The Heterogenicity of Leukemia Initiating Cells

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Introduction

Leukemia originates from a single hematopoietic stem cell with genetic damage leading to uncontrolled cell proliferation, giving rise to clones of cancer cells. Despite this, there exists variability within these clones, with only a subset having the ability to restart the proliferation process. These particular cells are identified as leukemia stem cells (LSCs) or leukemia initiating cells (LICs).

The concept of LSCs gained traction following observations of relapse in acute myeloid leukemia (AML) patients after intensive treatment, suggesting that certain leukemia cells are resistant as they are dormant during chemotherapy. This study aims to explore the diversity of LICs in B acute lymphocytic leukemia (BALL).

Methods

This study involved 40 ALL samples with consent obtained. Mononuclear cells were isolated using density gradient separation, then sorted into 4 LSC populations for colony-forming unit assays (CD34+CD38-CD19+, CD34+CD38+CD19+, CD34+CD38-CD19-, and CD34-CD38-CD19-). Karyotyping and molecular cytogenetic analysis were performed for each sample.

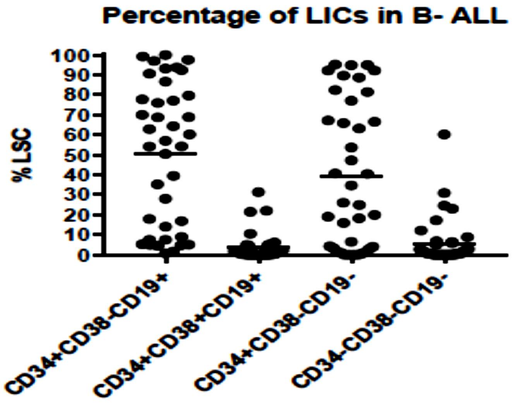


Figure 1: Proportions of different leukemic stem cell populations in B-ALL samples. regardless of cytogenetic abnormalities and the patient age.

Results

The study revealed that ALL LSCs consist of heterogeneous compartments with varying proportions of the four LSC populations, showing diversity both across and within cytogenetically categorized cases (figures 1,2 & 3).

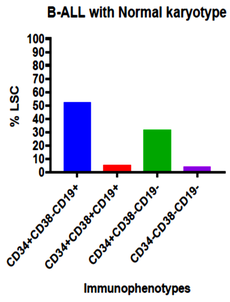


Figure 2: Showed percentage of LSC for B-ALL samples with normal Karyotype.

Conclusion

The findings suggest that LSCs in ALL demonstrate heterogeneity within and across cytogenetic groupings. Notably, CD34+ CD38- CD19+ and CD34+ CD38- CD19- cells are prominent LSC populations in B-ALL.

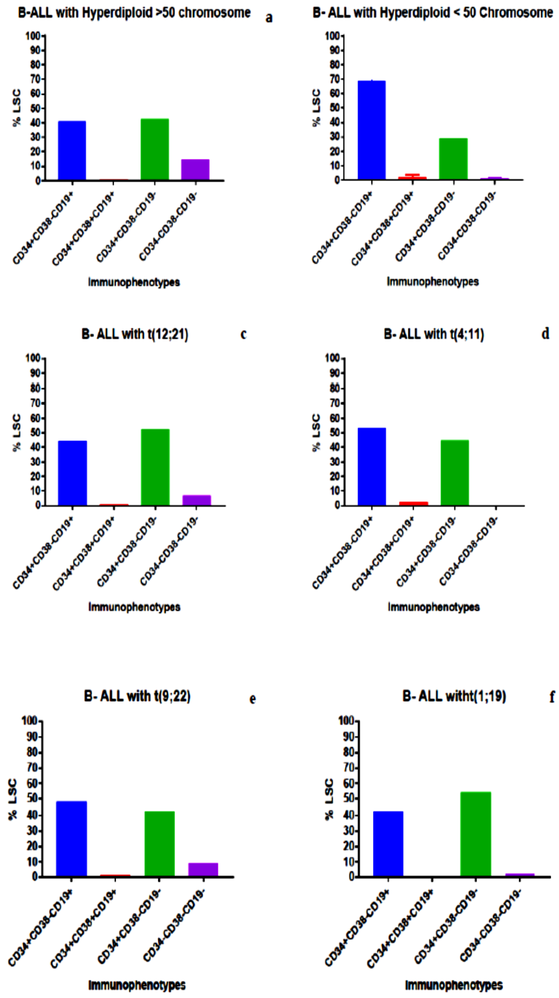


Figure 3: percentage of LSC for B lymphoblastic leukemia with recurrent genetic abnormalities