

Marker Profiles of Leukemia-Lymphoma Cell Lines

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During the past decade increasing number of monoclonal human leukemia-lymphoma cell lines that exhibit a relatively stable marker profile of original leukemia-lymphoma have been established. In our earlier study with 28 leukemia-lymphoma cell lines (Minowada 1978) marker profiles of these cell lines were viewed as reflecting a pattern of normal hematopoietic cell differentiation. The present study extends and modifies the attempt based on the analysis of a total of 50 leukemia lymphoma cell lines.

A. Materials and Methods

Establishment and characterization by the multiple marker analysis for each cell line have been described earlier (Greaves et al. 1978; Minowada 1978).

B. Results and Discussion

Table 1 summarizes marker profiles of a total of 50 leukemia-lymphoma cell lines (Nos. 1–50). For our convenience, these 50 cell lines are divided into three distinct groups, namely T-cell, B-cell, or non-T, non-B cell groups. The T-cell line was characterized by the presence of T-cell specific antigen, but negative for Ia-antigen, myelomonocyte antigen (MAG-I), immunoglobulins (SmIg, CyIg), and stimulating activity in “one-way” mixed leukocyte reaction. The B-cell line was characterized by the presence of immunoglobulin (monoclonal isotype on each leukemia lymphoma line), but was negative for T-cell antigen and MAG-I. The third group, i.e., the non-T, non-B cell line, is heterogeneous and characterized by the absence of both T- and

B-cell markers. Figure 1 is such a scheme based on primarily the marker profiles of leukemia-lymphoma cell lines. All cell lines are thus assigned as follows: The cell lines, Nos. 1–6, are T-blast I; Nos. 7–14 are T-blast II; No. 15 is T-cell; Nos. 16–20 are pre-B-cell; Nos. 21–29 are B-blast I; Nos. 30–39 are B-blast II; Nos. 40–42 are plasma cell; Nos. 43–46 are “lymphoid precursor”; No. 47 is promyelocyte; No. 48 is myeloblast; No. 49 is “myeloid precursor”; and No. 50 is “erythroid precursor”.

The attempt in this study is perhaps over simplified and in part speculative. Nevertheless, in view of similar results by others (Greaves et al. 1978; Minowada 1978; Nilsson 1978) it would provide some rational thoughts toward not only cellular origins of leukemia-lymphoma but also insight into normal hematopoietic cell differentiation.

Acknowledgments

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References

Greaves MF, Janossy G, Francis G, Minowada J (1978) Membrane phenotypes of human leukemic cells and leukemic cell lines: Clinical correlates and biological implications. In: Clarkson B, Marks PA, Till JE (eds) Differentiation of normal hematopoietic cells. Cold Spring Harbor Laboratory, Cold Spring Harbor, pp 823–841 – Minowada J (1978) Markers of human leukemia-lymphoma cell lines

Table 1. Origin and marker profile of leukemia-lymphoma cell lines^a

No. Cell line	Origin	Markers													
		E	EA	EAC	SmIg	CyIg	T-Ag	Ia	cALL	MAG-I	TdT	EBV	Chr	MLC-S	
<i>T-cell leukemia lymphoma lines</i>															
1	CCRF-CEM	ALL	-	-	-	-	+	-	+	-	+	-	A	-	
2	RPMI 8402	ALL	-	-	+	-	-	+	-	+	-	+	A	-	
3	HPB-ALL	ALL	+	-	+	-	-	+	-	+	-	+	A	-	
4	DND-41	ALL	+	-	+	-	-	+	-	+	-	+	A	-	
5	HPB-MLT	ATL	+	-	+	-	-	+	-	+	-	+	A	-	
6	HD-Mar-2	?HD	+	-	+	-	-	+	-	+	-	+	A	-	
7	MOLT 1-4	ALL	+	-	+	-	-	+	-	-	-	+	A	-	
8	JM	ALL	+	-	+	-	-	+	-	-	-	+	A	-	
9	MOLT-11	ALL	+	-	+	-	-	+	-	-	-	+	A	-	
10	P12/Ich	ALL	+	-	+	-	-	+	-	-	-	n.t.	A	-	
11	TALL-1	ATL	+	-	-	-	-	+	-	-	-	+	A	-	
12	MOLT-10	ALL	-	-	-	-	-	+	-	-	-	+	A	-	
13	CCRF-HSB-2	ALL	-	-	-	-	-	+	-	-	-	-	A	-	
14	Peer	ALL	-	-	-	-	-	+	-	-	-	-	A	-	
15	SKW-3	CLL	+	-	-	-	-	+	-	-	-	-	A	-	
<i>B-cell leukemia lymphoma lines</i>															
16	NALM-1	CML	-	-	-	-	+	-	+	+	-	+	-	A/Ph'	+
17	NALM 6-15	ALL	-	-	-	-	+	-	+	+	-	+	-	A	+
18	NALM 17,18	ALL	-	-	-	-	+	-	+	+	-	+	-	A	+
19	KOPN 1-8	ALL	-	-	-	-	+	-	+	+	-	-	-	A	+
20	HPB-Null	ALL	-	-	-	-	+	-	+	+	-	-	-	A	+
21	U-698-M	LS	-	-	-	+	+	-	+	+	-	-	-	A	+
22	EB-3	BL	-	-	-	+	+	-	+	+	-	-	+	A	+
23	Ramos	BL	-	-	-	+	+	-	+	+	-	-	-	A	+
24	DG-75	BL	-	-	-	+	+	-	+	+	-	-	-	A	+
25	Chevallier	BL	-	-	-	+	+	-	+	+	-	-	-	A	+
26	Raji	BL	-	-	+	+	+	-	+	+	-	-	+	A	+
27	HR1K	BL	-	+	-	+	+	-	+	+	-	-	+	A	+
28	Daudi	BL	-	-	-	-	-	-	-	-	-	-	-	-	-
29	DND-39	BL	-	-	+	+	+	-	+	+	-	-	-	A	+
30	BALL-1	ALL	-	+	-	+	+	-	+	-	-	-	-	A	+
31	BALM 1,2	ALL	-	-	+	+	+	-	+	-	-	-	+	A	+
32	BALM 3-5	LS	-	-	/+	-	+	+	-	+	-	-	-	A	+
33	Ogun	BL	-	-	+	+	+	-	+	-	-	-	+	A	+
34	B35M	BL	-	-	+	+	+	-	+	-	-	-	+	A	+
35	AL-1	BL	-	-	+	+	+	-	+	-	-	-	+	A	+
36	SL-1	BL	-	-	+	+	+	-	+	-	-	-	+	A	+
37	NK-9	BL	-	-	+	+	+	-	+	-	-	-	+	A	+
38	B46M	BL	-	+	-	+	+	-	+	-	-	-	+	A	+
39	BJAB	BL	-	-	+	+	+	-	+	-	-	-	-	A	+
40	RPMI 8226	MM	-	-	-	+	+	-	+	-	-	-	-	A	+
41	U-266	MM	-	-	-	+	+	-	+	-	-	-	-	A	+
42	ARH-77	MM	-	-	+	+	+	-	+	-	-	-	-	A	+
<i>Non-T, non-B leukemia lines</i>															
43	Reh	ALL	-	-	-	-	-	-	+	+	-	+	-	A	+
44	KM-3	ALL	-	-	-	-	-	-	+	+	-	+	-	A	+
45	NALL-1	ALL	-	-	-	-	-	-	+	+	-	+	-	A	+
46	NALM-16	ALL	-	-	-	-	-	-	+	+	-	+	-	A	+
47	HL-60	APL	-	+	+	-	-	-	-	-	+	-	-	A	+
48	ML 1-3	AML	-	+	-	-	-	-	-	-	+	-	-	A	+
49	KG-1	AML	-	+	-	-	-	-	+	-	+	-	-	A	+
50	K-562	CML	-	+	-	-	-	-	-	-	-	-	-	A/Ph'	+

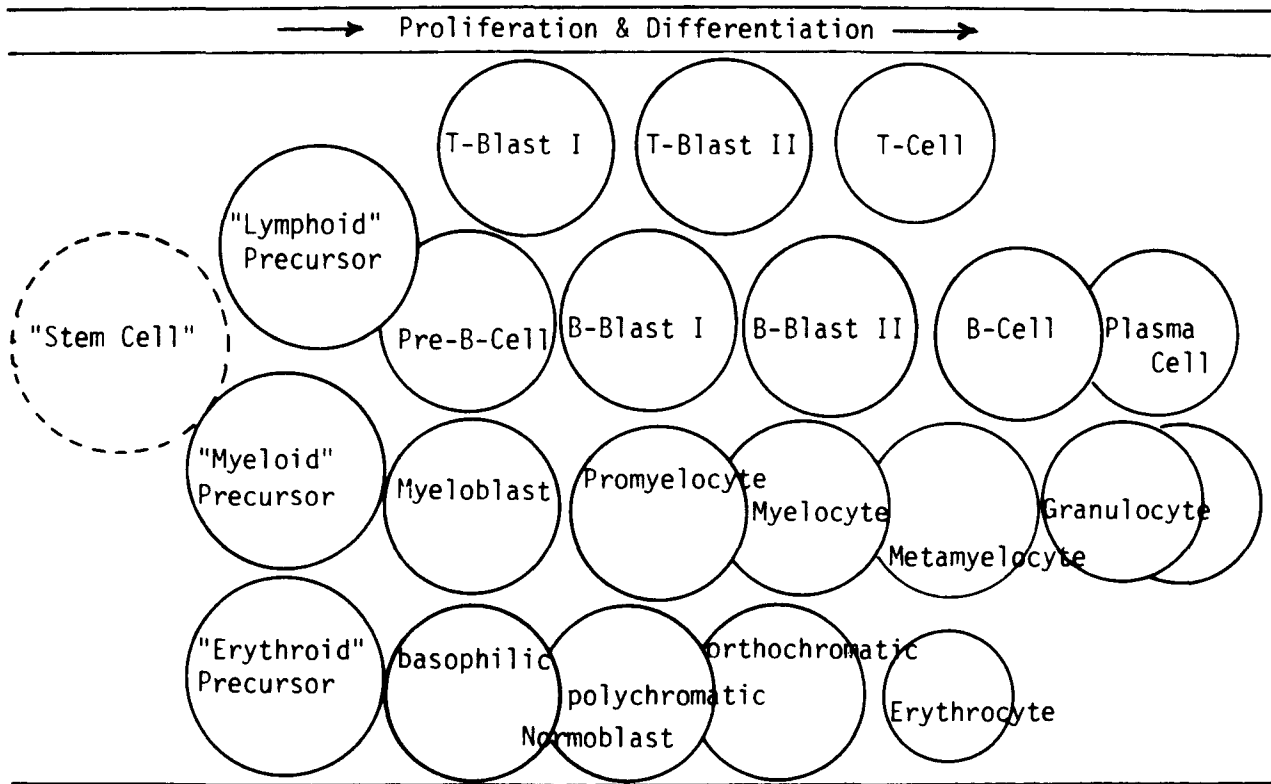


Fig. 1. Scheme for hematopoietic differentiation based on the marker profiles of 50 leukemia-lymphoma cell lines

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◁ ^a Abbreviations used are: ALL=acute lymphoblastic leukemia; ATL=adult T-cell leukemia; ?HD=unproven Hodgkin's disease; CLL=chronic lymphocytic leukemia; CML=chronic myelocytic leukemia in blast crisis; LS=lymphosarcoma/lymphoma; BL=Burkitt's lymphoma; MM=multiple myeloma; APL=acute promyelocytic leukemia; AML=acute myeloblastic leukemia; E=sheep erythrocyte rosette; EA=rosette formed by bovine erythrocyte-IgG antibody complex; EAC=rosette formed by bovine erythrocyte-IgM antibody-complement complex; SmIg=surface membrane immunoglobulin; CyIg=cytoplasmic immunoglobulin; T-Ag=T-cell specific antigen; Ia=p28,30 glycoprotein Ia-like antigen; cALL=common ALL associated antigen; MAg-I=myelomonocyte specific antigen; TdT=terminal transferase by immunofluorescence; EBV=Epstein-Barr virus; Chr.=chromosome constitution (A=abnormal, Ph'=Philadelphia chromosome); MLC-S=stimulating activity in "one-way" mixed leukocyte culture; n.t.=not tested