HAEMA (Αίμα) ISSN: 1108-2682
www.mednet.gr/eae/haema

Haema 2006; 9(5): 649-651
Original article

ABO gene frequencies in Oran of Algeria: Heamotypological situation

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Abstract. ABO blood group system is a useful tool to anthropologists. Gene frequencies of this system were calculated in many regions, which allowed the construction of haemotypologic cartography of the world. In this paper, we have calculated the ABO genes frequencies then studied their kinetic by comparing them to those of 1986, found in the archives. We have also compared the haemotypology of Oran with other cities of the neighboring countries.

Key words: ABO system • gene frequencies; haemotypology • cartography.

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INTRODUCTION

With the generalization of blood grouping, ABO and rhesus blood group systems became the most useful markers for anthropologists in order to study origin of populations and their migration[1-4].

Gene frequencies of several blood group systems were calculated in many regions all over the globe so that a synthetic geographical map had been drawn by Piazza and Cavalli-Sforza[5], and many theories had been built on the variation of these frequencies[6]. This study is a contribution to this world cartography.

MATERIAL AND METHODS

ABO phenotypes of 5361 Oranian inhabitants were picked from the register of the Sénia polyclinic during the period (March 2003 to December 2004).

Received: April 18, 2006; Accepted: May 31, 2006

The ABO phenotyping was performed according to the Beth-Vincent Method[7] using the following Anti sera: Anti A, Anti B and Anti AB (Sanofi-Pasteur).

The gene frequencies were calculated using the Bernstein formula[8], then compared to those of 1986, found in the archives of the biology department (Sénia University of Oran).

Oran population was compared to four other cities of the neighboring countries: Rabat[9], Tunis[10], Timbuktu[11] and Madrid[9]. Figure1 shows the geographic situation of Oran among these four cities.

RESULTS

The phenotype and the gene frequencies of ABO blood group system in our sample are summarized in Table 1. They have been compared to those calculated in 1986. The

Figure 1. A map showing the geographic situation of Oran city among the others.

χ^2 test showed that there was a significant heterogeneity between these two distributions.

Table 2 shows the gene frequencies of the ABO blood group system in Oran in comparison with the four other cities reported in the literature. The χ^2 test showed that there was homogeneity between the three Maghreb populations, but on the other hand a significant heterogeneity between Madrid's, Timbuktu's and Oran's populations.

DISCUSSION

The comparison between the present genes proportions to those calculated in 1986, show a considerable heterogeneity. The frequency of the O gene decreased whereas those of the A and B genes increased. However, the O gene remains the most frequent followed by the A gene then the B gene.

A population is assumed to Hardy-Weinberg equilibrium if the gene frequencies remain stable of a generation to the other. But Hardy-Weinberg's model is only a theoretical concept in which the conditions of application are rarely combined in the human populations[6].

Oran, economic capital of the western of Algeria, is a cosmopolitan city and constitutes a destination preferred of many families in Algeria. The emigration as well as the rural exodus make that this gene frequencies fluctuates from a generation to another.

Table2 shows that homogeneity exists between Oran's; Rabat's and Tunis's populations, contrarily what it was yielded in the literature a half century before.

Levique (1955) noticed that the B allele was in high quantity in Morocco where it reached up to 0,144 and this frequency decreases in the region of Saoura in Algeria[12]. The frequency of the A allele reached its maximum in the region of Tripoli "Libya" (0,2599), whereas its minimum was observed in the Hoggar "Algeria" (0,0539)[13].

After the independence of Algeria in 1962, the populations flow between these big cities, and the miscegenation between these populations of the Arab and Islamic

Table 1: Phenotype and gene frequencies in the population of Oran: the frequencies in our sample were compared to those of 1986 found in the archives of the Senia Biology Department.

	Phenotype frequencies				Gene frequencies		
	A	**B**	**AB**	**O**	**p**	**q**	**r**
Our population (2003-2004)	31.17%	17.01%	5.60%	46.22%	0.205	0.120	0.680
1986's population	27.89%	16.82%	3.79%	51.41%	0.174	0.109	0.717

Table 2. The gene frequencies were compared to four other cities in the neighboring countries.

Comparison west to east					Comparison North to south			
	p	**q**	**r**			**p**	**q**	**r**
Rabat9	0.205	0.110	0.685		Madrid9	0.305	0.076	0.618
Oran 0.205	0.120	0.680		Oran	0.205	0.120	0.680	
Tunis10	0.192	0.122	0.686		Timbuktu11	0.170	0.180	0.640

Maghreb with the same culture homogenized these frequencies.

The North-south comparison shows clearly that the frequency of the B gene decreases from North to South contrary to the A gene. This observation is compatible with many publications[6, 9, 12, 13].

The Algerian north constitutes an isolated region: it is limited at the north by the Mediterranean Sea and to the south by the immense "Sahara desert". This makes the genetic flow more difficult between Timbuktu, Oran and Madrid. Besides of that, the cultural distances make the miscegenation between these populations less obvious.

ACKNOWLEDGMENTS

We thank the staff of the Sénia polyclinic for their help.

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