

A-B-O and Rh Affinities between Highland and Lowland Quechua-speaking Peruvian Populations

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ABSTRACT According to the accounts of the Spanish chronicles and various historical analyses the Quechua-speaking population inhabiting the Province of Lamas in the Eastern Tropical Lowlands of Peru are descendants of the Chanca Tribes that migrated from the highlands about 500 years ago. The results of the present study indicate that in terms of the A-B-O and Rh systems the lowland Quechua-speaking population from the Province of Lamas and the highland Quechua population from the Province of Junin are more similar to each other than to other tropical tribes. Therefore, it is quite possible that the present lowland Quechua-speaking population from the Province of Lamas may be descendants of Andean populations.

In the lofty eastern lowlands of Peru live the only Quechua-speaking tropical population currently known as Lamistas. This population according to various historical analyses is supposed to be descended from the ancient Chanca Tribes, who migrated from the Andes after they were defeated by the Incas (Markham, '11; Isquierdo, '60; Vasquez, '49; Weis, '59). Prior to the rule of Inca Pachacutec, the Inca Empire of Tawantinsuyo was disorganized and consisted of several competing confederations of tribes, of which the Chancas and the Incas were the most important. The Chanca Tribes occupied the regions corresponding to the present Departments of Huancavelica, Ayacucho, and Apurimac (fig. 1) in the Central and Southern Highlands of Peru (Balboa, '20; Cieza de Leon, '43; Las Casas, '39; Sarmiento de Gamboa, '40; Rostworowski de Diez Canseco, '53). According to these sources, following their defeat by the Inca Pachacutec around 1350 A.D. the Chancas in the Southern highlands attempted to settle in the area of present Lake Junin which corresponds to the District of Ondores in the Department of Junin in the Central Highlands (fig. 1). However the Inca Pachacutec continued his persecution and the Chancas pursued their escape through the highlands into the tropical regions and settled near the Mayo River in

the Province of Lamas, taking the name Lamistas.

In summary, from the various historical sources and deductions it appears that the present lowland Quechua-speaking native population located in the Province of Lamas are descendants of the former Chanca tribes and as such they come from the same biological stock as many of the highland Indians. Due to the fact that there have been no roads connecting the highlands with the eastern lowlands until today, the lowland populations have not mixed with those from the highlands. Therefore, in an attempt to determine the possible biological similarities and differences that may exist between these populations, we conducted a study concerned with genetic markers, skin color, growth, reproduction, mortality, etc. In the present article we report data on the affinities for the A-B-O, and Rh systems between the Quechua-speaking population from the Province of Lamas in the eastern tropical lowlands and Quechua-speaking populations from the Province of Junin in the Central Highlands of Peru.

METHODS AND MATERIALS

Sample

The sample included 175 subjects derived from the Quechua-speaking population of the Village of Pamashto in the Prov-

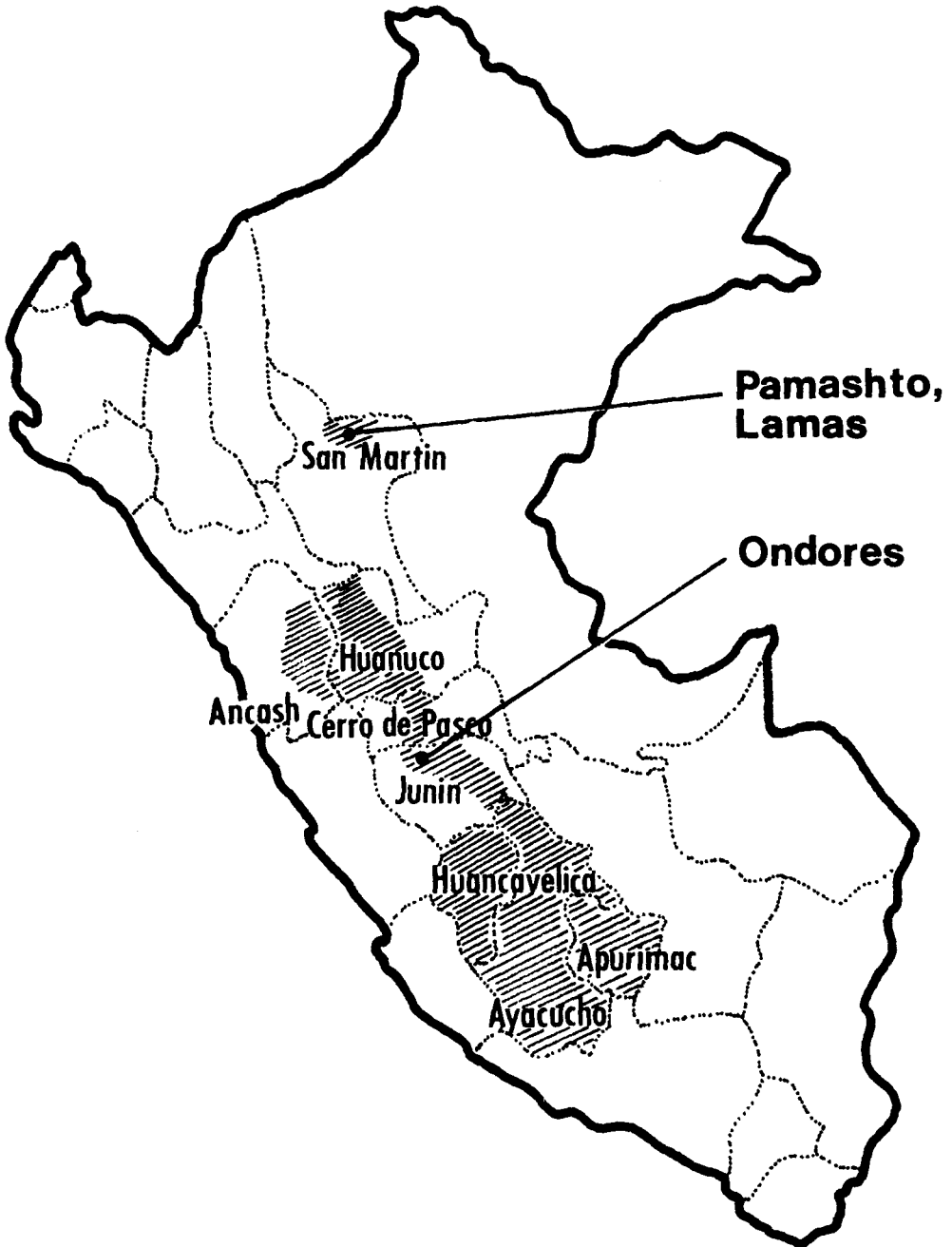


Fig. 1 Map of Peru. The Confederation of Chanca tribes prior to the formation of the Inca Empire occupied the regions corresponding to the present departments of Ayacucho, Apurimac, and Huancavelica. After being defeated by the Inca Pachacutec the Chancas escaped through the Central Highlands through the departments of Junin, Cerro de Pasco, Huanuco and Ancash, into the lowland Province of Lamas in the Department of San Martin. The cross-hatched areas represent the original and subsequent regions occupied by the Chancas. The dotted lines mark the present departments of Peru.

ince of Lamas of the Department of San Martin in the eastern Peruvian lowlands. At the time of the present study, a total of 118 families resided in the Village of Pamashto. (No census data exists for this population). The highland sample included 174 subjects derived from the Quechua-speaking population of the town of Ondores in the Province and Department of Junin of the Central Peruvian Highlands. According to the Peruvian census, 1961, the District of Ondores had a population of 2,683 inhabitants; 856 were located in the town of Ondores, and 1,827 were in the rural areas.

By finger tip puncture venous blood specimens were derived from the children, ages 6 to 18 years, attending the primary schools of Pamashto in the lowlands and the school of Ondores in the highlands. Antigenic specimens were determined for the A-B-O system and Rh system by the slide agglutination test by the authors and assistants who were trained in blood typing. For the A-B-O system anti-A and anti-B antisera were used, and for the Rh system the blood samples were tested with four specific antisera for the blood factors C(rh¹), D(Rh⁰), E(rh^{''}), c(rh[']). The reliability of the tests was checked by testing the blood

samples with albumin. The gene frequency for the A-B-O and Rh systems were calculated by a computer program.

RESULTS AND DISCUSSION

In table 1 are given the phenotypic and genotypic distributions for the A-B-O and Rh systems in the lowland and highland Quechua-speaking samples. From these data it is evident that the phenotypic and gene frequency for O, A, and B are quite similar in both highland and lowland populations. The phenotypic and gene frequency for the Rh system in the highlands are also quite similar to those of the lowlands.

In table 2 the gene frequency of the blood groups for the A-B-O and Rh systems of the lowland and highland Quechua populations that we studied are compared to data on highland Quechua populations and tropical tribes studied by other investigators. The data demonstrate that the highland and lowland Quechua populations have a similar gene frequency for the A, B and O blood type. The tropical tribes differ from the highland and lowland Quechua populations by the complete absence of the blood group A or B (only one case with blood B was found among the Shipibo). The frequency for the CDE (R^Z), CDe(R¹), cDE(R²)

TABLE 1

Distribution of the A-B-O and Rh blood groups among lowland (Pamashto, Lamas) and highland (Ondores, Junin) Peruvian Quechua populations

	Phenotypic frequency				Gene frequency		
	Lowland Quechua		Highland Quechua		Lowland Quechua	Highland Quechua	
	(N)	(%)	(N)	(%)			
ABO							
A	8	4.62	12	6.86	A	0.026	0.035
B	2	1.16	1	0.57	B	0.009	0.003
AB	1	0.58	0	0.00	O	0.965	0.962
O	162	93.64	162	92.57			
Total	173	100.00	175	100.00		1.000	1.000
RH (4 Antigens)							
CCDE (Rh ₂ Rh ₁)	12	7.01	9	5.17	CDE (R ^Z)	0.071	0.053
CCDee (Rh ₁ Rh ₁)	25	14.62	31	17.82	CDe (R ₂)	0.358	0.387
CcDE (Rh ₁ Rh ₂)	55	32.17	68	39.08	cDE (R ²)	0.413	0.472
CcDee (Rh ₁ rh)	22	12.87	5	2.87	cDe (R ⁰)	0.011	0.000
ccDE (Rh ₂ rh)	56	32.75	59	33.91	CdE (r ^Y)	0.000	0.000
Ccdee (rh/rh)	1	0.58	0	0.00	Cde (r')	0.016	0.000
ccdde (rh''rh)	0	0.00	1	0.57	cdE (r'')	0.000	0.037
ccdee (rh rh)	0	0.00	1	0.57	cde (r)	0.132	0.051
Total	171	100.00	174	99.99		1.001	1.000

TABLE 2
 Comparison of gene frequency for A-B-O and Rh blood groups of lowland and highland Quechua and tropical Peruvian tribes

Population	Region and location		A-B-O system				Rh system						
			N	A	B	O	N	CDE (R ²)	CDe (R ¹)	cDE (R ²)	cDe (R ⁰)	Cde (r)	cde (r')
Quechua ¹	Lowland: Lamas	173	0.026	0.009	0.000	1.000	0.071	0.358	0.413	0.011	0.016	0.000	0.132
Quechua ¹	Highland: Junin	175	0.035	0.003	0.000	1.000	0.053	0.387	0.472	0.000	0.000	0.037	0.051
Quechua ²	Highland: Ancash	396	0.044	0.006	0.000	1.000	—	—	—	—	—	—	—
Quechua ³	Highland: Puno	181	0.008	0.043	0.000	1.000	0.050	0.386	0.494	0.039	0.000	0.000	0.031
Quechua ⁴	Highland: Puno	165	0.050	0.016	0.000	1.000	—	—	—	—	—	—	—
							Tropical tribes						
Piro ³	Lowland: Amazonas	90	0.000	0.000	0.000	1.000	0.102	0.382	0.498	0.018	0.000	0.000	0.000
Campa ³	Lowland: Amazonas	89	0.000	0.000	0.000	1.000	0.146	0.376	0.477	0.000	0.000	0.000	0.000
Shiibo ³	Lowland: Amazonas	142	0.000	0.003	0.000	1.000	0.102	0.356	0.500	0.042	0.000	0.000	0.000
Cashinahua ⁵	Lowland: Loreto	113	0.000	0.000	0.000	1.000	—	—	—	—	—	—	—

¹ Frisancho and Klayman (Present study) tested with 4 antisera: C, c, D, E.

² Allen ('59) no gene frequency for the Rh system is given.

³ Matson et al. ('66).

⁴ Garruto ('73).

⁵ Johnston et al. ('68) Rh system tested with only 3 antisera: D, C, E.

genotypes is very similar in the lowland and highland Quechua populations. The tropical tribes distinguish themselves from the Quechua by the complete absence of the cde(r) genotype.

In conclusion this investigation suggests that the lowland and highland Quechua populations, based on the A-B-O and Rh blood group systems, have a similar genetic composition. This similarity may be attributed to the fact that genetic variation at the A-B-O and Rh loci, due to either similar selective forces or similar rates of admixture through much of the indigenous populations of South America, is small. However, despite the expected similarity of indigenous populations this study demonstrates that the lowland and highland Quechua populations are more similar to each other than to the other tropical tribes. Therefore, it is quite possible that the present indigenous Quechua-speaking population from the Province of Lamas may be descendants of Andean populations. This similarity suggests then that the differences between the *Chancas* and *Quechuas* or *Incas* were probably of a cultural nature and not of genetic origin.

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