

## Correlation of Some Palm Papillary Patterns with the Phenotypes of ABO Blood Group Systems

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For the study we took blood samples from 626 individuals of Bulgarian origin, at the age from 18 to 60, clinically healthy, without family relationships among them. The determination of the blood groups was made using the classical method. We took palm-prints from both hands of the same individuals using the typographic method. The representations of the palms were deciphered using the methodology of Cummins and Midlo. The correlative relations vary from moderate to significant between the phenotypes of the system ABO and the papillary palm representations. We did not find out significantly expressed bilateral and intersexual relationships.

*Key words:* blood-group systems ABO, palm papillary patterns.

### Introduction

The problem of the correlation between the dermatoglyphic indices and the phenotypes of the blood-group systems is not sufficiently studied and the different authors have controversial opinions. [3, 6, 7].

Most publications concern the papillary representations of the fingers.

The aim of the present study is to investigate the correlative relations between the blood-group system ABO and the papillary representations of the palm in Bulgarians.

### Material and Methods

For the study we took blood samples from 626 individuals of Bulgarian origin, living in South Central and South-East region of Bulgaria, males 330 and females — 296, at the age from 18 to 60, clinically healthy, without family relationships among them.

The determination of the blood groups was made using the classical method. We took palm-prints from both hands of the same individuals using the typographic method. The representations of the palms were deciphered using the methodology of Cummins, Midlo [1]. The data were processed according to the methods of the variation and correlation analysis.

## Results and Discussion

Among the studied 626 individuals we found out 6 phenotype combinations of the blood groups ABO with frequency as follows:  $A_1$  (41.85%);  $A_2$  (5.75%); B (18.21%);  $A_1B$  (5.43%);  $A_2B$  (0.31%) and O (28.43%). The genetic frequencies that we found are for  $p_1=0.2873$ ;  $p_2=0.0514$ ;  $q=0.1497$ , and  $r=0.5332$ . We used the criterion of Pierson and we compared the distribution among the observed and the expected values and we found out that the difference is not significant ( $p>0.05$ ).

The analysis of the frequency of the representations of the Thenar (Th) shows slight bilateral differences in lines III and IV (in males) IA and slight differences between sexes only in Th/I IA.

The per cent distribution of the palm representations in the studied individuals is similar to those compared with literary data from other authors [2, 4, 5, 8].

The data of the correlation analysis is presented in Table 1.

We determined strong correlative relations between phenotypes  $A_2$ ,  $A_1B$  and B and palm representations — open arc (O), loops (Ld) on Th in I,II,III and IV IA with great extent of reliability ( $p>0.95$  and  $p>0.99$ ).

We found out significant correlative relation between phenotypes  $A_2$ ,  $A_1B$  and B. In phenotype  $A_2$  there is relation with O on Th /II for males and on Th/I for females on the left hand as well as with Ld on Th/IV for left hand in males and Th/III for right hand in females.

In phenotype  $A_1B$  we found relation with Ld on Th/III on the right hand in both sexes and in phenotype B — only in males with O on Th/II for both hands.

Moderate correlative relation is found in phenotypes  $A_2$ ,  $A_1B$  and the palm representations in both sexes and phenotype B in males.

We determine this relation in phenotype  $A_2$  with O on Th/III on left hand in males, with O on Th/I on right hand, O on Th/I on both hands and with Ld on Th/I on both hands in females. In phenotype  $A_1B$  there is relation also with O on Th/I on right hand in males and both hands in females, as well as O on Th/III on left hand in females. In males with phenotype B we found moderate correlation with O on Th/II on right hand and with Ld on Th/IV on left hand.

There is slight correlative relation in phenotype  $A_1B$  with O on Th/III on right and Th/I on left hand in males. We observe tendency of increasing of  $r$  for individuals

Table 1. Per cent frequencies of palmar patterns in males and females

Th	Pat-tern	Males (n = 330)						Females (n = 296)					
		right			left			right			left		
		n	%	Sp	n	%	Sp	n	%	Sp	n	%	Sp
Th/I	Au	2	0.61	0.43	6	1.82	0.74	2	0.68	0.48	2	0.68	0.48
	Ar	52	15.76	2.01	56	16.97	2.07	26	8.78	1.64	32	10.81	1.80
	Lu	—	—	—	2	0.61	0.43	—	—	—	—	—	—
	Lr	6	1.82	0.74	10	3.03	0.94	10	3.38	1.05	14	4.73	1.23
	Lc	6	1.82	0.74	8	2.42	0.85	6	2.03	0.82	4	1.35	0.67
	W	4	1.21	0.60	2	0.61	0.43	4	1.35	0.67	4	1.35	0.67
	Ws	—	—	—	16	4.85	1.18	16	5.41	1.31	22	7.43	1.52
	V	164	49.70	2.75	148	44.85	2.74	82	27.70	2.60	84	28.38	2.62
O	96	29.09	2.50	82	24.85	2.38	150	50.68	2.91	134	45.27	2.89	
Th/II	Ld	18	5.45	1.25	14	4.24	1.11	26	8.78	1.64	10	3.38	1.05
	V	16	4.85	1.18	2	0.61	0.43	14	4.73	1.23	2	0.68	0.48
	O	296	89.70	1.67	314	95.15	1.18	256	86.49	1.99	284	95.95	1.15
Th/III	Ld	222	67.27	2.58	108	32.73	2.58	156	52.70	2.90	98	33.11	2.74
	V	14	4.24	1.11	48	14.55	1.94	10	3.38	1.05	36	12.16	1.90

Table 2. Correlation between phenotypes of ABO blood groups and some palmar patterns

Th	Pat-tern	Side	MALES (n = 330)											
			A <sub>1</sub>		A <sub>2</sub>		B		A <sub>1</sub> B		O			
			r	χ <sup>2</sup>	r	χ <sup>2</sup>	r	χ <sup>2</sup>	r	χ <sup>2</sup>	r	χ <sup>2</sup>		
I	V	R	-0,0973	0,67	-0,2109	0,45	-0,2549	1,82	-0,4363	1,52*	-0,1857	1,66		
		L	-0,0851	0,35	-0,2701	0,73	-0,1355	0,51	-0,1812	0,26	-0,2056	2,03		
	O	R	0,1139	0,92	-0,2909	0,85	-0,0416	0,05	-0,1812	0,26	-0,0007	0,00		
		L	0,1891	2,54	-0,1462	0,21	-0,1054	0,31	-0,2870	0,66**	0,0580	0,16		
II	Ld	R	0,3871	10,6	-	-	0,1320	0,49	-	-	0,1806	1,57		
		L	0,3178	10,6	-	-	0,0951	0,25	-	-	0,2459	2,90		
	V	R	0,3511	8,75	-0,0376	0,01	0,1320	0,49	-	-	0,2459	2,90		
		L	0,4168	12,3	-	-	-	-	-	-	-	-		
III	Ld	R	-0,4318	13,6	-0,0289	-	-0,5839	9,55**	0,0357	0,01	0,4841	11,3		
		L	-0,4913	17,1	-0,6727	4,53*	-0,5839	9,55**	0,0357	0,01	-0,5661	15,4		
	V	R	-0,2125	3,21	-0,4312	1,86**	-0,3645	3,72	-0,5026	2,02*	-0,3925	7,40		
		L	0,0737	0,39	-0,1257	0,16	0,0416	0,05	-0,1812	0,26	-0,0948	0,43		
IV	Ld	R	0,3871	10,6	-0,0864	0,08	0,0599	0,10	-	-	-	-		
		L	0,2659	5,02	-0,0864	0,08	0,0951	0,25	-0,1812	0,26	0,1188	0,68		
	O	R	0,1267	1,14	-0,2102	0,44	-0,2162	1,31	-0,2856	0,65**	0,0381	0,07		
		L	-0,0445	0,14	-0,4993	2,49*	-0,4469	5,59	-0,3725	1,11**	-0,1325	0,83		
V	Ld	R	-	-	-	-	-	-	-	-	-			
		L	0,4168	12,3	-	-	-	-	-	-	-			
	V	R	0,0860	0,53	-0,4304	1,85**	-0,1049	0,09	-0,2851	2,28	0,0981	0,46		
		L	-0,0860	0,03	-0,5653	3,20**	-0,3388	0,92**	-0,4618	5,97	-0,1325	0,83		
W	Ld	R	0,3547	8,93	-	-	0,0599	0,03	0,0734	0,15	0,2036	1,99		
		L	0,2396	4,08	-	-	-0,0083	0,00	-0,1771	0,88	0,1188	0,68		
	O	R	-0,1487	1,57	-0,2701	0,73	-0,3636	1,06**	-0,4363	5,33	-0,3873	7,20		
		L	0,0867	0,53	-0,2125	0,45	-0,0734	0,04	0,0734	0,15	-0,0952	0,44		
FEMALES (n = 296)	V	R	-	-	-	-	-	-	-	-	-			
		L	-	-	-	-	-	-	-	-	-			
	O	R	-0,0395	0,99	-0,4471	1,60*	-0,3511	3,58	-0,4700	1,19*	-0,1652	1,12		
		L	0,0344	0,07	-0,5347	2,29*	-0,3019	2,64	-0,3198	0,92**	-0,1652	1,12		
II	Ld	R	0,2628	4,14	-0,1712	0,24	0,1578	0,72	-0,1456	0,19	-	-		
		L	0,3504	7,37	-0,0660	0,04	0,1578	0,72	-	-	-	-		
	V	R	0,3850	8,27	-	-	0,1284	0,48	-0,0468	0,02	0,2002	1,64		
		L	-	-	-	-	-	-	-	-	0,2499	2,56		
III	Ld	R	-0,4038	9,78	-0,5347	2,29*	-0,5595	9,08**	-0,4700	1,99*	-0,5410	12,0		
		L	-0,4941	14,7	-0,6084	2,29*	-0,5986	10,4**	-0,6821	4,19**	-0,5806	13,8		
	V	R	-0,0931	0,52	-0,5347	2,29*	0,2753	2,20	-0,5423	2,65*	-0,1860	1,42		
		L	0,2592	4,03	-0,3592	1,03**	-0,1335	0,52	-0,2336	0,49	-0,1001	0,41		
IV	Ld	R	0,3640	7,95	-	-	0,1284	0,48	-	-	0,2499	2,56		
		L	0,2766	4,59	-0,1712	0,24	0,0552	0,09	-0,0468	0,02	0,1737	1,24		
	O	R	-0,0408	0,10	-0,1712	0,24	-0,1892	1,04	-0,1456	0,19	-0,1860	1,42		
		L	-0,1751	1,84	-0,1712	0,24	-0,2753	2,20	-0,4011	1,45**	-0,2049	1,72		
W	Ld	R	0,3850	8,89	-	-	-	-	-	-	-	-		
		L	0,3850	8,89	-	-	-	-	-	-	-	-		
	V	R	0,1014	0,62	-0,2742	0,60**	-0,1892	1,04	-0,4011	1,45**	-0,1436	0,85		
		L	-0,0854	0,44	-0,3892	1,21**	-0,2745	2,19	-0,4011	1,45**	-0,2879	3,4		
O	R	0,3298	6,53	-	-	0,0879	0,22	-	-	0,2002	1,64			
	L	0,2766	4,59	-0,0660	0,04	0,0552	0,09	-0,0468	0,02	0,2224	2,03			
V	Ld	R	0,0202	0,03	-0,3892	1,21**	-0,2436	1,72	-0,3198	0,92**	-0,1860	1,42		
		L	0,0509	0,16	-0,2742	0,60**	-0,1323	0,51	-0,2336	0,49	-0,0362	0,05		
	O	R	0,3640	7,95	-0,0660	0,04	-	-	-	-	-	-		
		L	0,3640	7,95	-	-	-	-	-	-	0,2499	2,56		

\*\* P > 0.99

\* P > 0.95

with phenotype A<sub>2</sub>B and A<sub>1</sub>B with O on Th/II on left and right hand in females and with O on Th/IV on right hand in both sexes (p>0.99).

We found out that in all phenotypes of the system ABO there are correlative relations and r varies from -0.7 to -0.2 but not all of them are reliable. There is considerable correlation but the extent of reliability is not so significant (p>0.92).

We suppose that the observed correlative relations are due to the presence of genetic relations among the individuals and perhaps there are general factors for their determination that vary independently one from the other.

## Conclusions

1. The dermatoglyphic analysis of the palm representations shows presence of slight bilateral and intersexual differences.

2. The correlative relations vary from moderate to significant between the phenotypes of the system ABO and the papillary palm representations.

3. We did not find out significantly expressed bilateral and intersexual relationships.

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