What are the differences between Leukemia and Lymphoma

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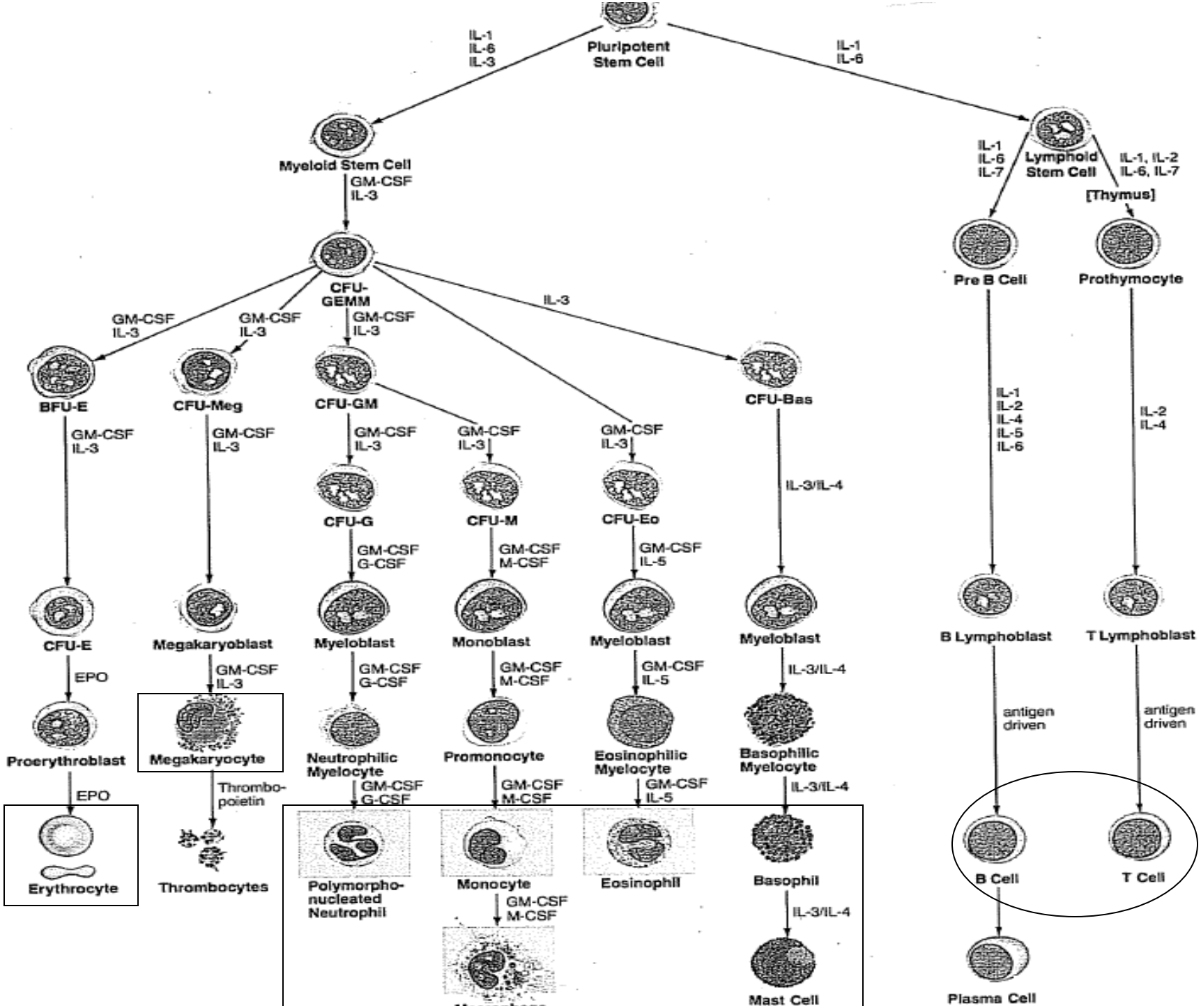
Hematopoiesis

Myeloid

- Origin- Bone Marrow
- Granulocytes
- White blood cells
  - Neutrophil
  - Eosinophil
  - Macrophages
  - Basophils
  - Megakaryocyte
- Red Blood cells

Lymphoid

- Origin-Bone Marrow
- Lymphocytes
- T-Cells
  - Mature through thymus “teaching”
  - Cell Mediated Immunity
- B-Cells
  - Mature in the Bone Marrow
  - Humoral immune response


Pluripotent Stem Cell
IL-1
IL-6
IL-3
IL-1
IL-6
Myeloid Stem Cell
GM-CSF
IL-3
Lymphoid Stem Cell
IL-1
IL-6
IL-7
IL-1, IL-2
IL-6, IL-7
[Thymus]
Pre B Cell
Prothymocyte
CFU-GEMM
GM-CSF
IL-3
IL-3
BFU-E
CFU-Meg
CFU-GM
CFU-Bas
IL-1
IL-2
IL-4
IL-5
IL-6
IL-2
IL-4
CFU-G
CFU-M
CFU-Eo
IL-3/IL-4
CFU-E
Megakaryoblast
Myeloblast
Monoblast
Myeloblast
Myeloblast
B Lymphoblast
T Lymphoblast
EPO
Proerythroblast
Megakaryocyte
Neutrophilic Myelocyte
Promonocyte
Eosinophilic Myelocyte
Basophilic Myelocyte
antigen driven
antigen driven
Thrombo-poietin
Erythrocyte
Thrombocytes
Polymorpho-nucleated Neutrophil
Monocyte
Eosinophil
Basophil
B Cell
T Cell
Mast Cell
Plasma Cell

Chronic vs. Acute

- **Acute**
  - Symptoms appear and worsen rapidly over time
    - Increase in Blast cells ⟶ Non-functional
- **Chronic**
  - Symptoms develop and worsen over an extended period of time (usually)
    - Later stage stem cell differentiation
- Both
  - ↑White Blood cells
    ↓Red Blood cells (Leads to Anemia)
    ↓Platelets (Bruising/Hemorrhages)

AML and CML

- Acute Myelogenous Leukemia
- Most common type of Leukemia
- Fast growing cancer of the blood and bone marrow
- Characterized by
  - Leukemia cells in the Bone Marrow
  - Blast cells- increased proliferation

- Chronic Myelogenous Leukemia
- Slow growing cancer of white blood cells
- 3 Phases
  - Chronic
  - Accelerated
  - Blast Phase (Sometimes referred to as ALL)
- Characterized by
  - Too many white blood cells
  - Philadelphia chromosome
    - t(9;22)
    - *bcr/abl* gene
    - Makes tyrosine kinase

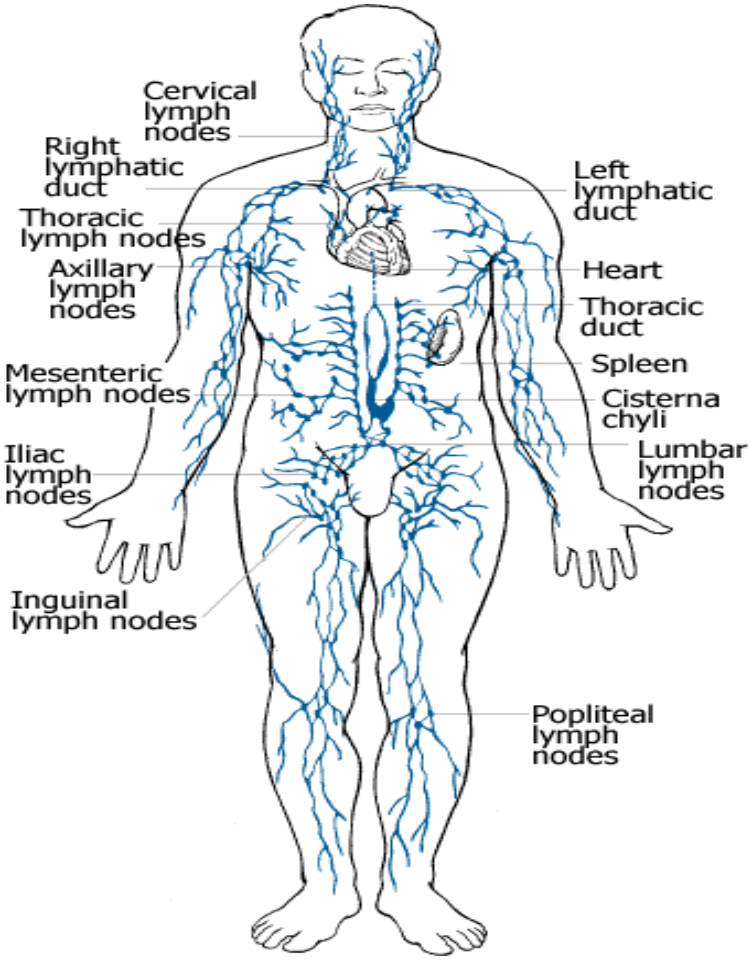
ALL and CLL

- Acute Lymphocytic Leukemia
- Greatest risk for ALL is in the first 5 years of life
- Fast growing cancer of the blood and bone marrow
- Characterized by
  - Uncontrollable and exaggerated growth of lymphoblasts
    - Also non-functional
  - Blockade of normal marrow cells

- Chronic Lymphocytic Leukemia
- Risk associated with CLL increases rapidly after age 40.
  - 90% Diagnosed over 50
- Can be a very stable disease, some may not received treatment directly after the diagnosis
- Characterized by
  - Staging system (Rai or Binet)
    - # of lymphocytes in blood and marrow
    - Spleen size
    - Lymph node distribution

Lymphomas

- A type of Cancer that begins with a malignant change in a lymphocyte, lymph node cell or lymphatic tissue of the marrow.
- Two Main categories
  - Hodgkins
    - 12% of Lymphoma
    - One of the most curable
    - Presence of Reed-Sternberg cell
      - Distinctive B-lymphocytes
  - Non-Hodkins
    - Majority of lymphoma cases
      - 14 types of B-cell
      - Other types are T-cell and NK cell
    - Spreads through the lymphatic system in a less orderly way



Conclusion

- Both Lymphocytic Leukemia and Lymphoma are the result of a malignant transformation of a cell destined to be a lymphocyte.
  - Distinction(s)
    - The disease started from a lymphocytic cell in a lymph node or other part of the Lymphatic System (LS)
      - Lymphoma
    - The disease started from a lymphocytic cell in Bone marrow (BM)
      - Leukemia
  - In either case, the malignant cells can migrate from their source (BM or LS) and be found in the other.

Conclusion cont.

- Reporting concerns for Forms Net 2.0
  - AML from MDS or MPS
    - Complete entire MDS section on Disease Classification and also complete entire AML section
  - B cell/Small Lymphocytic Lymphoma is reported under CLL
  - CML in Blast Crisis is sometimes referred to as Acute Lymphoblastic Leukemia
    - This is not the case and the disease still should be reported as CML

- Generally the Pre-TED follows World Health Organization (W.H.O.) classifications.

ACUTE LEUKEMIAS

Select most specific W.H.O. classification:

Acute Myelogenous Leukemia (AML)

AML with recurrent genetic abnormalities

- ❑ AML with t(8;21)(q22;q22), (AML1/ETO) (281)
- ❑ AML with abnormal BM eosinophils and inv(16)(p13q22) or t(16;16)(p13;q22), (CBFβ/MYH11) (282)
- ❑ APL with t(15;17)(q22;q12), (PML/RARα) and variants/{M3} (283)
- ❑ AML with 11q23 (MLL) abnormalities (284)
- ❑ AML with multilineage dysplasia (285)

AML, not otherwise categorized/{NOS}

- ❑ AML, minimally differentiated/{M0} (286)
- ❑ AML without maturation/{M1} (287)
- ❑ AML with maturation/{M2} (288)
- ❑ Acute Myelomonocytic Leukemia/{M4} (289)
- ❑ Acute Monoblastic/Acute Monocytic Leukemia/{M5} (290)
- ❑ Acute Erythroid Leukemia (erythroid/ myeloid and pure erythroleukemia)/{M6} (291)
- ❑ Acute Megakaryoblastic Leukemia/{M7} (292)
- ❑ Acute Basophilic Leukemia (293)
- ❑ Acute Panmyelosis with Myelofibrosis (294)
- ❑ Myeloid Sarcoma (295)
- ❑ AML, NOS (280)

Acute Lymphoblastic Leukemia (ALL)

- ❑ Precursor B-cell ALL {L1/L2} (191)

If known, indicate subtype:

- ❑ t(9;22)(q34;q11); BCR/ABL+ (192)
- ❑ t(v;11q23); MLL rearranged (193)
- ❑ t(1;19)(q23;p13) E2A/PBX1 (194)
- ❑ t(12;21)(p12;q22) ETV/CBF-α (195)

- ❑ Precursor T-cell ALL (196)
- ❑ ALL, NOS (190)

Acute Leukemias of ambiguous lineage

- ❑ Acute undifferentiated leukemia (31)
- ❑ Biphenotypic, bilineage or hybrid leukemia (32)
- ❑ Acute mast cell leukemia (33)
- ❑ Other acute leukemia, (89) specify:_____

CHRONIC MYELOGENOUS LEUKEMIA (CML)

Philadelphia chromosome+, Ph+, t(9;22)(q34;q11), or variant OR bcr/abl+

Did recipient receive treatment prior to this HSCT? ❑Yes ❑No

(check all that apply) ***Mandatory for CIBMTR Research Teams:***

- ❑ Ph+/bcr+ (41)
- ❑ Ph+/bcr- (42)
- ❑ Ph+/bcr unknown (43)
- ❑ Ph-/bcr+ (44)
- ❑ Ph unknown/bcr+ (47)

- ❑ Combination chemotherapy
- ❑ Dasatinib (Sprycel)
- ❑ Hydroxyurea (HU)
- ❑ Imatinib mesylate (Gleevec, Glivec)
- ❑ Interferon
- ❑ Nilotinib (Tasigna)
- ❑ Other, specify:_____

OTHER LEUKEMIAS

Classification:

Atypical chronic myeloid leukemia {CML, NOS}

- ❑ Ph-/bcr/abl- (45)
- ❑ Ph-/bcr unknown (46)
- ❑ Ph unknown/bcr- (48)
- ❑ Ph unknown/bcr unknown (49)

- ❑ Chronic Lymphocytic Leukemia (CLL), NOS (34)
- ❑ Chronic Lymphocytic Leukemia (CLL), B-cell/ Small Lymphocytic Lymphoma (SLL) (71)
- ❑ CLL, T-cell (72)
- ❑ Hairy Cell Leukemia (35)
- ❑ Prolymphocytic Leukemia (PLL), NOS (37)
  - ❑ PLL, B-cell (73)
  - ❑ PLL, T-cell (74)
- ❑ Other leukemia (39), specify:_____
- ❑ Other leukemia, NOS (30)

Status at Transplantation:

- ❑ Never treated
- ❑ Complete Remission (CR)
- ❑ nodular Partial Remission (nPR)
- ❑ Partial Remission (PR)
- ❑ No Response/Stable (NR/SD)
- ❑ Progression
- ❑ Relapse (untreated)

LYMPHOMAS

Classification:

Hodgkin Lymphoma

- ❑ Nodular lymphocyte predominant Hodgkin lymphoma (155)
- ❑ Lymphocyte-rich (151)
- ❑ Nodular sclerosis (152)
- ❑ Mixed cellularity (153)
- ❑ Lymphoma depleted (154)
- ❑ Hodgkin lymphoma, NOS (150)

Non-Hodgkin's Lymphoma

B-cell Neoplasms

- ❑ Burkitt's lymphoma/Burkitt cell leukemia {ALL L3} (111)
  - ❑ High-grade B-cell lymphoma, Burkitt-like (provisional entity) (135)
- ❑ Diffuse large B-cell lymphoma (107)
  If known, indicate subtype:
  - ❑ Intravascular large B-cell lymphoma (136)
  - ❑ Mediastinal large B cell lymphoma (125)
  - ❑ Primary effusion lymphoma (138)
- ❑ Extranodal marginal zone B-cell lymphoma of MALT type (122)
- ● Follicular lymphoma (includes variants)
  - ❑ Grade I (102)
  - ❑ Grade II (103)
  - ❑ Grade III (104)
  - ❑ Unknown (164)
- ❑ Lymphoplasmacytic lymphoma (121)
- ❑ Mantle cell lymphoma (115)
- ❑ Nodal marginal zone B-cell lymphoma (+/– monocytoid B cells) (123)
- ❑ Primary CNS lymphoma (118)
- ❑ Splenic marginal zone B-cell lymphoma (124)
- ❑ Waldenstrom macroglobulinemia (173)
- ❑ Other B-cell lymphoma (129), specify:_____

T-cell and NK-cell Neoplasms

- ❑ Adult T-cell lymphoma/leukemia (HTLV1+) (134)
- ❑ Aggressive NK-cell leukemia (27)
- ❑ Anaplastic large-cell lymphoma, T/null cell, primary cutaneous type (147)
- ❑ Anaplastic large-cell lymphoma, T/null cell, primary systemic type (148)
- ❑ Angioimmunoblastic T-cell lymphoma (AILD) (131)
- ❑ Enteropathy-type T-cell lymphoma (133)
- ❑ Extranodal NK/T-cell lymphoma, nasal type (137)
- ❑ Hepatosplenic gamma-delta T-cell lymphoma (145)
- ❑ Mycosis fungoides (141)
- ❑ Peripheral T-cell lymphoma {NOS} (130)
- ❑ Subcutaneous panniculitis-like T-cell lymphoma (146)
- ❑ Sezary syndrome (142)
- ❑ Large T-cell granular lymphocytic leukemia (126)
- ❑ Other T/NK cell lymphoma (139), specify:_____

Status at Transplantation:

- ❑ Never treated