

HLA Frequencies in Pakistani Population Groups

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Naqi Zafar, Sacedullah Khan, Abdul Qadir, Yawar Raza, Anwar Naqvi, Adib Rizvi (Sindh Institute of Urology and Transplantation, Dow Medical College and Civil Hospital, Karachi.)

Abstract

HLA Antigen A, B and DR frequencies were determined in 912 subjects who were prospective donors and recipients for renal transplantation. Of the 912, 305 were Sindhi, 248 Punjabi, 315 Urdu and 44 Pushto speaking. HLA A1, A2, A11 and A19 were common in all these groups. A3 was more frequent in Pushto, A9 (24) in Punjabi, A10 (26) in Sindhi and A28 in Urdu-speaking group. HLA B5 (51) and B40 (60) were common in all, while B8 in Sindhi and Punjabi, B35 in Sindhi, Urdu and Pushto and B27 in Punjabi and Urdu speaking individuals. HLA-DR3 and DR2 (15) were common in all groups. DR6 (13) in Sindhi, Urdu and Pushto and DR6 (14) in Punjabi, DR5 (11) in Urdu, Punjabi and Pushto speaking subjects. Overall, Pakistani frequencies showed linkage to Caucasians and Orientals. This paper describes differences in frequencies in various population groups within Pakistan which may have relevance in factors where HLA

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Introduction

The importance of the HLA system is now well recognized as an incompatibility factor in organ transplantation¹, immunological recognition and immune response² and susceptibility to diseases³. Thus, a large number of studies have reported on different populations and ethnic groups to collect basic data on their HLA antigen allele frequencies. Recently two reports have appeared in the literature on Pakistani populations, one from Hannan et al from Rawalpindi⁴ and the other from our own laboratory⁵. We now report HLA allele frequencies in various populations based on provincial and linguistic groups.

Materials and Methods

A total of 912 subjects were tested for HLA A, B and DR antigens. All subjects were prospective recipients and donors for renal transplantation. The HLA antigens were tested by two stage NIH microlymphocytotoxicity assay by eosin dye extrusion. Antisera trays were obtained from the Collaborative Transplant Study (CTS) Heidelberg, Germany. HLA A and B were tested on two trays AB 1 and AB2 of 60 antisera each. HLA DR were tested on 60 antisera trays. Purified T and B cells were used for Class I and Class II antigens by using monoclonal labeled magnetic beads (Dyna Beads). Relative allele frequencies were calculated via the total number of subjects.

Results

A total of 912 subjects were tested. Of these 305 (33.4%) were Sindhis, 248 (26.3%) Punjabis, 315 (34.5%) Urdu-speaking and 44 (5%) were Pushto-speaking. HLA A frequencies are shown in Table I.

Table I. HLA-A frequencies in Pakistani population groups.

Alleles	Sindhi n=305	Punjabi n=248	Urdu n=315	Pushto n=44	Overall n=912
A1	23.4*	36.2*	30.0*	36.4*	31.4*
A2	46.4*	33.8*	42.9*	50.0*	43.0*
A3	13.5	5.5	11.6	22.7	11.7
A9	15.7	37.0*	19.4	18.1	20.8*
A9 (23)	0.9	3.1	0.3	0.0	1.0
A9 (24)	14.7	33.8*	19.1	18.1	19.7
A10	30.4*	22.0	13.2	13.6	21.5*
A10 (25)	0.0	0.0	0.0	0.0	0.0
A10 (26)	27.2*	15.7	11.9	9.0	18.6
A10 (34)	3.2	6.3	1.2	4.5	2.9
A11	26.0*	38.6*	30.7*	18.1*	29.7*
A28	10.6	8.7	23.8*	9.0	15.6
A19	32.7*	18.1	31.3*	32.0*	29.7*
A19 (29)	3.5	0.8	6.6	0.0	4.2
A19 (30)	8.6	0.0	3.4	4.5	5.0
A19 (31)	7.4	7.0	5.6	4.5	6.5
A19 (32)	3.8	8.7	5.6	9.0	5.5
A19 (33)	9.3	1.6	10.0	13.6	8.5
A36	0.0	0.0	0.0	0.0	0.0
A43	0.0	0.0	0.0	0.0	0.0
Ax	1.3	0.0	0.0	0.0	0.5

*Common A frequencies

HLA A1, A2, A11 and A19 were common in all groups. A3 was frequent in Pushto, A9 (24) in Punjabi, A10 (26) in Sindhi and A28 in Urdu-speaking groups. HLA B frequencies are given in Table II.

Table II. HLA-B frequencies in Pakistani population groups.

Alleles	Sindhi n=305	Punjabi n=248	Urdu n=315	Pushto n=44	Overall n=912
B7	3.9	3.9	4.0	4.8	7.9
B8	33.0*	25.0*	14.9*	0.5	23.6*
B13	3.9	6.2	4.7	14.2*	4.9
B14	1.9	0.0	0.6	0.0	1.0
B18	5.2	5.5	4.0	4.8	4.7
B27	1.3	12.5	7.2	0.0	5.5
B35	28.5*	11.7	24.3*	33.3*	24.1*
B37	2.6	4.7	4.0	4.8	3.6
B38 (16)	1.9	1.6	5.0	0.0	3.1
B39 (16)	2.9	0.0	1.2	0.0	1.7
B41	0.0	1.6	0.3	0.0	0.4
B42	2.3	0.0	0.0	0.0	0.9
B44 (12)	6.8	19.5*	18.0*	4.4	13.5*
B45 (12)	0.0	0.0	1.2	0.0	0.5
B46	0.9	0.0	0.0	0.0	0.4
B47	1.9	2.3	1.9	9.5	2.2
B48	0.0	3.1	0.0	0.0	0.5
B49 (21)	3.2	0.0	0.6	0.6	1.5
B50 (21)	4.5	7.0	9.6	0.6	6.9
B51 (5)	19.7*	26.6*	18.7*	61.9*	21.6*
B52 (5)	5.2	6.3	5.6	19.0*	5.9
B53	2.3	0.0	5.6	0.0	3.2
B54 (22)	0.0	0.8	0.3	4.8	0.4
B55 (22)	5.8	5.4	8.7	0.0	6.8
B57 (17)	15.2*	10.9	9.3	0.0	11.7
B58 (17)	6.5	3.9	7.9	14.3*	6.8
B60 (40)	16.8*	24.2*	19.3*	14.3*	19.0*
B61 (40)	2.9	7.0	10.9	0.0	6.8
B62 (15)	7.1	9.4	7.9	0.0	7.6
B63 (15)	2.3	0.8	3.1	0.0	2.3
B70	1.3	0.0	0.9	0.0	0.9

***Common B frequencies**

B5 (51) and B40 (60) were common in all groups. B8 was more in Sindhis and Punjabis, B35 in Sindhi, Urdu and Pushto speaking people, B12 (44) in Punjabi and Urdu speaking individuals; B27 was

most frequent in Punjabi and Urdu-speaking. HLA DR frequencies are given in Table III.

Table III. HLA-DR frequencies in Pakistani population groups.

Alleles	Sindhi n=305	Punjabi n=248	Urdu n=315	Pushto n=44	Overall n=912
DR1	16.0	8.0	7.3	13.6	11.1
DR2	41.0*	38.7*	35.9*	32.0*	38.4*
DR3	65.0*	41.1*	33.3*	36.3*	47.6*
DR4	10.2	10.4	13.3	13.1	13.4
DR5	15.7	32.2*	21.9*	31.8*	21.4*
DR7	15.4	21.8*	29.5*	18.1	22.4
DR6	25.2*	25.1*	44.4*	45.4*	33.8*
DR8	2.3	1.6	8.6	0.0	4.7
DR9	3.3	9.7	2.5	0.0	3.9
DR10	2.9	0.8	3.1	9.0	2.9
DR11 (5)	12.1	27.4*	21.9*	31.8*	19.2
DR12 (5)	3.6	4.8	0.0	0.0	2.2
DR13 (6)	22.6*	13.7*	31.1*	45.4*	25.4*
DR14 (6)	2.6	11.4*	13.3*	0.0	8.4
DR15 (2)	36.4*	38.7*	35.9*	32.0*	36.6*
DR16 (2)	4.6	0.0	0.0	0.0	1.8

***Common DR frequencies**

DR2 (15) and DR3 were common in all groups. DR7 was common in Punjabi and Urdu, DR6 (13) in Sindhi, Urdu and Pitshto, while DR6 (14) in Punjabi and Urdu. DR5 (11) in Urdu, Punjabi and Pushto speaking subjects. A comparison of Pakistani: frequencies with other population groups is given in Table IV.

Table IV. Comparison of common antigens with various world populations.

Antigen	Pakistani	Caucasian	Negroid	Japanese	Chinese
A1	31.4*	28.6*	10.1	1.4	9.2
A2	43.0*	48.8*	30.3*	42.4*	54
A11	29.7*	9.9	3.8	19.7	33.1*
A9 (24)	19.7*	16.8*	8.8	58.1	32.9*
A10 (26)	18.6*	7.3	3.2	20.4*	3.8
B8	23.6*	18.6*	6.3	0	3.6
B35	24.1	15.4*	14.8	15.4	9.8
B51 (5)	21.6	6.9	6.7	7.2	13
B60 (40)	19.0*	8.2	2.2	10.7	20.1*
DR3	47.6	17.7	19.5	0.4	7.3
DR7	22.4*	26.2*	11.1	1	15
DR6 (13)	25.4*	21.7*	16.5	14.6	12.2
DR2 (15)	36.6*	19.9	14.8	30.9*	22*
DR5 (11)	19.2*	17.0*	18.1*	4.9	19.4*

*Common frequencies

Our population shows linkage to Caucasians and Orientals. A comparison of common antigens in various Pakistani groups is given in Table V.

Table V. Comparison of common antigens in Pakistani population.

Antigen	Sindhi n=305	Punjabi n=248	Urdu n=315	Pushto n=44	Overall n=912
A1	23.4	36.2	30.0	36.4	31.4
A2	46.4	33.8	42.9	50.0	43.0
A11	26.0	38.6*	30.7*	18.1	29.7
A9 (24)	14.7	33.8*	19.1	18.1	19.7
A10 (26)	27.2*	15.7	11.9	9.0	18.6
A19	32.7*	18.1	31.3*	32.0*	29.7
B8	33.0*	25.0*	14.9	0.5	23.6
B35	28.5	11.7	24.3	33.3	24.1
B51 (5)	19.7	26.6*	18.7	61.9*	21.5
B60 (40)	16.8	24.2*	19.3	14.3	19.0
DR3	65.0	41.1	33.3	36.3	47.6
DR7	15.4	21.8*	29.5*	18.1	22.4
DR6 (13)	22.6*	13.7	31.1*	45.4*	25.4
DR2 (15)	36.4	38.7	35.9	32.0	36.6
DR5 (11)	12.1	27.4	21.9	31.8	19.2

* Common frequencies.

Discussion

Earlier studies on our population^{6,7} have shown linkage to Caucasians. Recent studies show linkage to Orientals⁴, while our study shows linkage to both Caucasians and Orientals⁵. The advent of renal transplantation in Pakistan has given an impetus to the study of HLA system. Our present data on various ethnic groups, though small in numbers, specially from Pushto-speaking, provides a baseline for further study in terms of HLA and disease association and HLA matching for organ allocation in view of the expected cadaver law on organ transplantation.

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