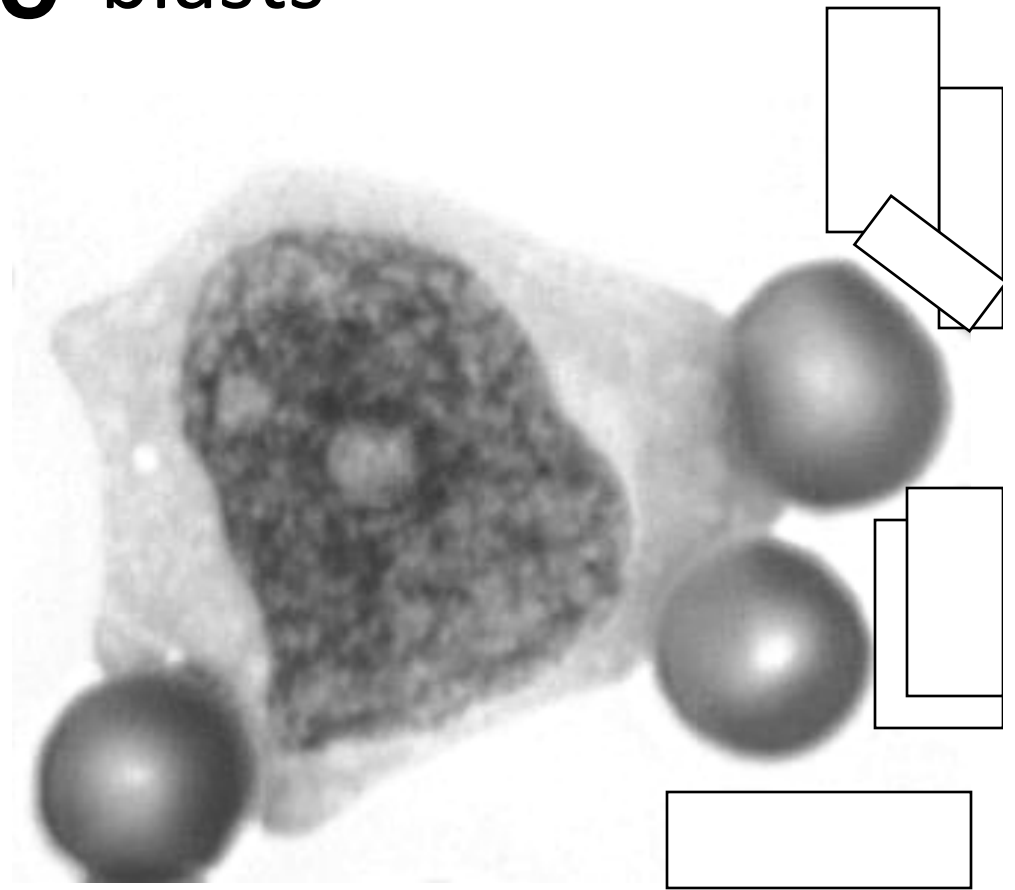
Acute Myeloid Leukemia

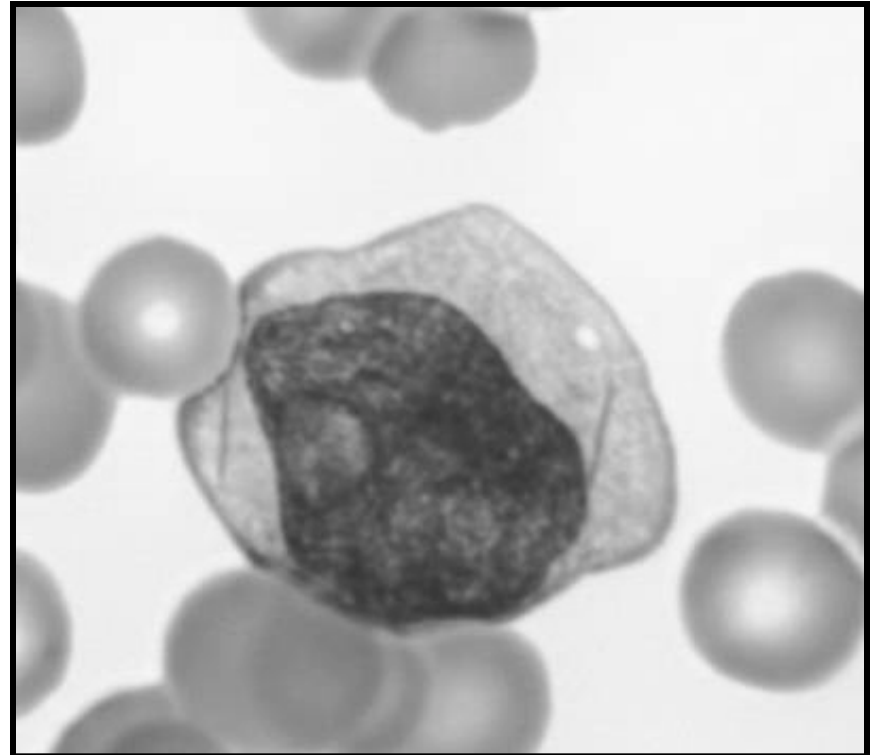
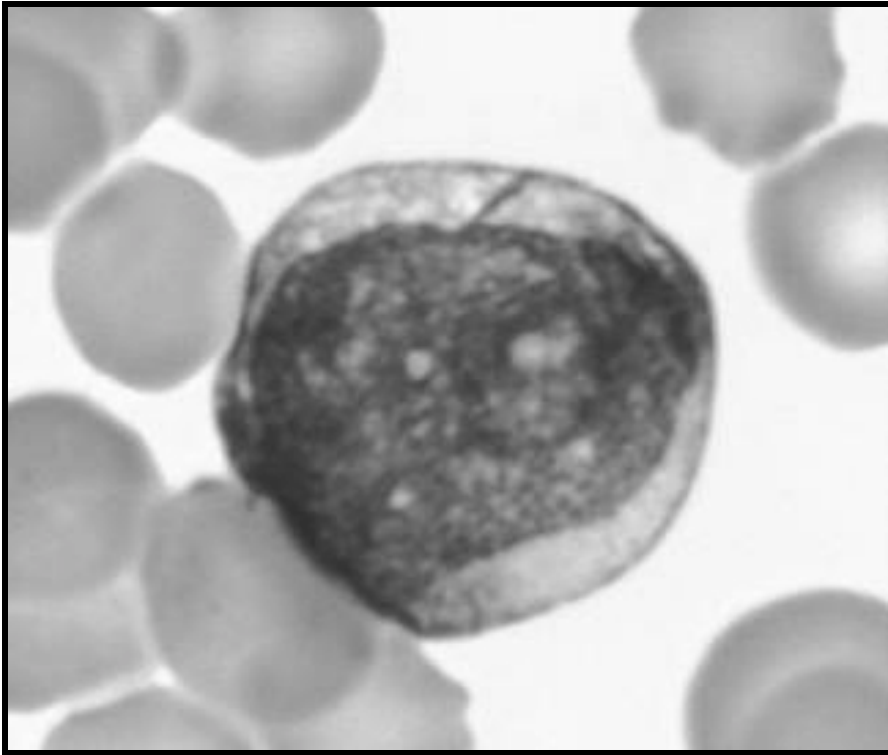
Things you must know

- Malignant proliferation of myeloid blasts in blood, bone marrow
- 20% cutoff for diagnosis
- Many subtypes
- Bad prognosis

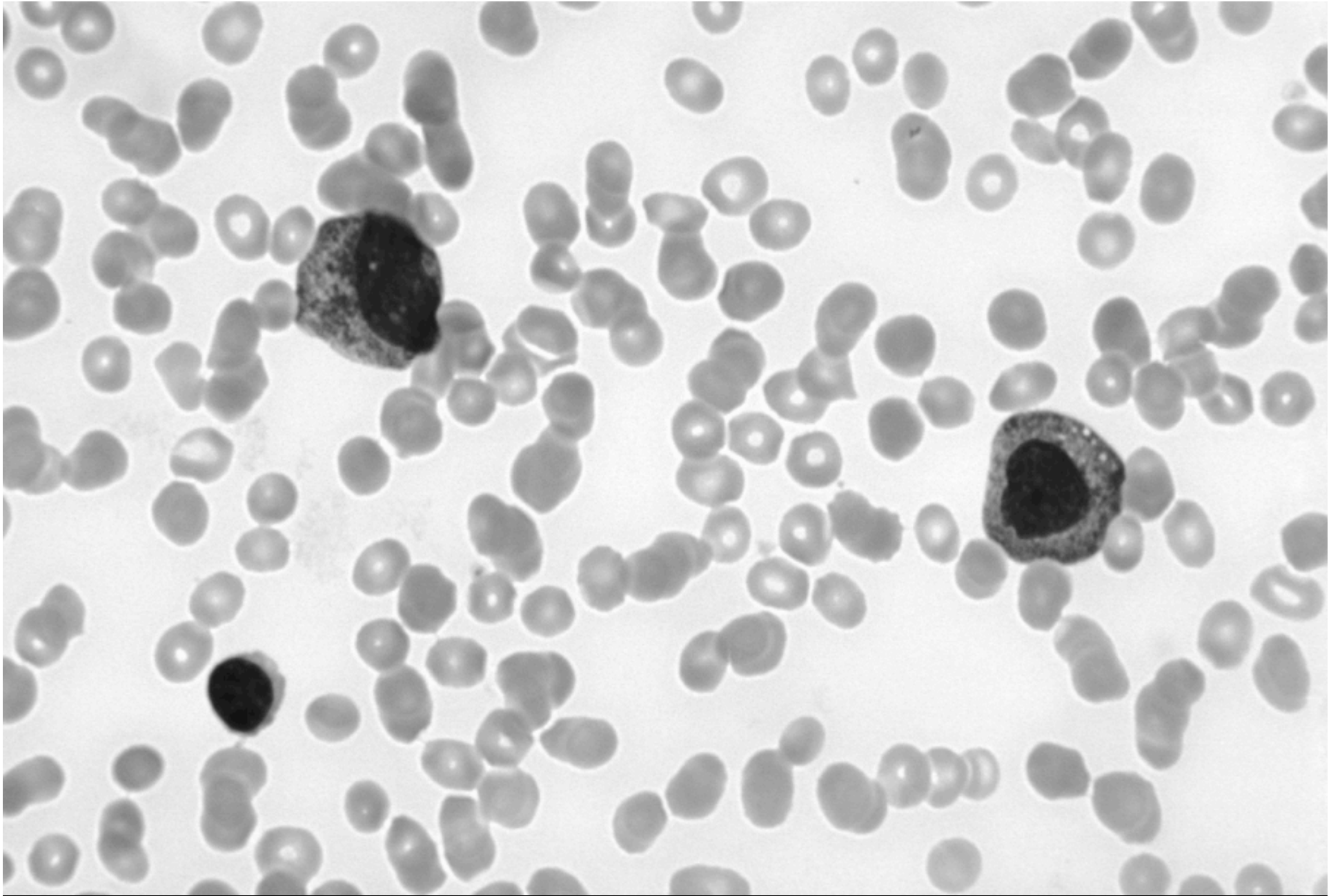


need at least **20%** blasts

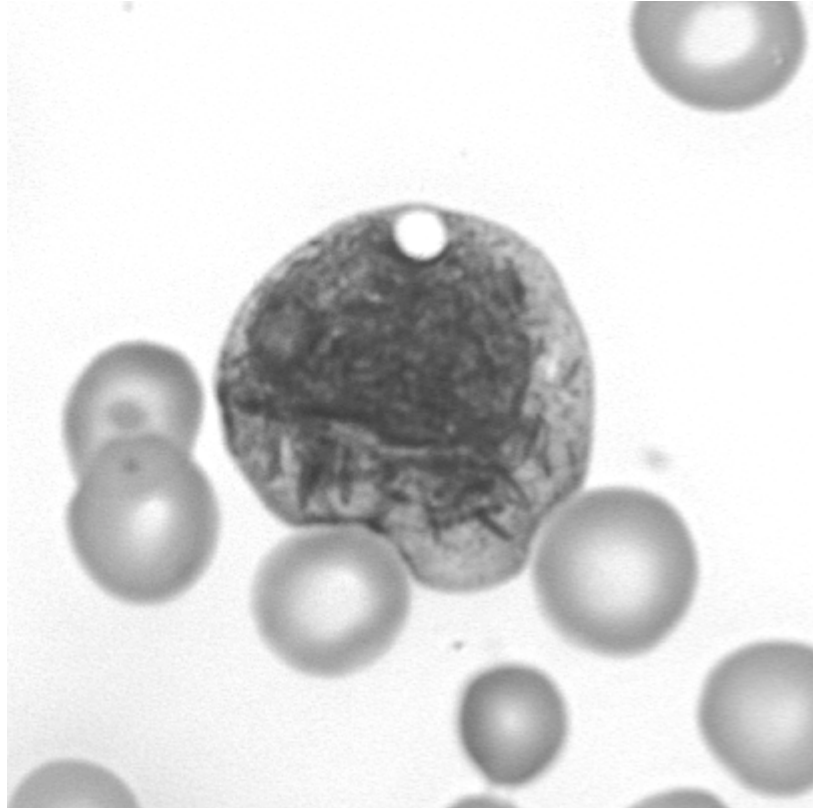




Auer rods



Acute promyelocytic leukemia



Faggot cell

109748



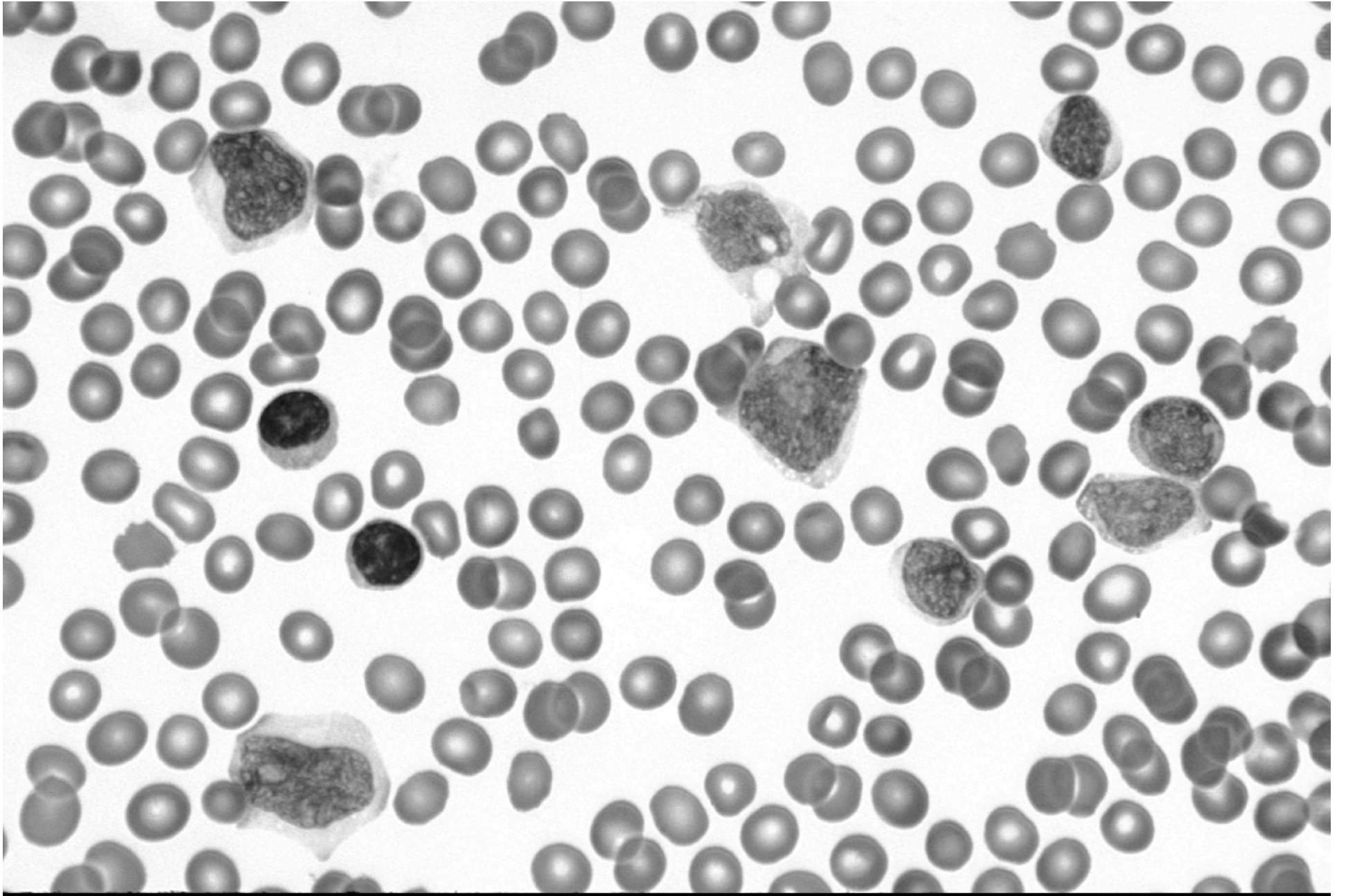
© 1910
ASAHEL CURTIS

20189

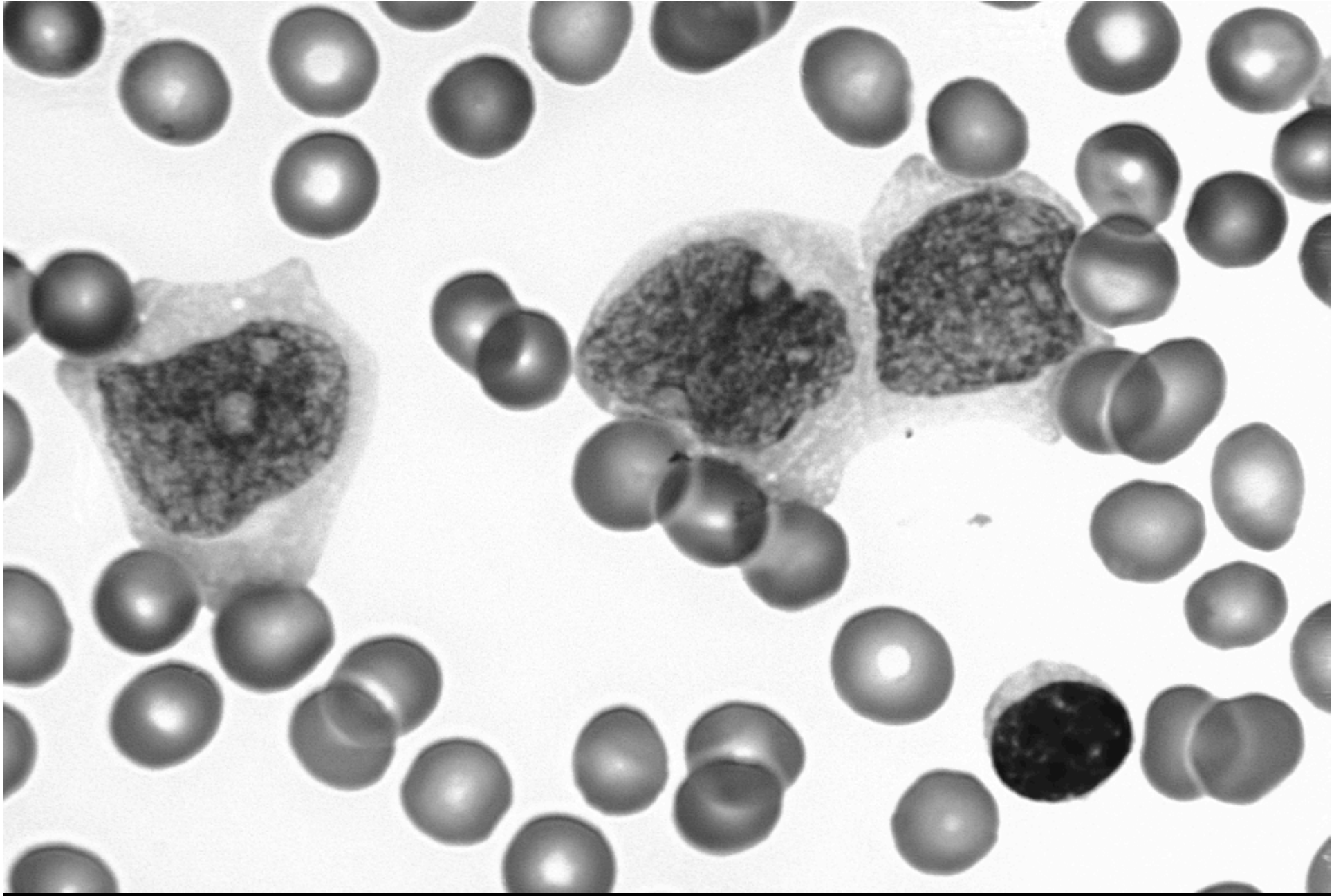
**INDIVIDUALLY WE ARE WEAK,
LIKE A SINGLE TWIG**



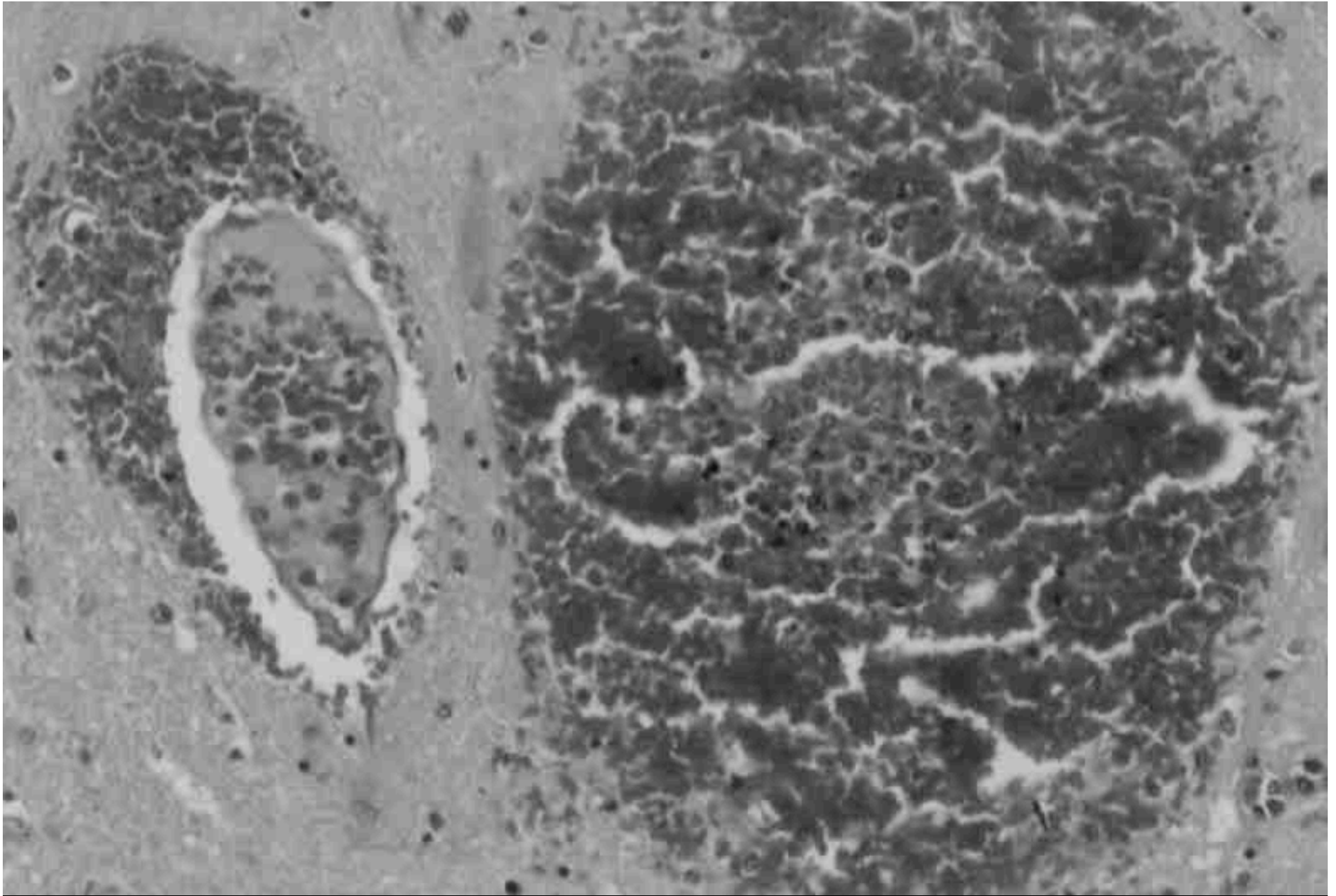
**BUT AS A BUNDLE,
WE FORM A MIGHTY FAGGOT**



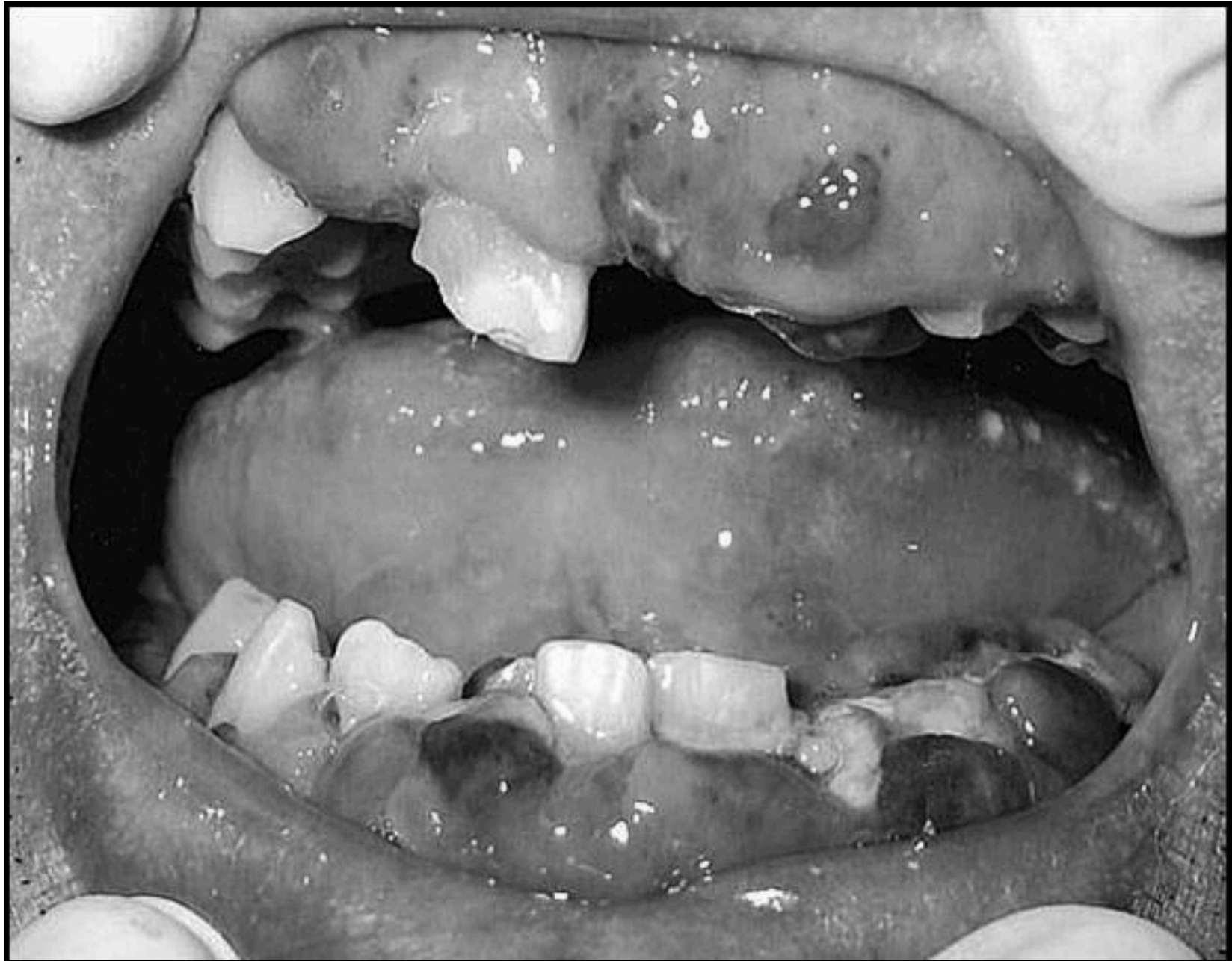
Acute monoblastic leukemia



Acute monoblastic leukemia



Acute monoblastic leukemia: brain involvement



Acute monoblastic leukemia: gum involvement

Treatment and Prognosis of AML

Treatment

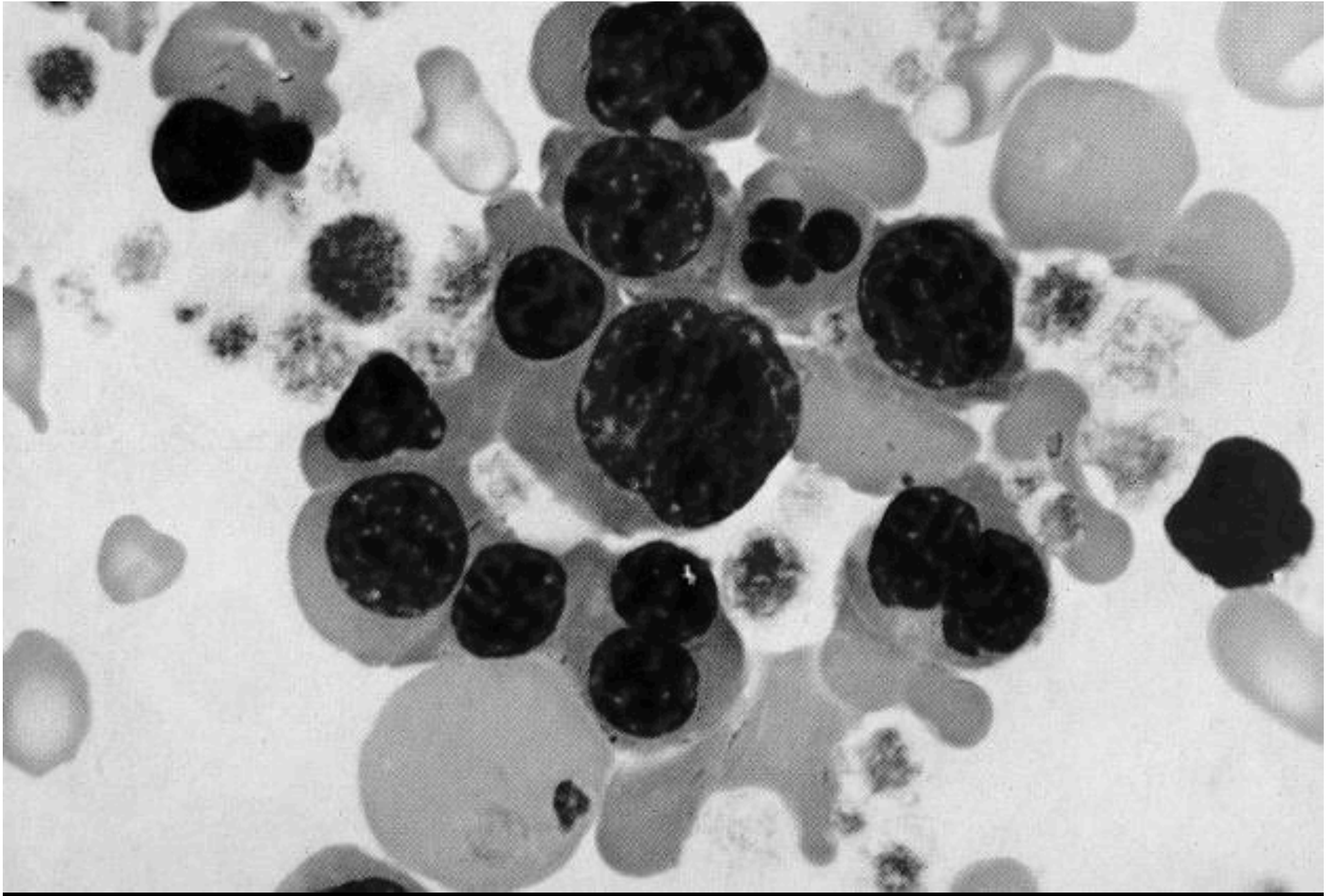
- Chemo
- Bone marrow transplant

Prognosis

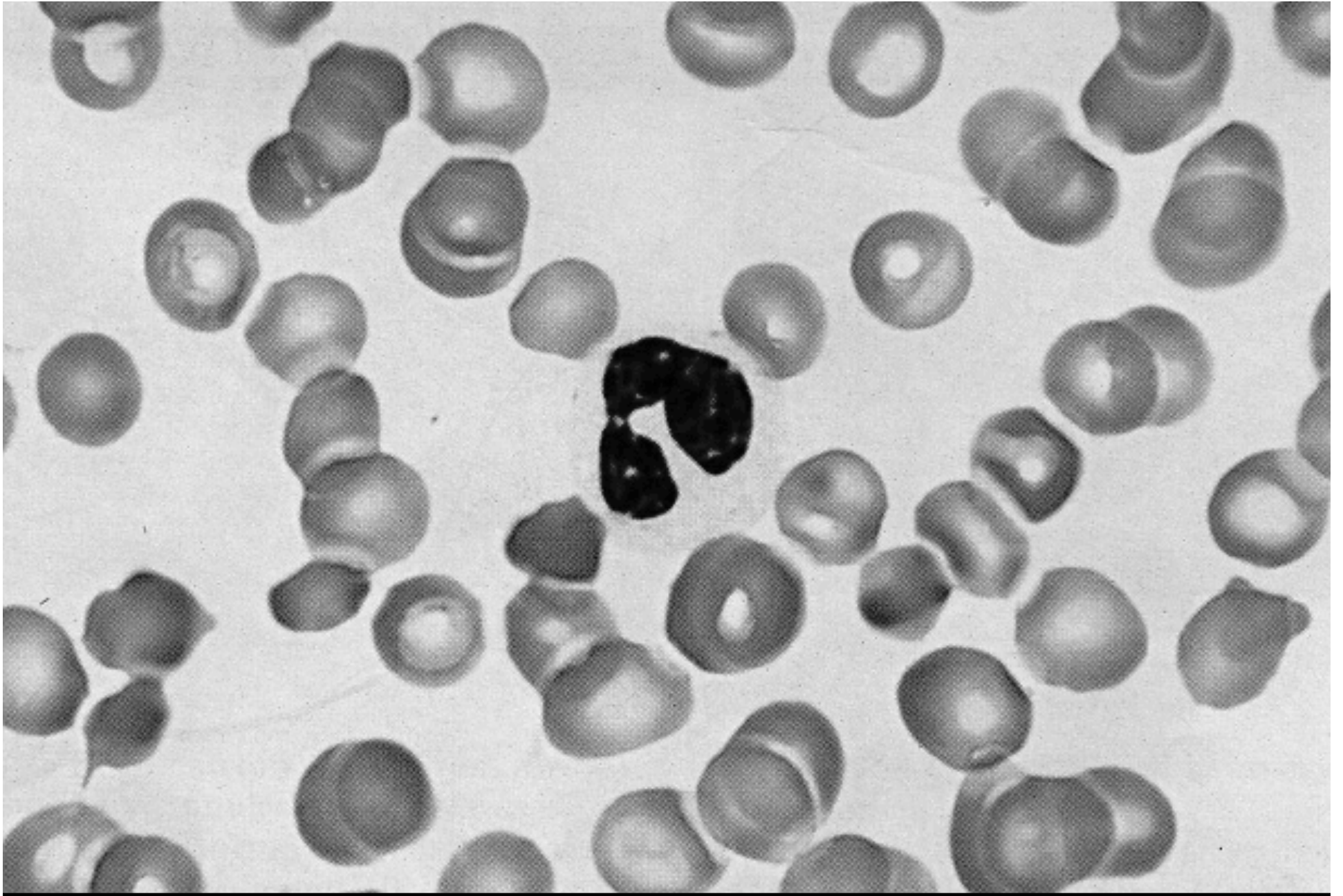
- Dismal
- Some chromosomal abnormalities confer different prognosis
- If therapy-related, worse prognosis

Myelodysplastic Syndrome

- Dysmyelopoiesis
- May evolve into AML
- Older patients, usually
- Macrocytic anemia
- Treatment depends on age, aggressiveness



Dyserythropoiesis (dysmyelopoiesis in red cells)

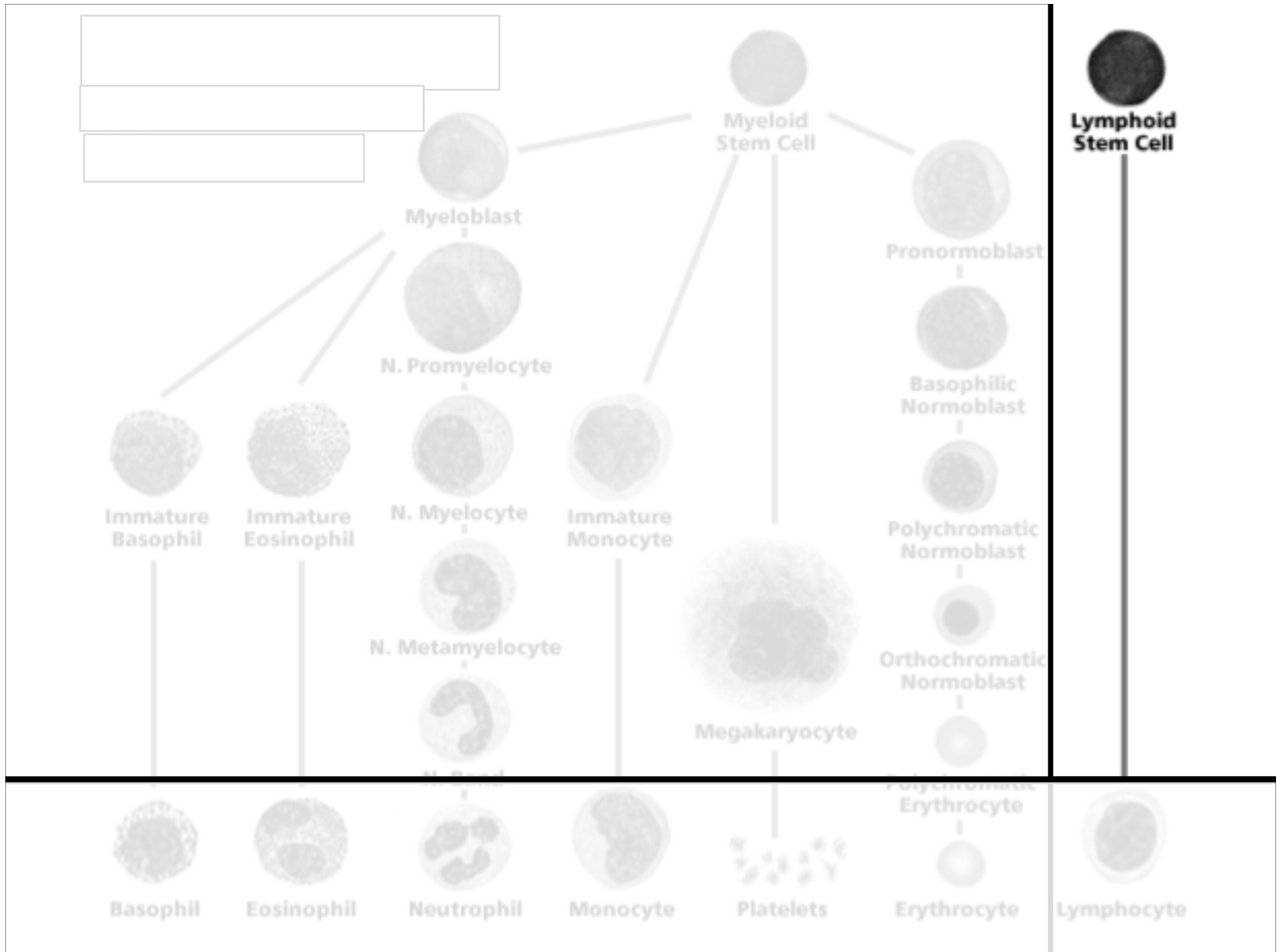


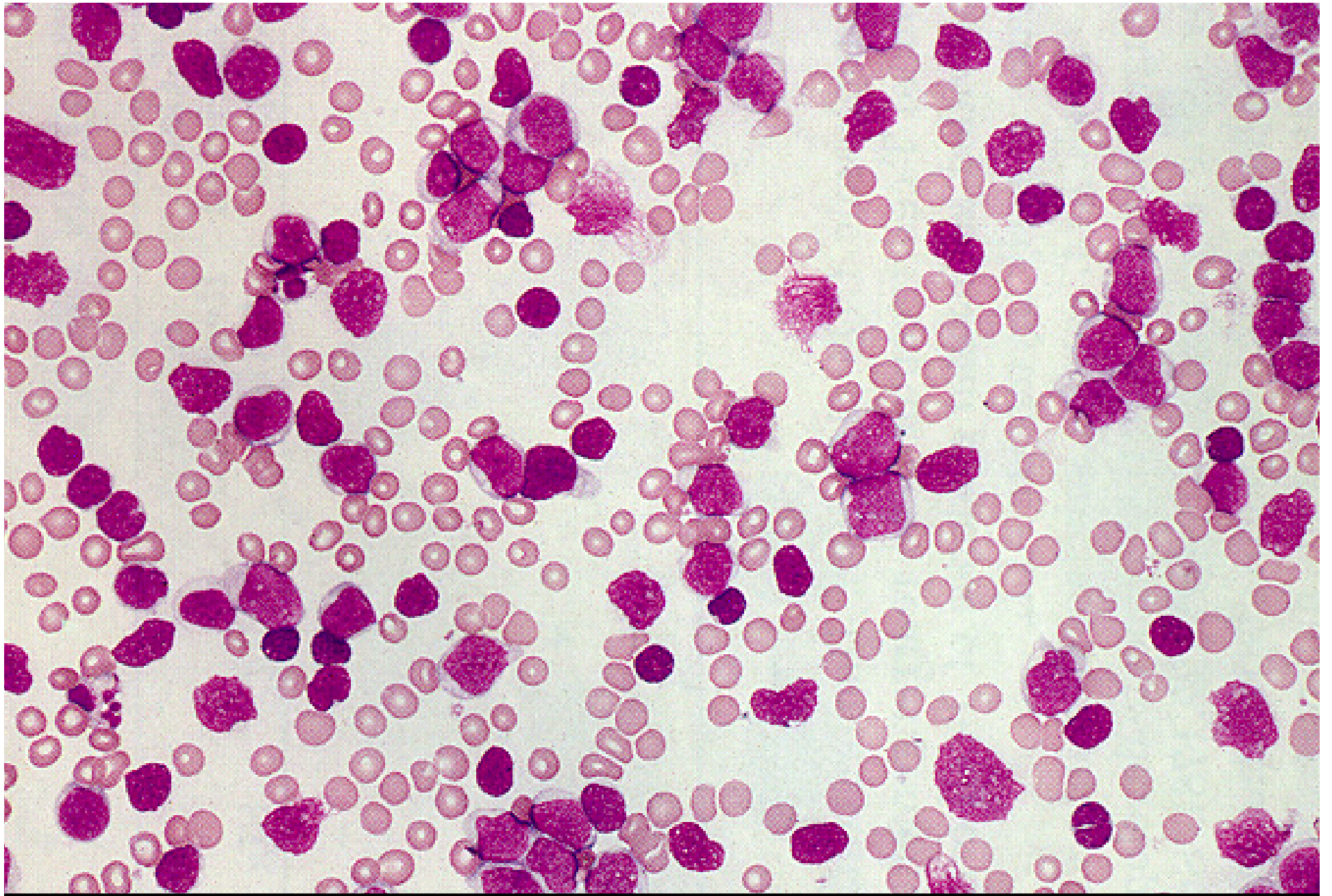
Dysgranulopoiesis (dysmyelopoiesis in neutrophils)

Acute Lymphoblastic Leukemia

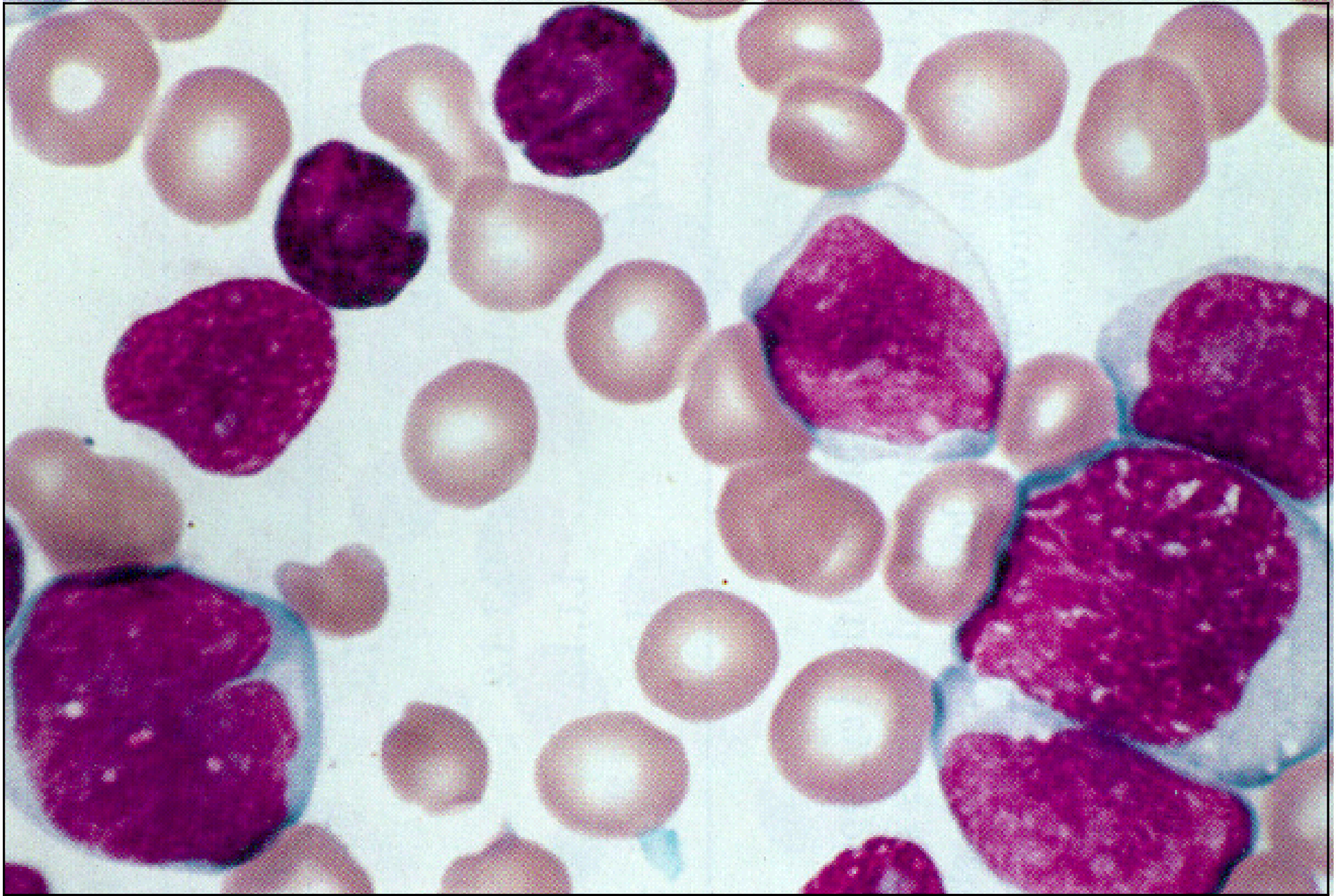
Things You Must Know

- Malignant proliferation of lymphoid blasts in blood, bone marrow
- Classified by immunophenotype (B vs. T)
- More common in children
- Prognosis often good!





ALL

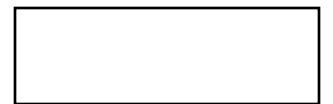
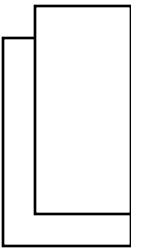
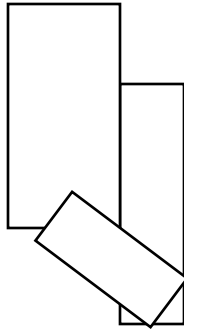


ALL

ALL Immunophenotype

- T-lineage ALL: worse prognosis.
- B-lineage ALL: better prognosis.

most common in **children**



Treatment and Prognosis of ALL

Treatment

- Chemo ± bone marrow transplant
- Many children are cured!

Prognosis

- Immunophenotype (T is worse)
- Age (1-10 better)
- WBC (<10,000 better)
- Cytogenetics (hyperdiploidy better!)