

**Precursor B lymphoblastic
leukemia/lymphoma**

Precursor B lymphoblastic leukemia/lymphoma

Definition: a neoplasm of lymphoblasts committed to the B-cell lineage.

- B-LBL: lymphoma mass, without or minimal blood and BM involvement
- B-ALL: lymphoblastic leukemia, extensive BM and blood involvement (>25% BM cells)

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Epidemiology

- B-ALL: 75% of cases in children under 6 years old
- B-LBL: 10% of lymphoblastic lymphoma, 75% of cases in patients under 18 years old

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Clinical features:

- B-ALL: WBC decreased, normal or markedly elevated
Anemia, thrombocytopenia
Lymphadenopathy, hepatosplenomegaly
Bone pain, arthralgias
- B-LBL: skin, bone, soft tissue, and lymph node

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Sites of involvement:

-B-ALL: blood and BM, all cases

-B-LBL: skin, bone, soft tissue, and lymph node,
rare in mediastinal mass

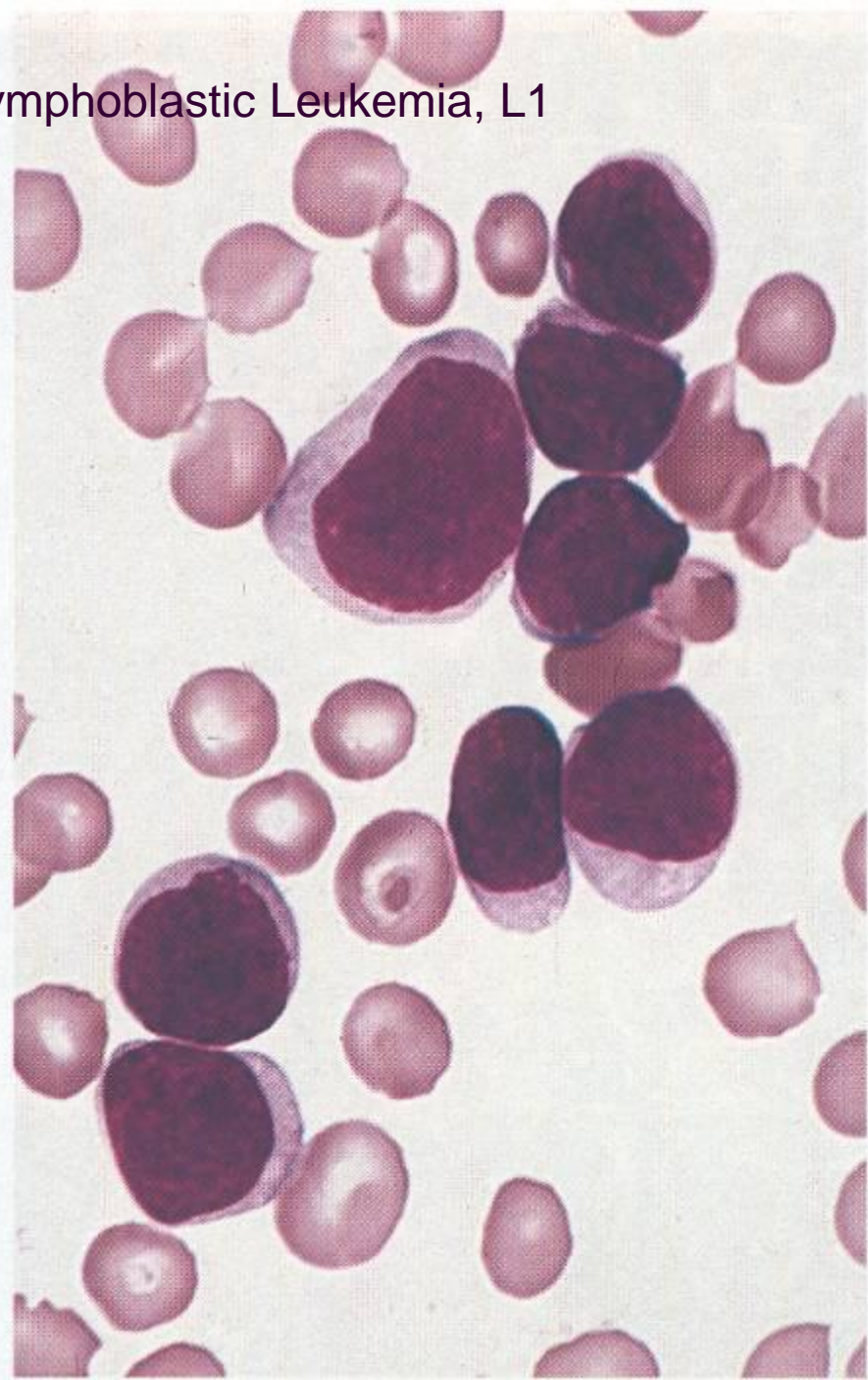
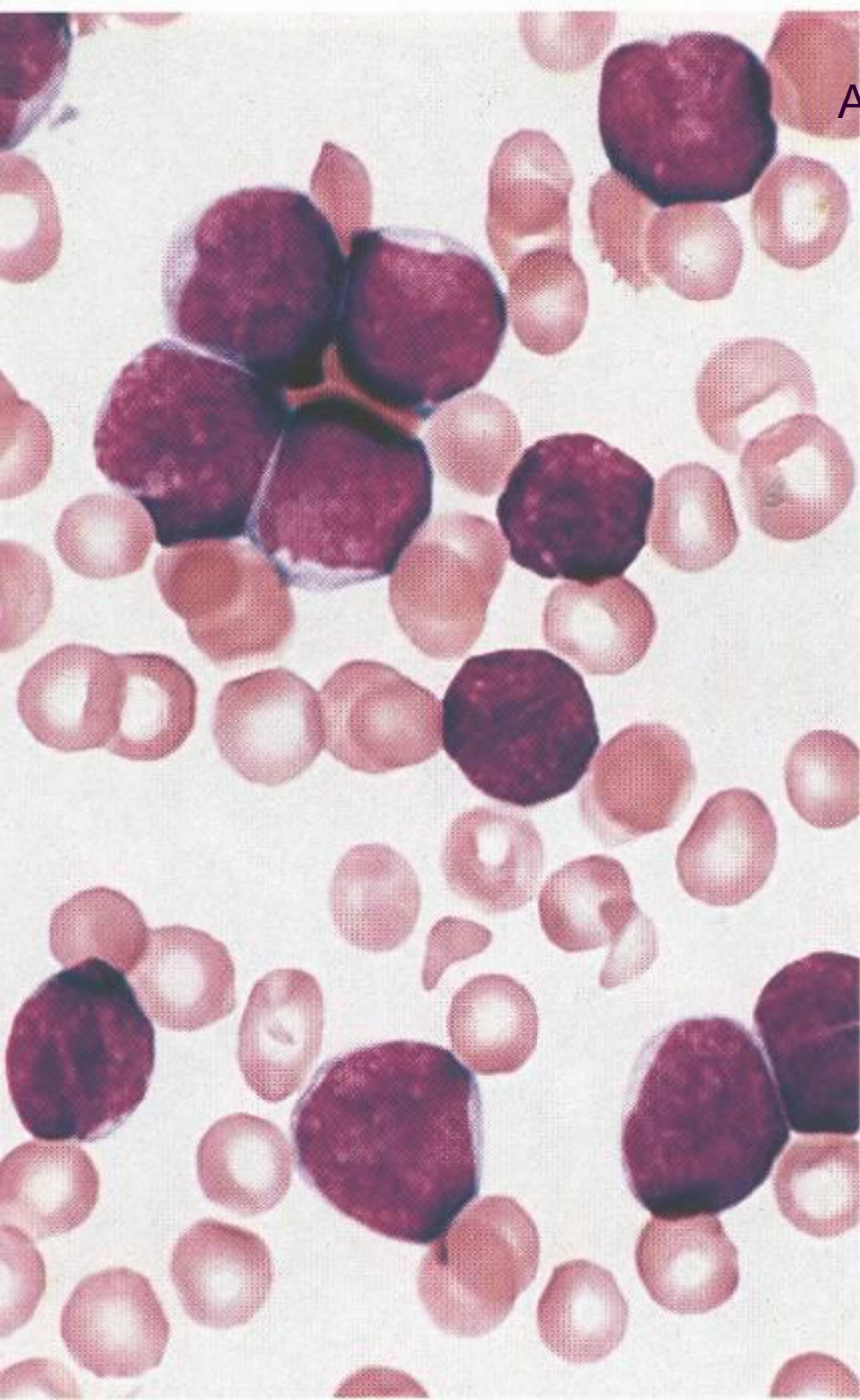
Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Morphology:

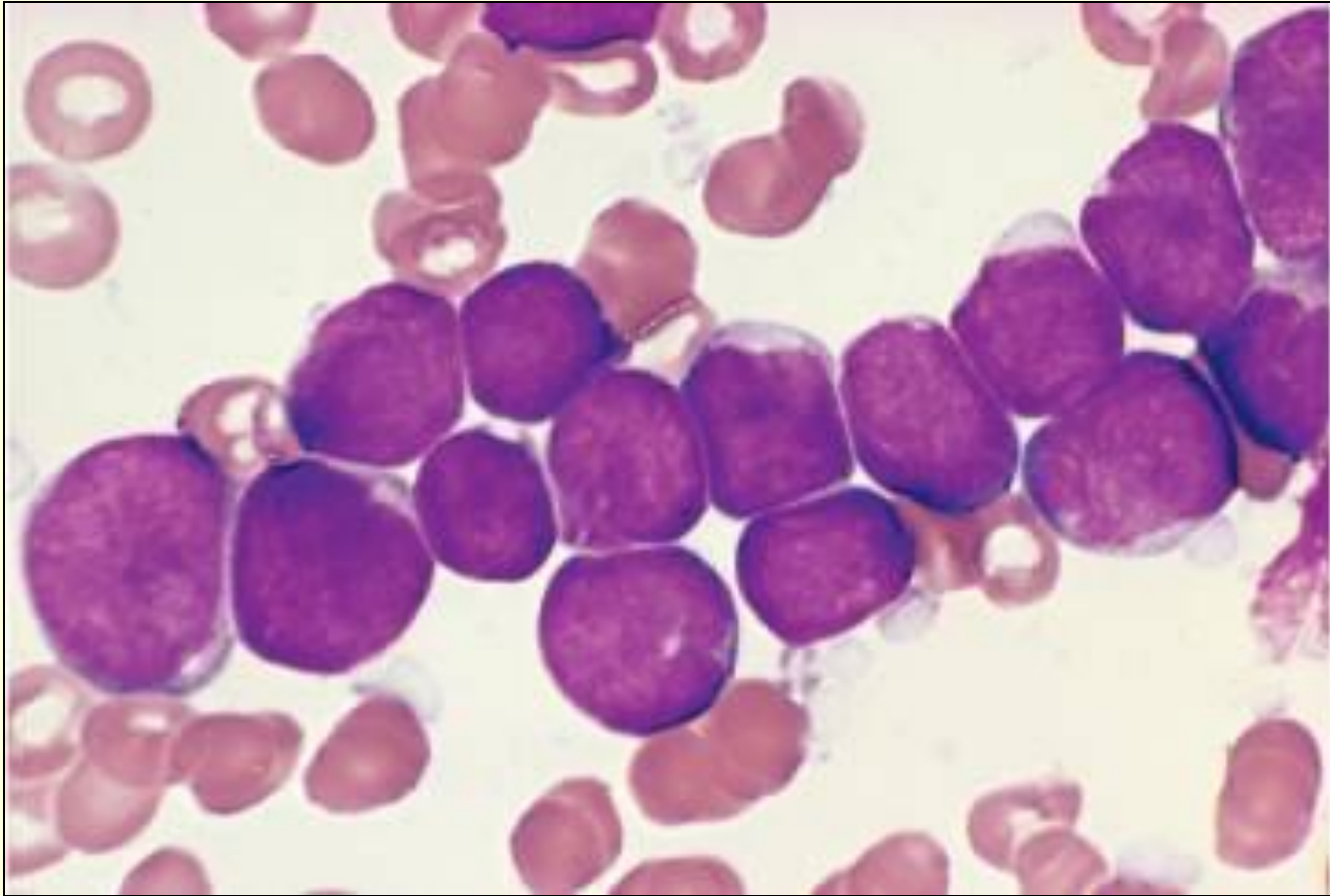
-B-ALL: blood and BM, all cases

-B-LBL: skin, bone, soft tissue, and lymph node, rare
in mediastinal mass

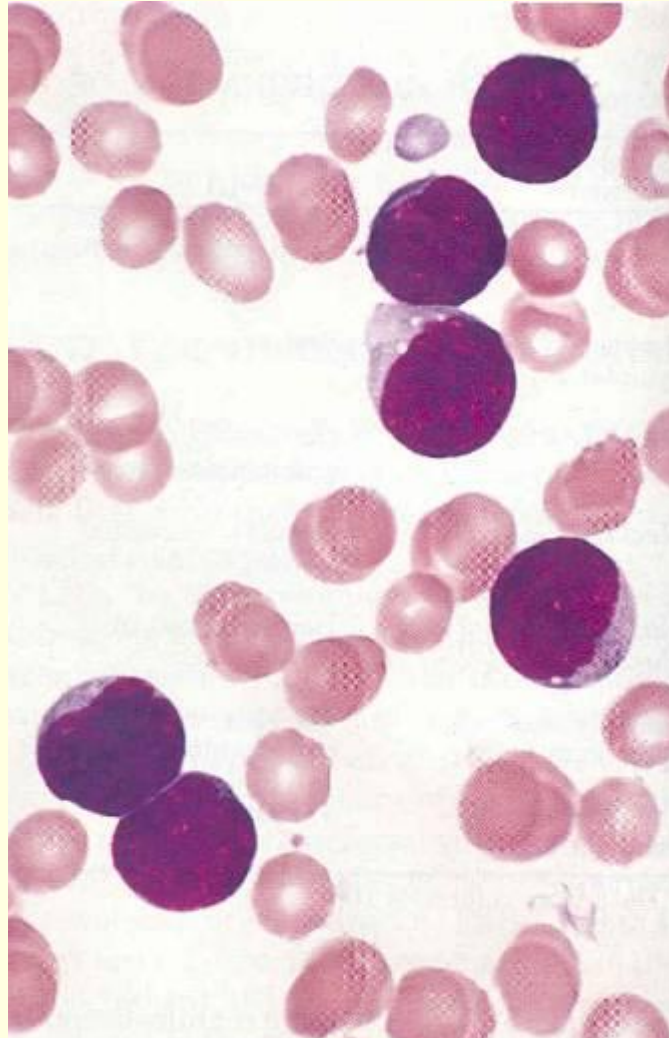
Acute Lymphoblastic Leukemia, L1



Acute Lymphoblastic Leukemia

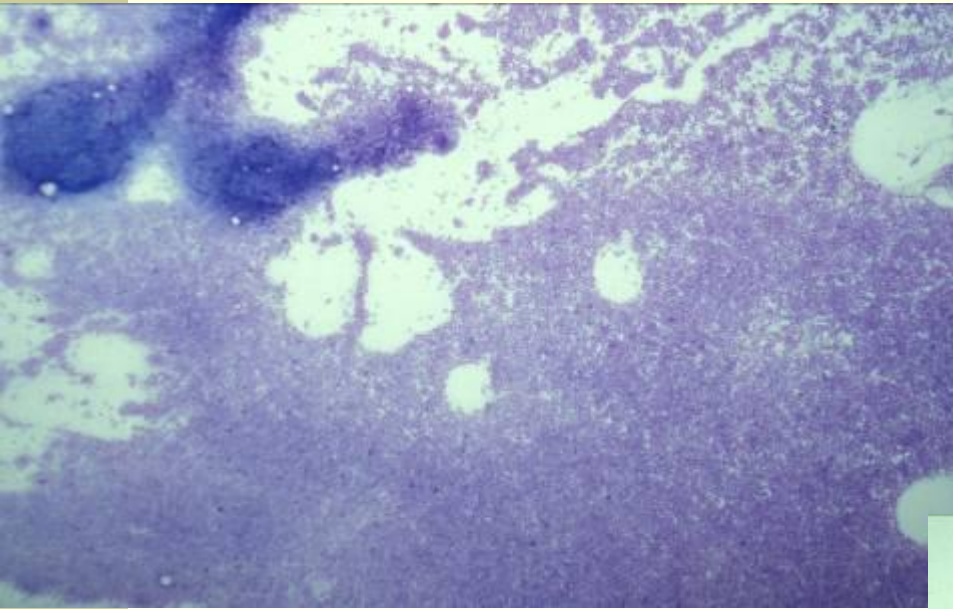


Acute Lymphoblastic Leukemia



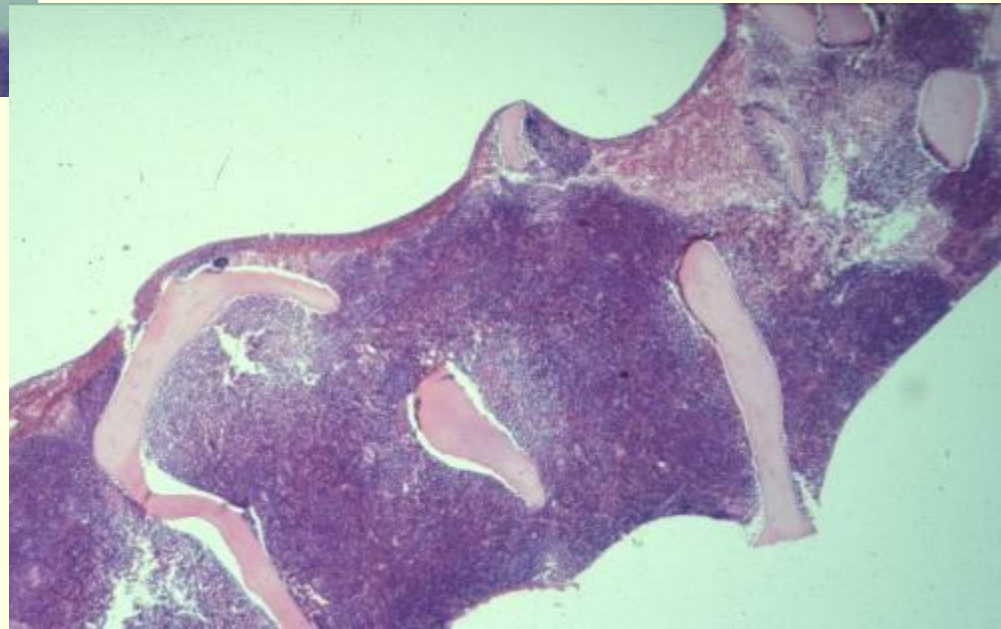
Acute Lymphoblastic Leukemia

Bone Marrow

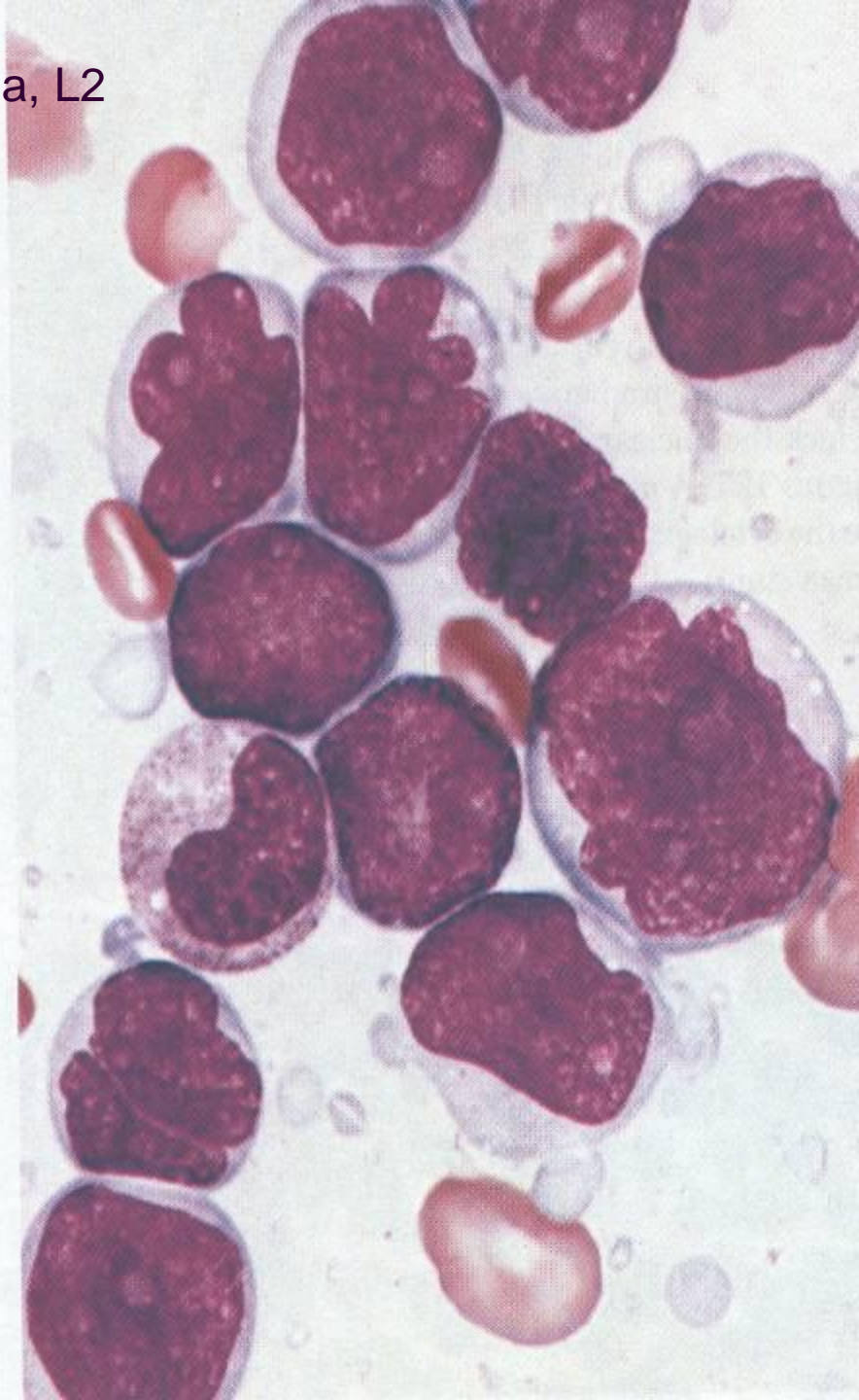


Bone marrow aspirate smear

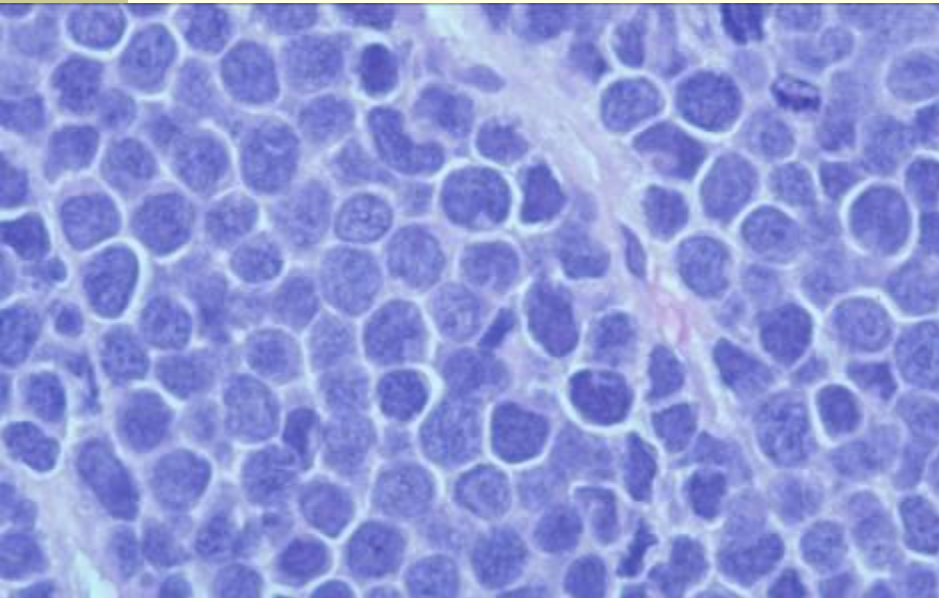
Bone marrow biopsy



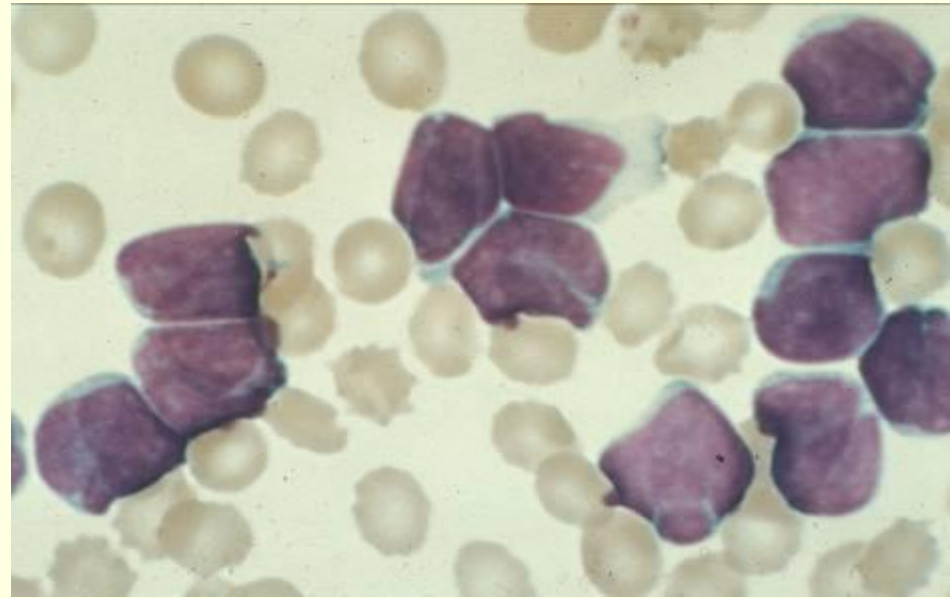
Acute Lymphoblastic Leukemia, L2



Lymphoblastic Lymphoma/Leukemia



**Mediastinal mass:
Lymphoblastic lymphoma**



**Peripheral blood:
Acute lymphoblastic leukemia**

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

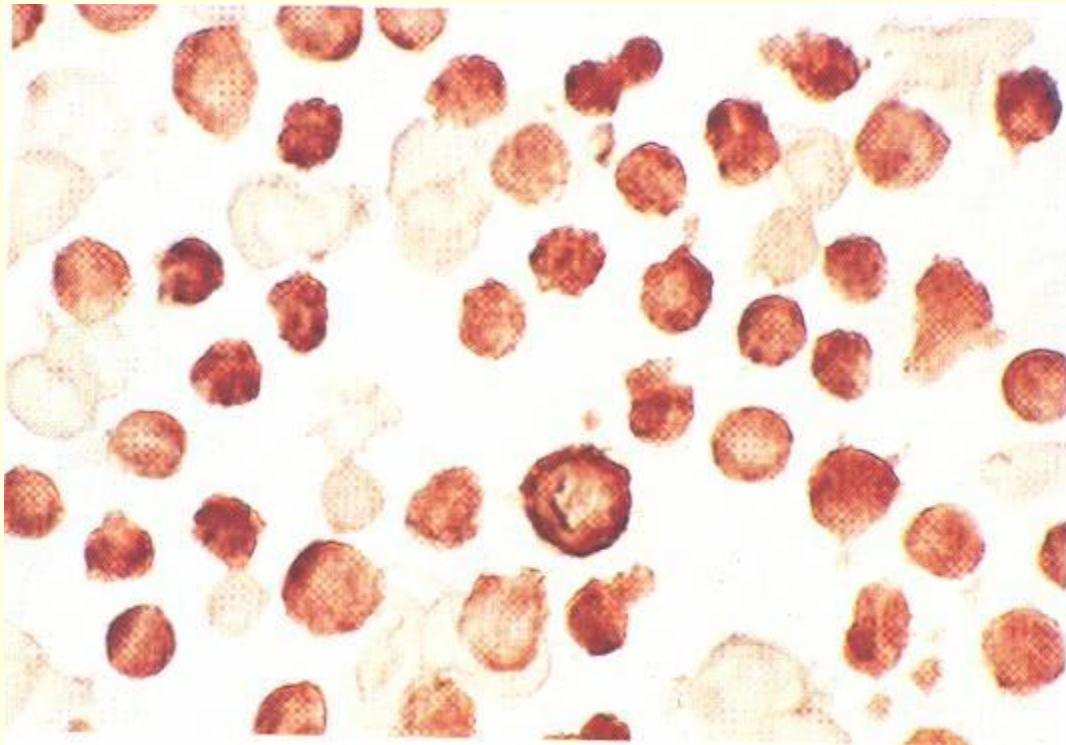
Cytochemical stains

TdT: positive

MPO, SBB: negative

PAS : nuclear is partially encircled by a rim of PAS reactivity

Precursor B-ALL



TdT

Precursor B lymphoblastic leukemia/lymphoblastic lymphoma



PAS Stain

Nuclear is partially encircled by a rim of PAS reactivity.

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Immunophenotype

TdT, HLA-DR

CD19, CD79a, CD10, CD24

(Note that $t(4;11)(q21;q23)$ cases are typically negative for CD10 and CD24)

Variably positive for CD20 and CD22

CD45 may be negative

Cytoplasmic Mu chain in pre-B ALL

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Genetics:

t(9;22)(q34;q11.2)

3-4% of cases

in most childhood cases associated with a 190 kd
BCR/ABL fusion tyrosin kinase

unfavorable prognosis

t(4;11)(q21;q23)

associated with AF4/MLL

2-3% of cases

unfavorable prognosis

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Genetics:

t(1;19)(q23;p11.3)

associated with PBX/E2A

6% of cases (25% of pre-B ALL)

unfavorable prognosis

t(12;21)(p13;q22)

associated with TEL/AML1

16-29% of cases

favorable prognosis

Precursor B lymphoblastic leukemia/ lymphoblastic lymphoma

Genetics:

Hyperdiploidy (>50)

20-25% of cases

favorable prognosis

Hypodiploidy (<50)

5% of cases

unfavorable prognosis

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Differential diagnosis:

Precursor T-ALL and AML(M0)

Resolved with immunophenotyping

-Hematogones (normal B precursors)

Mimic blasts morphologically

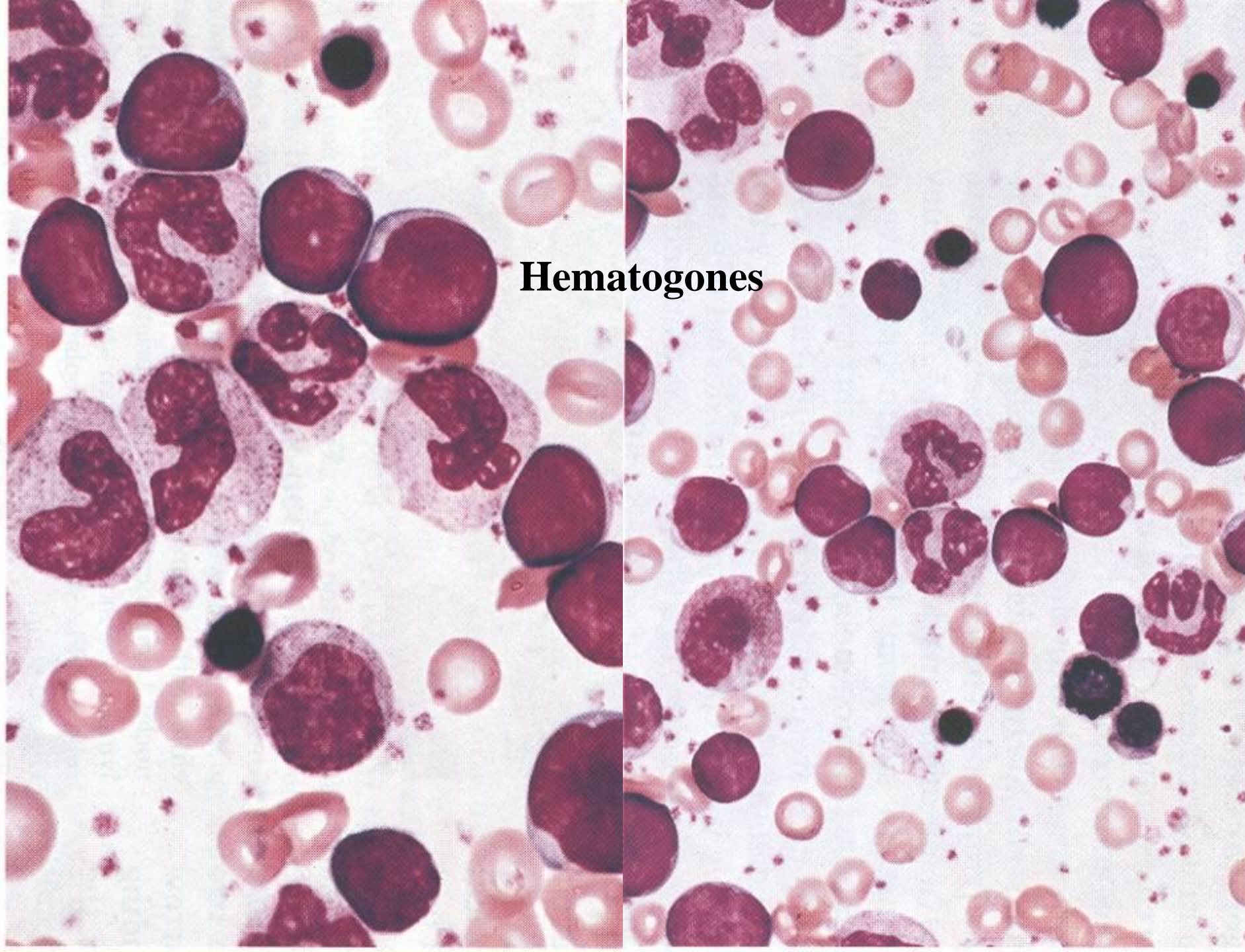
Positive for TdT, CD34, CD10, pan B markers
(with continuum of expression)

In very young patients or in older patients with
neuroblastoma, post-chemo, iron deficiency, ITP

-Burkitt lymphoma

-Blastoid variant of mantle cell lymphoma (positive for
bcl-1, negative for TdT)

Hematogones



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B-ALL:

Good prognosis in the pediatric group, 80% of patients cured

Poorer prognosis in adult group with more unfavorable genetic results

B-LBL: median survival of 60 months