



Morpho:-



Bone Marrow

- Hypercellular  
{ packed  $\bar{c}$  Lymphoblasts }
- ( $\downarrow$  normal marrow elements)

Blood

- Total WBC count  $\uparrow$
- $>20\%$  Lymphoblasts
  - $\rightarrow$  small amount of cytoplasm
  - $\rightarrow$  Lack granules
  - $\rightarrow$  Inconspicuous nucleoli
  - $\rightarrow$  condensed chromatin
- PAS  $\oplus$
- MPO  $\ominus$
- Sudan black B  $\ominus$

Organs

- Mediastinal thymic masses (T-ALL)
- Hepatosplenomegaly
- Lymphadenopathy
- Hb  $\downarrow$
- Platelet  $\downarrow$

# Immunophenotype :-

## (i) Immunostaining :-

Pre B & Pre T lymphoblasts  $\Rightarrow$  TdT  $\oplus$

(Terminal deoxynucleotidyl transferase)

(ii) B-cell marker :- CD19, CD10, CD20  
(B-ALL)

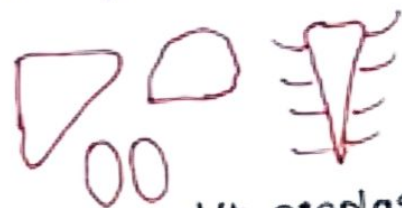
(iii) T-cell markers :- CD1, CD2, CD3, CD4, CD5, CD7, CD8  
(T-ALL)

C/F :- Onset :- Abrupt stormy onset (days/weeks)



Symptoms related to  
Bone marrow depression :-

- 1) Anemia  $\rightarrow$  pallor, fatigue
- 2) Neutropenia  $\rightarrow$   $\uparrow$  risk of infection
- 3)  $\downarrow$  platelet  $\rightarrow$  Bleeding tendencies



- Symptoms d/t neoplastic infiltration
- 1) Bone pain (sternal tenderness)
  - 2) Gen. Lymphadenopathy
  - 3) Hepatosplenomegaly
  - 4) Testicular enlargement
  - 5) CNS involvement
    - Headache
    - Vomiting
    - Nerve palsies

## Prognosis :-

### Good prognosis

- 2-10 yrs
- Female
- White
- B-ALL
- (CNS, LN, testes) are not involved
- Blast count  $< 100,000$
- Hyperploidy
- presence of  $t(12;21)$

### Bad prognosis

- $< 2$  yr or  $> 10$  yrs
- Male
- Black
- T-ALL
- Involved
- $> 100,000$
- Hypoploidy
- presence of  $t(9;22)$

philadelphia chromosome



BCR-ABL fusion gene



constitutively active TK activity



{ BCR-ABL have stronger TK activity than BCR-ABL of CML }

# FAB classification of ALL :-

	<u>ALL-L<sub>1</sub></u>	<u>ALL-L<sub>2</sub></u>	<u>ALL-L<sub>3</sub></u>
<u>cell</u>	Small cell size	Large heterogenous cell population	Large homogenous cell population
<u>Nuclei</u>	Regular	Irregular	Regular
<u>chromatin</u>	condensed	Dispersed	finely stippled
<u>Nucleoli</u>	small & inconspicuous	1-2 visible	Prominent
<u>Prognosis</u>	Better prognosis	Good prognosis	Worst prognosis

# ALL-L<sub>3</sub> is the leukemic counterpart of Burkitt Lymphoma