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HISTOCOMPATIBILITY ANTIGENS (HLA) IN ACUTE LYMPHOCYTIC LEUKEMIA*

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It has been claimed that certain histocompatibility antigens are associated with disease disposition and resistance to acute lymphoblastic leukemia (ALL)[1-6]. We have investigated HLA Class 1 antigens (A, B and C loci) as they presented in two groups of Turkish children with acute lymphoblastic leukemia (ALL).

Material and Methods

In the first part of the study we determined Class 1 antigens in 12 children with ALL (aged 2.5-11 years at onset of disease) that had been diagnosed at least 3 years previously (Group 1). Later we tissue typed 17 consecutive children (aged 9 months-11 years) with newly diagnosed ALL on the basis of patient availability (Group 2). For the controls we used 150 healthy adults[7] and 36 healthy children[8] who had previously been tissue typed in the same laboratory. This tissue typing was done by standard methods[9], utilizing antisera by Behringwerke. We investigated 8 alleles in the A locus (A1, A2, A3, A9, A25, A26, A28, AW32), 14 alleles in the B locus (B5, B8, B12, B13, B14, B17, B7, B27, BW6, BW15, BW22, BW35, BW40, BW49), and 2 alleles in the C locus (CW2 and CW4).

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Results

The individual patient characteristics and the tissue typing results for Groups 1 and 2 are given in Tables I and II. Table III depicts the phenotype frequencies in the two groups combined and among the 186 normal controls.

TABLE I

HLA Antigens and Survival Time in Group 1

Name	Age	Sex	Histocompatibility Antigens			Survival (in months)
			A locus	B locus	C locus	
H.K.	5	K	A2,A9	BW40	–	95
V.A.	5	K	A2,A3	B5	CW2	73
S.M.	3.5	E	A2	B27, BW15	CW2, CW4	68
İ.T.	3	K	A1,A26	B8, BW15	–	49
A.C.	6.5	K	A2,A9	B5	–	55
G.B.	9	K	A2,A9	B5, BW15	–	55
S.G.	4	K	A9,A26	B5	CW4	50
Y.İ.	5	K	A9,A28	B17	–	47
Ö.G.	2.5	E	A3,A26	BW35	CW4	48
G.B.	4	K	A1,A28	BW35	–	45
Ö.K.	11	K	A1,A9	BW35	CW4	37
H.Ç.	3	E	A1,A2	BW35	–	36

TABLE II

HLA Antigens and Survival Time in Group 2

Name	Age	Sex	Histocompatibility Antigens			Survival (in months)
			A locus	B locus	C locus	
H.A.	4	E	A1,A9	B14,BW40	CW4	20
A.G.	5	K	A3,A9	BW49	–	19
Y.Ş.	9	E	A9,A28	B13,BW35	–	18
Y.A.	4	E	A9,A28	B27	CW2	9
A.G.	3.5	E	A3,A9	B7,B12	CW4	28
S.K.	3.5	E	A2,A9	B12,BW40	–	10
E.D.	3	E	A2	B5,B27	CW2	27
Y.G.	11	E	A1,A9	BW35	CW4	15
N.Y.	5	K	A2,A26	B7,BW35	CW4	10
O.K.	6	E	A2	B5,BW35	–	19
S.Y.	1.5	K	A2,A26	BW6,BW35	–	7
T.S.	5	E	A2	B5,BW6	CW4	13
S.B.	5	E	A2	BW35,BW49	CW2,CW4	11
M.D.	9/12	E	A3	B7,B17,BW6	CW4	3
N.K.	3.5	K	A1,A28	BW6,BW35	–	10
İ.U.	9	E	A9,A26	B12,BW6,BW35		4
İ.Ö.	5.5	E	A3,A26	B5,		1

TABLE III

The Comparison of HLA Frequencies in the Combined Groups 1 and 2 Versus Normal Controls

HLA-A	Number of Cases		Phenotype Frequency	
	ALL	Controls	ALL	Controls
A1	7	37	23.33	19.89
A2	14	75	46.66	40.32
A3	6	33	20.00	17.74
A9	14	22	46.66	11.82
A10*		64		34.40
A11*		21		11.29
A28	5	13	16.66	6.98
B5	9	50	30.00	26.88
B7	2	24	6.66	12.90
B8	2	28	6.66	15.05
B12	3	27	10.00	14.51
B13	1	7	3.33	3.76
BW16*		12		6.45
B17	2	18	6.66	9.67
BW21*		7		3.76
BW22*		9		4.83
B27	3	4	10.00	2.15
BW35	11	21	36.66	11.29
BW40	2	8	6.66	4.30

* Not evaluable in ALL patients.

The only significant association between a locus and ALL in either group was with A9. The frequency of this allele was 14/30 (46.66%) among Groups 1 and 2 together, whereas it was 22/186 (11.82%) among the 186 controls ($p<0.001$).

Discussion

Our results confirm the earlier findings of Vukovic et al[3], that the prevalence of HLA A9 is increased in ALL. On the other hand Batchelor et al[1] and Sanderson et al[2] had not found this association among their patients.

Our findings do not show a "protective" allele in ALL as has previously been claimed[4-6]. Further, in our study, there was no significant difference between the

two groups in the numbers of any one allele. There seems to be no ready explanation for these differing HLA associations. One might speculate as to whether geographical variation might be operative, as has been observed in other diseases[10]. The only other report that shows an association with A9 is from Yugoslavia[3], which is indeed geographically and ethnically much closer to Turkey than are the countries which supplied the material for the other reports[1,2,4-6].

Summary

The frequency of HLA A9 is found to be high among 30 Turkish patients with acute lymphoblastic leukemia (47%) when compared to the frequency of the same allele (12%) among 186 healthy controls. Our results do not indicate a "protective" allele among our patients, though in some other studies this has been suggested.

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