

Original Article**Distribution of Human Leukocyte Antigens among Sudanese Tribes**Elobaid EA¹, Forney SC² and Gerlach JA^{2,3}¹ Tropical Medicine Research Institute, National Center for Research, Khartoum, Sudan. ² Department of Medicine, Michigan State University, East Lansing, Michigan. ³ Medical Technology Program, Michigan State University, East Lansing, Michigan.**Introduction**

The antigens of the human Major Histocompatibility Complex (MHC) are often surveyed for disease association linkages because of their role in antigen presentation to the immune system⁽¹⁾. Such an effort has been ongoing in the Sudanese population looking for a risk factor associated with schistosomiasis. As a contribution to this effort, characterization of the Human Leukocyte Antigens (HLA) types of the indigenous Sudanese population is necessary.

The indigenous population of the Sudan is an Arab-Negroid admixture comprising of semi nomadic ancient tribes attracted to the Nile River Valley, where admixture occurred⁽²⁾. For the past 60 to 80 years, isolates of west African origin (Fallata) had lived in the region but rarely mixed with the indigenous people until about 20 years ago⁽²⁾. Other tribes in the west are Balanda, Bargo, Dago, Galfan, Fur, Karku, Kiga, Lira, Mandu, Meiri, Niming, Nuba. In north and central Sudan the dominant tribes are Agialab, Atrak, Bagara, Bedria, Beja, Danagla, Duwiah, Gaalin, Gumia, Halawin, Hawara, Halfawin, Hassania, Ingasana, Kawahla, Kunuz, Mahas (Nubian), Masalmia, Rufaa, Shaikia, Shukria, Wad Eshaib and their branches had immigrated to Sudan from Arab semi land across the Red Sea or through Egypt. In Eastern Sudan, the main tribes are Bani Amir, Beja, Hadendawa and Rashaida^(3,4). The indigenous population of the south are Baria, Blenda Bor, Burun, Denka, Kaku, Muru, Nuer, Shuluk and Zandi and their sub clans⁽¹⁾.

The purpose of this study is to document the distribution of HLA antigens across 9 groups of Sudanese tribes.

Materials and Methods

Genomic nucleic acid was isolated from buffy coats prepared from peripheral blood collected on 97 Sudanese natives distributed over nine groups of tribes. This material was checked for quality and quantified to allow use in commercially obtained typing kits (One Lambda, Inc., Canoga Park, CA.) In brief, these kits employed sequence specific primers that allowed allele group amplification for 5 class II HLA loci; HLA-DRB1, DRB3, DRB4, DRB5 and DQB1. This protocol also employed internal amplification controls as an assessment of the amplification process. Amplification products were visualized on an agarose gel and documented after staining with ethidium bromide. Banding patterns were reviewed and an algorithm provided by the vendor was used to assign the individual's HLA type with manual review.

Results

The HLA types of the Sudanese population are presented in Table 1. Clear allele assignments were possible for all five loci typed. Samples with negative allele specific bands without the presence of the amplification control band were not analyzed.

Discussion

As noted, 97 Sudanese representing 9 groups of different historic tribes were HLA class II typed. There was an average of 10 individuals per group

of tribes with a range of 2-26. The distribution of the antigens covered all the allelic groups present in

the literature and their distribution was not remarkable.

Table 1. Distribution of HLA Class II antigens.

Tribe Name	Tribe Group No. (n)	DRB1	DR3,4,5	DQB1		
Ababda, Danagla, Halfawien, Mahas, Masalmia, Shaigia	1(26)	03XX	03XX	02XX		
		04XX	04XX	03XX		
		07XX	05XX	04XX		
		08XX		05XX		
		1001		06XX		
		11XX				
		13XX				
		14XX				
		15XX				
Batahin, Gaalin, Gumia, Kunuz, Hasanab, Rubatab	2(13)	01XX	03XX	02XX		
		04XX	04XX	03XX		
		07XX	05XX	04XX		
		08XX		05XX		
		1001		06XX		
		11XX				
		13XX				
		15XX				
		16XX				
Balanda, Dago, Galfan, Karku, Kiga, Lima, Lira, Mandu,, Meiri, Niming, Nuba	3(15)	01XX	03XX	02XX		
		03XX	04XX	03XX		
		04XX	05XX	05XX		
		07XX		06XX		
		08XX				
		1001				
		11XX				
		13XX				
		14XX				
Bani Amir, Bederia, Duwiah, Halawin, Hadandawa, Hawari, Kawahla, Magarba, Misaria. Shukria	4(16)	03XX	03XX	02XX		
		04XX	04XX	03XX		
		07XX	05XX	05XX		
		08XX		06XX		
		1001				
		11XX				
		13XX				
		15XX				
		16XX				
Aigalab, Hasania, Rufaia, Tagalawi, Wad Eshaib	5(8)	03XX	03XX	02XX		
		04XX	04XX	03XX		
		07XX	05XX	06XX		
		08XX				
		10XX				
		11XX				
		12XX				
		13XX				
		15XX				
Dinka, Baria,, Kaku, Muru, Nuair, Shuluk	6(8)	03XX	03XX	02XX		
		07XX	04XX	03XX		
		08XX		05XX		
		09XX		06XX		
		1001				
		11XX				
		13XX				
		Miscellaneous	7(4)	08XX	03XX	03XX
				1001	04XX	05XX
13XX				06XX		
14XX						
Atrak	8(2)	01XX	05XX	03XX		
		04XX		05XX		
		15XX				
Bargo, Barnu, Falata, Fur	9(2)	07XX	03XX	02XX		
		08XX	04XX	03XX		
		11XX		05XX		

Review of each tribe will highlight the lack of some alleles, i.e. group one did not present with any 12xx individuals while it was present in group five. This may reflect the small numbers present in this sampling. The overall distribution is encouraging from a transplant stand point in showing a wide distribution of the antigens across the population and not the obvious presence of clustered groups within the population. It is this same broad distribution that will be helpful when these same groups are further tested to determine disease association within the groups and across the population.

Historically, these tribes are considered a subpopulation structure and one would assume that would reflect a less than homogenous HLA distribution within them. This paper appears to counter that conclusion by demonstrating a more homogenous HLA distribution but this is done with a cautionary note. The representation of many of the tribes are small and therefore the sampling is not sufficient to make statements about the overall population nor tribal genetics. There needs to be a larger sampling of the population in general, across all tribes to gather meaningful conclusions. This typing would be best if done at a high-resolution level such that unique allele associations with in

tribes can be accomplished. Further testing on a larger population that included kindreds and allowed haplotype assignment of alleles would also contribute to disease association work.

This study suggests that HLA alleles are well distributed over the Sudanese tribes but it is incomplete and needs to be followed by more typing within these indigenous tribes.

References:

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