Precursor B lymphoblastic leukemia/lymphoma
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**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)
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**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
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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
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Sites of involvement:
-B-ALL: blood and BM, all cases
-B-LBL: skin, bone, soft tissue, and lymph node, rare in mediastinal mass
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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
Lymphoblastic Lymphoma/Leukemia

Mediastinal mass: Lymphoblastic lymphoma

Peripheral blood: Acute lymphoblastic leukemia
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Cytochemical stains
TdT: positive
MPO, SBB: negative
PAS: nuclear is partially encircled by a rim of PAS reactivity
Precursor B-ALL

TdT
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**PAS Stain**
Nuclear is partially encircled by a rim of PAS reactivity.
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**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
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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
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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
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**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