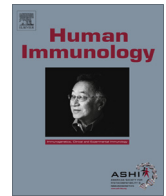




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Distribution of *HLA-DRB1* and *HLA-DQB1* alleles in Lak population of Iran



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ABSTRACT

Human leukocyte antigen (*HLA*) genes are the most polymorphic loci in the human genome and encode the highly polymorphic molecules critically involved in immune responses. Anthropological studies based on highly polymorphic *HLA* genes provide useful information for bone marrow donor registry, forensic medicine, disease association studies, as well as designing peptide vaccines against tumors, and infectious or autoimmune diseases. The aim of this study was to determine the *HLA-DRB1* and *HLA-DQB1* allele frequencies in 100 unrelated Lak individuals from Lorestan province of Iran. Finally, we compared the results with those previously described in four other Iranian populations. Commercial *HLA*-Type kits were used for determination of the *HLA-DRB1* and *HLA-DQB1* allele frequencies. Differences between populations in the distribution of *HLA-DRB1* and *HLA-DQB1* alleles were estimated by χ^2 test with Yate's correction and Fisher's exact test. The most frequent *HLA-DRB1* alleles were $^*1103 = 4$ (23%), *1502 (9.5%), *0701 (9%), *0301 (8.5%), *1101 (7.5%) and *1501 (6%) while *HLA-DQB1* *0301 (40%), *0201 (15%), *0502 (10.5%), *0303 (10%), $^*0602 = 3$ (9.5%), and *0501 (7.5%) were the most frequent alleles in Lak population. *HLA-DRB1* *0409 , *0804 , *1102 , *1112 , *1405 , and *HLA-DQB1* *0503 , *0604 were the least observed frequencies in Lak population. Our results based on *HLA-DRB1* and *HLA-DQB1* allele frequencies showed that the Lak population possesses the previously reported general features of the Lur and Kurd populations but still with unique, decreased or increased frequencies of several alleles. In other words, the Lak population is close to Lurs Khorramabadi and Kurd but far from Lurs Kohkiluyeh/Boyerahmad and Bakhtiari.

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1. Introduction

Human leukocyte antigen (*HLA*) genes are the most polymorphic loci in the human genome. They express on the surface of the T lymphocytes and, therefore, play a major role in the regulation of the immune system [1]. Studies of *HLA* gene diversity in different populations [2] can regard as useful markers by anthropologists for determination of genetic relationship and interaction among different populations [3,4]. Also, anthropological studies based on highly polymorphic *HLA* genes provide useful information for bone marrow donor registry [5], forensic medicine [6], disease association studies [7], as well as designing peptide vaccines against tumors [8], and infectious or autoimmune diseases [9].

Iranians are ethnically diverse people. Most of the Iranians are Muslims. The population living in Iran might be admixed due to

encounter with other populations and immigrants from neighboring populations. In previous studies, the frequencies of *HLA* class II alleles in most Iranian populations have been determined and compared with each other [10–15].

In the present study, due to the lack of this study in Lak population, initially frequency of *HLA-DRB1* and *HLA-DQB1* alleles was determined in Lak population of Iran. Finally, we compared the results with those previously described in Lur of Khorramabadi [10], Lur of Kohkiluyeh/Buyerahmad [10], Lur of Bakhtiari [10], and Kurd [14] populations. Indeed, in this study, genetic relationship among Laks, Lurs, and Kurds of Iran was investigated based on *HLA-DQB1* and *HLA-DRB1* allele frequencies.

2. Materials and methods

2.1. Study subjects

Laks dwell in the northwest and west of Lorestan province, southern Kermanshah province and east Ilam provincial (Fig. 1)

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and are speaking Laki, a dialect of Kurdish language. The vast majority of this population lives in the cities of Aleshtar, Nurabad and Kuhdasht from Lorestan, Harsin and Kangavar from Kermanshah and Chardavol and Darreh Shahr from Ilam. Also, there are some other minority groups from Laks reside in Iraq. Some call them Lur, some call them Kurd, and some call them an ethnic between Lur and Kurd. Some also know the Laks an independent division of Iranian ethnic groups. Lurs are living in three provinces of central and southern Zagros including Lorestan, Kohkiluyeh/Boyerahmad, and Chahar-Mahal/Bakhtiari (Fig. 1) and are speaking Luri, a dialect of Persian language. Kurds of Iran are living in West Azerbaijan, Kurdistan, Kermanshah and Ilam provinces (Fig. 1). Their language, Kurdish, is related to Persian and belongs to the Indo-European languages [10].

Fig. 1. The map that shows the geographical location of all studied Iranian populations.

Table 1
Distribution of HLA-DRB1 and HLA-DQB1 alleles in Lak population compared with four other Iranian populations[10,14].

	Lak (n = 100)	Lur of Khorramabadi (n = 50)	Lur of Kohkiluyeh/Boyerahmad (n = 54)	Lur of Bakhtiari (n = 50)	Kurd (n = 100)
<i>DRB1</i>					
0101	3 (0.015)	2 (0.020)	–	1 (0.010)	5 (0.025)
0102	–	–	1 (0.009)	4 (0.040)	3 (0.015)
0103	3 (0.015)^a	–	7 (0.065)	3 (0.030)	–
0301	17 (0.085)^a	8 (0.080)	25 (0.230)	9 (0.090)	16 (0.080)
0302	–	–	–	1 (0.010)	1 (0.005)
0402	6 (0.030)	2 (0.020)	4 (0.037)	6 (0.060)	11 (0.055)
0403	6 (0.030)	2 (0.020)	–	1 (0.010)	14 (0.070)
0404	–	1 (0.010)	1 (0.009)	–	1 (0.005)
0407	–	–	–	3 (0.030)	–
0409	1 (0.005)	2 (0.020)	2 (0.019)	–	2 (0.010)
0411	–	–	–	2 (0.020)	–
0701	18 (0.090)^a	2 (0.020)	3 (0.028)	12 (0.120)	18 (0.090)
0801	–	–	–	1 (0.010)	–
0804	1 (0.005)	1 (0.010)	–	–	–
0901	–	–	–	1 (0.010)	–
1001	4 (0.020)	3 (0.030)	3 (0.028)	5 (0.050)	1 (0.005)
1101	15 (0.075)	10 (0.100)	7 (0.065)	4 (0.040)	14 (0.070)
1102	1 (0.005)	–	–	2 (0.020)	1 (0.005)
1103 = 4	46 (0.230)^a	31 (0.310)	26 (0.241)	10 (0.100)	41 (0.205)
1112	1 (0.005)	–	–	–	1 (0.005)
1201	2 (0.010)	1 (0.010)	–	–	1 (0.005)
1202	–	–	–	1 (0.010)	–
1301	10 (0.050)	6 (0.060)	5 (0.046)	3 (0.030)	13 (0.065)
1302	4 (0.020)	2 (0.020)	–	1 (0.010)	2 (0.010)
1303	4 (0.020)	2 (0.020)	1 (0.009)	3 (0.030)	2 (0.010)
1305	2 (0.010)	–	–	3 (0.030)	1 (0.005)
1401	5 (0.025)	1 (0.010)	2 (0.019)	4 (0.040)	8 (0.040)
1404	–	–	–	1 (0.010)	–
1405	1 (0.005)	–	–	–	2 (0.010)
1501	12 (0.060)	6 (0.060)	7 (0.065)	7 (0.070)	11 (0.055)
1502	19 (0.095)	6 (0.060)	5 (0.046)	7 (0.070)	17 (0.085)
1601	9 (0.045)	4 (0.040)	6 (0.056)	3 (0.030)	7 (0.035)
1602	10 (0.050)	7 (0.070)	2 (0.019)	1 (0.010)	7 (0.035)
1605	–	–	1 (0.009)	–	–
Total	200 (1.000)	100 (1.000)	108 (1.000)	100 (1.000)	200 (1.000)
<i>DQB1</i>					
0201	30 (0.150)	14 (0.140)	25 (0.231)	17 (0.170)	33 (0.165)
0301	80 (0.400)^a	46 (0.460)	38 (0.351)	22 (0.220)	64 (0.320)
0302	–	–	2 (0.019)	–	–
0303	20 (0.100)	7 (0.070)	8 (0.074)	17 (0.170)	24 (0.120)
0402	3 (0.015)	1 (0.010)	1 (0.009)	2 (0.020)	3 (0.015)
0501	15 (0.075)^b	6 (0.060)	2 (0.019)	6 (0.060)	8 (0.040)
0502	21 (0.105)	11 (0.110)	14 (0.130)	7 (0.070)	13 (0.065)
0503	1 (0.005)^a	1 (0.010)	5 (0.046)	8 (0.080)	14 (0.070)
0601	10 (0.050)^b	6 (0.060)	7 (0.065)	12 (0.120)	18 (0.090)
0602 = 3	19 (0.095)	7 (0.070)	6 (0.056)	6 (0.060)	18 (0.090)
0604	1 (0.005)	1 (0.010)	–	3 (0.030)	5 (0.025)
Total	200 (1.000)	100 (1.000)	108 (1.000)	100 (1.000)	200 (1.000)

Frequencies of Lak population of Iran and those statistically different to Iranians in other populations are shown in bold.

^a Significant after correction.

^b Significant before correction.

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