

LETTER TO THE EDITOR

Iran J Allergy Asthma Immunol
December 2007; 6(4): 223-224

Human Leukocyte Antigen Profile of Two Ethnic Groups in Southeast of Iran

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Received: 14 January 2007; Received in revised form: 20
February 2007; Accepted: 12 March 2007

ABSTRACT

This study was performed to determine the genetic diversity of HLA class I and II alleles among two ethnic groups in Southeastern Iran. HLA profiles were determined in 71 Iranian populations (41 Zaboli and 30 Baloch). The frequencies of HLA-A02 ($p=0.017$), -Cw4 ($p=0.003$), and -DR8 ($p=0.025$) in the Zaboli populations were significantly higher than that in Baloch ethnic group. In contrast, the frequency of HLA-A23 allele was more frequent in Baloch than Zaboli ($p=0.020$). This report represents an important resource for investigators in the fields of transplantation immunology and population genetics from widely dispersed areas of Iran.

Keywords: Anthropology; human leukocyte antigen; human populations; Iran

LETTER

Human leukocyte antigen (HLA), is one of the most utilized systems for anthropogenetic purposes because of its very high degree of polymorphism.¹ The frequencies with which HLA haplotypes occur in a given population serve as an important reference for clinical and basic studies in immunogenetics, and provide information about the diversity of human populations.² HLA haplotypes serve as powerful markers for studying the genetic background of human populations.¹ Distribution of HLA alleles can vary greatly among different racial and ethnic populations in unrelated stem cell registries³ and can impact donor searches.⁴ In this regard, basic data on the allele and haplotype frequencies among different populations are needed.

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Such studies are relevant both for anthropology, and for clinical medicine. The aim of this study was to determine the genetic diversity of HLA class I and II alleles among two ethnic groups in Southeastern Iran to establish a database for further investigations on ancestry and the genetic factors contributing to complex diseases in this region.

We have previously shown the allele and haplotype frequencies of Baloch ethnic group,⁵ but this article presents a comparison of the results in Baloch and Zaboli populations. We studied a randomly selected cohort of healthy adults representing the following two ethnic groups from the far South-east of Iran. This study included 71 healthy unrelated individuals (52 males and 19 females) from two Iranian populations. A sample of 41 healthy unrelated individuals from the Zaboli ethnic group (26 males and 15 females) and 30 Baloch ethnic group (26 males and 4 females), living in the Sistan and Balochestan state of Iran were included in this study. The technique for identification of HLA -A, -B, and -C antigens and HLA-DR, -DQ specificities were previously reported.⁵

The most frequent alleles of HLA class I in all studied populations were HLA-B05 (63.38%), -A02 (46.48%), and -A01 (42.25%), followed by the -A11 (25.35%), -A24 (22.54%), and -B16 (21.13%). The study of class II alleles revealed that HLA-DR1 (26.76%), -DR2 (33.80%), -DR3 (26.76%), -DR4 (30.99%), -DR7 (25.35%), -DR11 (43.66%), -DRw52 (77.46%), -DRw53 (46.49%), -DQ1 (50.70%), -DQ2 (26.76%), and -DQ3 (33.80%) were the most prevalent in both groups. Zaboli and Baloch ethnic groups are differed in the frequencies of some HLA alleles. When statistical analysis comparisons were made, some significant differences between groups were observed. The frequencies for the following alleles were significantly higher in the Zaboli populations than that in Baloch ethnic group: HLA-A02 ($p=0.017$), -Cw4 ($p=0.003$), and -DR8 ($p=0.025$). Conversely the frequency of HLA-A23 allele was more frequent in Baloch than Zaboli ($p=0.020$) (Table 1).

High degree of variation in HLA frequencies exists among different ethnic groups because of the polymorphism that characterizes the HLA system.¹ This report utilized a complete study of HLA class I and II typed individuals, from widely dispersed areas of Iran. In this study two linguistically and culturally diverse ethnic groups from South-east of Iran were analyzed at the HLA class I and II. It is possible to estimate population haplotype frequencies by phenotyping unrelated individuals and using a computer to estimate haplotype frequencies that are consistent with the observed phenotype data.⁶ The phylogenetic analysis of the Iranian populations separates them from the other world populations included in the analysis.

The number and origin of alleles present in each population provide an indication of the extent of admixture in that population. HLA-01 is one of the most frequent class I alleles in our study, seen in 42.25% of subjects (34.1% in Zaboli and 53.3% in Baloch), which was significantly higher than previous studies.⁷⁻¹⁰ HLA-A02 was one of the first HLA-A alleles to be discovered and is the most common allele in human populations with a frequency of 10-40% in different parts of the world. HLA-A02 was detected in 58.5% of Zaboli population, which was significantly higher than 30% in Baloch, 23% in Fars ethnic group.^{5,8-10}

Table 1. Frequencies of common HLA class I and II alleles in two Iranian ethnic groups.

HLA-Ag	Zaboli (n=41)		Baloch (n=30)		P-value	OR (95%CI)
	Number	Percent	Number	Percent		
A1	14	34.1	16	53.3	0.105	0.45 (0.15-1.32)
A2	24	58.5	9	30	0.017	3.29 (1.09-10.16)
A11	12	29.3	6	20	0.375	1.66 (0.48-5.89)
A23	2	4.9	7	23.3	0.020	0.17 (0.02-1.01)
A24	12	23.9	4	13.3	0.112	2.69 (0.68-11.41)
B5	29	70.7	16	53.3	0.132	2.11 (0.71-6.38)
B8	6	14.6	8	26.7	0.208	0.47 (0.12-1.77)
B16	11	26.8	4	13.3	0.168	2.38 (0.60-10.22)
B17	6	14.6	4	13.3	0.876	1.11 (0.24-5.33)
Cw4	10	24.4	0	0	0.003	-
DR1	11	26.8	8	26.7	0.987	1.01 (0.31-3.33)
DR2	11	26.8	13	43.3	0.146	0.48 (0.16-1.46)
DR3	13	31.7	6	20	0.271	1.86 (0.54-6.54)
DR4	12	29.3	10	33.3	0.714	0.83 (0.27-2.57)
DR7	10	24.4	8	26.7	0.827	0.89 (0.27-2.98)
DR8	9	22	1	3.3	0.025	8.16 (0.94-182.43)
DR11(5)	20	48.8	11	36.7	0.309	1.65 (0.57-4.83)
DR14(6)	7	17.1	4	13.3	0.667	1.34 (0.30-6.19)
DRw52	30	73.2	25	83.3	0.311	0.55 (0.14-2.02)
DRw53	22	53.7	11	36.7	0.156	2.00 (0.69-5.89)
DQ1	22	53.7	14	46.7	0.560	1.32 (0.46-3.79)
DQ2	13	31.7	6	20	0.271	1.86 (0.54-8.54)
DQ3	12	29.3	12	40	0.345	0.62 (0.20-1.88)

In contrast, HLA-A23 in Baloch population (23.3%) was significantly higher than 4.9% in Zaboli; however it is similar to Fars population.⁸⁻¹⁰ At HLA-B the most common allele was -B05, seen in 63.4% (70.7% of Zaboli and 53.3% of Baloch), which was higher than previous studies.⁷⁻⁹ Comparative analysis of allelic variation in HLA class I demonstrated that the two group population are similar, in that they have relatively high frequencies of the HLA-A01, -A02, -A11, and -B05 as well as the frequencies of 33 alleles were low in both groups. It could be suggested that Zaboli and Baloch have common features in their allelic repertoire, also demonstrated that common peculiar features among these populations. Zaboli and Baloch displayed a similar pattern of allele distribution in HLA antigen class II, with the exception of the HLA-DR8, which may indicate a common aboriginal component in their ancestry.

The variations observed in some of the HLA frequencies among the different Iranian ethnic groups may be due in part to consanguineous marriage, which is a common practice in both of the religious sects investigated.

Due to inherent complexity of HLA allele's inheritance, the sample size of this study may not be sufficiently large to allow detection of all possible differences in HLA alleles. Therefore, the suggestive results of present study need to be followed with further studies involving a larger sample size. Furthermore, the HLA data from some of the neighboring populations (e.g. Pakistan and Afghanistan) are limited and there is a need to type these populations at the HLA loci to obtain a clearer picture of the origin of the Zaboli and Baloch ethnic groups.

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