

HLA Antigens Among Iraqi Muslims Arabs And Kurds

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ABSTRACT:

BACKGROUND:

The HLA system is a relevant tool in population genetics analysis. From the genetic point of view, the HLA system is of general interest because of the extreme polymorphism of all known HLA loci. The allele and haplotype frequencies have a wide diversity among human population and differ in geographically and racially among populations. Iraq had a high percentage of Muslims people that distributed in two groups (Arab and Kurd). These groups are ancient populations and affected by many settlement in many centuries ago. These ancient settlements had left marks on the genetic structure of the modern Iraqi populations. The later immigrations to other countries were high in later years. The aim of study is to estimate the gene frequency of HLA class I (A, B, Cw) alleles in Iraqi Arab Muslims and Kurd Muslims and determine the genetic differences between them.

METHODS:

A total of unrelated 1400 Iraqi Arab Muslims (AM) and 705 Kurd Muslims (KM) healthy volunteers and individuals referred to Immunology and Tissue Typing Center in Al-Karamah Teaching Hospital for organ transplantation and Forensic medicine, were examined for HLA polymorphism using complement dependent cytotoxicity test from June-2003 to April-2004.

RESULTS:

The phenotypes of HLA typing of Iraqi Arab Muslims (AM) and Kurd Muslims (KM) were in agreement with Hardy-Weinberg equilibrium. Regarding HLA class I (A and Cw loci), there was a significant differences between these groups. Lastly, there was no significant difference between them in HLA-B.

CONCLUSIONS:

This may be due to their inhabitants different area in Iraq, and also due to their different origin as Arab and Kurd races with mild differences due to outbreeding and migration. The effects of invaders and settlements from out side the country and intermixing with them may play an important role in these differences.

KEY WORDS: HLA, Iraq, Arab Muslims and Kurd Muslims.

INTRODUCTION:

The antigens encoded by HLA class I and class II are expressed on different cells⁽¹⁾. These molecules are important in antigen presentation to CD4+ and CD8+ lymphocytes⁽²⁾. In addition to that, they play important role in diseases associations and paternity testing⁽³⁾. Increasing to that, they were important in determining the genetics and polymorphism of different races in different ethnic groups in the world⁽⁴⁾. One of the factors that affect HLA polymorphism was geographical variety which is mostly manifested on a continental basis (Africa, Europe, Asia, America, Australia and the Pacific). The extent of the geographic variety in the HLA system is very wide.

The frequencies of blanks due to appropriate antisera not having yet are particularly high in African and Japanese population.

The alleles broadly fall into three groups: those that are present in all populations at quite high frequency such as A2, those which tend to be present, but are occasionally totally absent from some population such as A1 in Africans, and those which are confined to a geographically restricted groups such as B42 in Africans⁽⁵⁾. Iraq is one of nations that had different groups like Arab Muslims and Kurd Muslims. These groups lived in different area of Iraq, one lived in the North and other group inhabit the middle and south of Iraq. This study tried to concentrate on the differences in the frequencies of HLA loci between them.

MATERIALS AND METHODS:

Population: A total of 1400 unrelated Iraqi Arab Muslims (AM) and 705 Kurd Muslims (KM) healthy volunteers and individuals referred to Immunology and Tissue Typing Center in Al-Karamah Teaching Hospital for organ transplantation and forensic medicine, were examined for HLA polymorphism. Iraqi Arab Muslims (AM) were drawn from different provinces: (872) Baghdad, (141) Babylon, (60)

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Salah-Aldin, (78)Najaf, (55)Kerbala, (61)Al-Basrah, (9)Al-Muthana, (15)The-Qar, (20)Maysan, (24)Deyala and the rest from Al-Anbar. They were examined for HLA-class I (A, B and Cw) antigens. The other group was Kurd Muslims (KM), they were drawn from different provinces: 98 from Deyala, 154 from Dohuk, 168 from Al-Sulaimaniyah, 188 from Erbil, 90 from Al-Taamim and the rest from Nineveh. They were examined for class I (A, B and C) too.

Serological typing:

For several years, the most widely used procedure was serological detection of HLA antigens by microlymphocytotoxicity test, which was developed by Terasaki and McClelland (1964) and standardized in agreement with the National Institute of Allergy and Infectious Disease⁽⁶⁾.

This test is a complement dependent reaction, in which antibodies (antisera from Pel-Freez Clinical System, USA., Biotest, Germany, BAG, Germany) recognize antigens on the surface of lymphocytes and form antigen-antibody complexes.

The formed antigen-antibody complexes thus are able to activate the added rabbit complement which results in death of reacted cells. Then by a dye exclusion technique, it is possible to score the reaction and to determine the HLA-phenotype.

Statistical methods:

Several types of statistical analyses were employed. They included mainly:

1. Calculating the phenotype frequencies, which were expressed as percentages.
2. Assessing the level of significance by Chi-square (X^2) test⁽⁷⁾.

RESULTS:

The results of HLA typing of both groups were in agreement with Hardy-Weinberg equilibrium (Table-1-). The comparison between both groups in phenotype frequencies, there was a significant differences between them in class I (HLA-A and Cw) as shown in table 2 and 4. Regarding HLA-B, there was no significant differences between them as shown in table 3.

Table 1: Hardy-Weinberg equilibrium in HLA-A, -B, -Cw loci in Iraqi Arab Muslims and Kurd Muslims.

Population	Locus	X^2	D.F.	P
Iraqi Arab Muslims	HLA-A	0.9585	22	N.S.
	HLA-B	5.1330	12	N.S.
	HLA-Cw	0.5831	06	N.S.
Iraqi Kurd Muslims	HLA-A	0.2631	12	N.S.
	HLA-B	0.3870	18	N.S.
	HLA-Cw	0.4410	07	N.S.

N.S. = Not significant.

Table 2: Observed numbers and percentage frequencies of HLA-A antigens in Iraqi Arab Muslims and Kurd Muslims.

HLA-A	Arab Muslims Number= 1400		Kurd Muslims Number=705	
	No.	%	No.	%
1	307	21.92	143	20.28
2	510	36.42	240	34.04
3	255	18.21	165	23.40
11	165	11.78	124	17.58
23(9)	058	04.14	025	03.54
24(9)	230	16.42	146	20.70
25(10)	010	00.71	ND	ND
26(10)	120	08.57	080	11.34
28	140	10.00	042	05.95
29(19)	037	02.64	035	04.96
30(19)	183	13.07	086	12.19
31(19)	001	00.07	018	02.55
32(19)	080	05.71	037	05.24
33(19)	140	10.00	032	04.53

$X^2 = 430.47$, D.F. =13 , P- value < 0.001

ND = Not detected

Table 3: Observed numbers and percentage frequencies of HLA-B alleles in Iraqi Arab Muslims and Kurd Muslims.

HLA-B	Arab Muslims Number =1400		Kurd Muslims Number=705	
	No.	%	No.	%
7	114	08.14	068	09.64
8	110	07.85	048	06.80
13	054	03.85	021	02.97
14	050	03.57	020	02.83
17	076	05.42	010	01.41
18	060	04.28	055	07.80
27	046	03.28	059	08.36
35	246	17.57	193	27.37
37	017	01.85	001	00.14
38(16)	026	01.85	044	06.24
39(16)	030	02.14	013	01.84
40	009	00.64	026	03.68
41	140	10.00	044	06.24
42	003	00.21	ND	ND
44(12)	116	08.28	077	10.92
45(12)	020	01.42	002	00.28
47	001	00.07	001	00.14
48	001	00.07	ND	ND
49(21)	101	07.21	027	03.82
50(21)	120	08.57	071	10.07
51(5)	325	23.21	182	25.81
52(5)	026	01.85	066	09.36
53	051	03.64	021	02.97
55(22)	006	00.42	ND	ND
56(22)	ND	ND	001	00.14
57(17)	002	00.14	001	00.14
60(40)	014	01.00	005	00.70
62(15)	025	01.78	011	01.56
63(15)	061	04.35	001	00.14
64(14)	003	00.21	ND	ND
65(14)	ND	ND	ND	ND

$X^2 = 26.40$, D.F. =29 , P- value=Not significant.

ND = Not detected

Table 4: Observed numbers and percentage frequencies of HLA-Cw antigens in Iraqi Arab Muslims and Kurd Muslims.

HLA-Cw	Arab Muslims Number=1400		Kurd Muslims Number=705	
	No.	%	No.	%
1	007	00.50	043	06.09
2	068	04.85	052	07.37
3	038	02.71	051	07.23
4	275	19.64	210	29.78
5	039	02.78	007	00.99
6	035	02.50	016	02.26
7	293	20.92	065	09.21
8	ND	ND	ND	ND

$X^2 =13.75$, D.F. =6 , P- value < 0.01

ND = Not detected

DISCUSSIONS:

Populations vary between them in HLA typing because this system was highly polymorphic. In Iraq, there were two different groups; Arab Muslims and Kurd Muslims. Those two groups had different origin, Arab originating from Arab peninsula⁽⁸⁾ while KM originated from originated from Aramaean who they are semitic population lived in the north of Iraq and Syria in the second thousands before Christ. (B.C.). Finally, Arab Christians had a various similarity with Arab people and Caucasoid⁽⁸⁾. This difference, which affect HLA typing in addition to the geographical area they lived because the geographical variety is an important factor in categorization of racial groups. Another striking feature of geographical variation is that it tends to occur gradually and evenly over extended distances. In addition to that, there are places where quite sharp changes occur, particularly where there are barriers to human movement such as oceans, deserts and high mountains. Here in this study, high mountains that act as barrier in the movements of people. Reproduction has no effect in itself on the frequency of genes because no genes are lost or gained. It is not easy to say that the breeding system is unimportant in evolution, but evolution means some degree of replacement of one set of genes by another. There is four factors which are important in basic evolutionary mechanisms: hybridization, mutation, genetic drift and natural

selection. The first two introduce genes into a population and the last two determine what happens after they have been introduced⁽⁹⁾. Populations are differing in gene frequencies; they are defined as races. The definition of races must exist in the human species and in most organisms. In histocompatibility trait, these are the exception rather than the rule because some trait such as skin color, hair form, facial form and other features of physique show more marked and abrupt geographical changes and even continental boundaries, like Kurdish group had fair skin and hair while Arab group had dark skin and hair. These traits are termed phenoclines in comparison with genoclines because one cannot identify the responsible genes for this character^(9,10). Another very important feature of geographical variation is the discordance in the distribution of different traits. It had been found that two genetically different characters had not had identical distribution in their geography. This may be due to ancestral groups mixing in various combinations with one another like invasions from outside and nearby countries leading to intermixing and change in HLA typing of the populations.

CONCLUSION:

There was a significant differences between AM and KA in HLA-A and Cw while there was no significant differences between them in HLA-B locus.

REFERENCES:

1. Goldsby RA, Kindt TJ and Osborne BA: *Kuby Immunology*. (2000) pp,173-200, WH Freeman and Company, New york.
2. Hyde RM: *Immunology*, (2000) pp.167-181, Lppincott Williams and Wikins, Philadelphia.
3. Parham P: *Immune system*. (2000). pp:74-83. Arland Publishing. NewYork.
4. Baxter LLA and Clombe BW : Histocompatibility Testing In: *Medical Immunology* Edited by T.G., Parslow, D.P., Stites, A.I. Terr, and J.B. Imboden, (2001) pp, 270-293, McGraw-Hill companies, USA.
5. Harrison GA, Tanner JM, Pilbeam DR and Baker PT: *Human Biology*. (1999); pp:181-336. Oxford University Press, UK.
6. Terasaki PI, Pernoco D, Park MS, Ozturk G and Iwaki Y: Micro droplet testing for HLA-A, B, C and D antigens. *American Journal of Clinical Pathology*. (1964). 69, 103-120.
7. Snedecor WG and Cochran GW: *Statistical methods*. (1981) . Iowa State University Press, USA.
8. Mahdi BM. Prevalence of HLA typing class I and class II in Iraqi populations. Iraqi Board of Medical Specialization thesis. (2004).
9. Wallace RA, Sadars GP and Ferl RJ: *Biology, the science of life*.(1996),pp:366-377. Harper Collins College Publishers.
10. Korf BR : *Human Genetics, A problem based approach*. (2000) pp. 93-96, 337-339. Blackwell Science, London.