

Serum Haptoglobin Polymorphism in Kotas and Badagas of Nilgiri Hills, South India

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KOTA VE BADAGA (NILGIRI HILLS, GÜNEY HİNDİSTAN) TOPLUMLARINDA SERUM HAPTOGLOBİN POLİMORFİZMİ

Özet

Güney Hindistan' daki *Nilgiri Hills* bölgesinde yerleşik ve soyunu kabile içi evlilikler (endogami) ile sürdüren *Kota* ve *Badaga* toplumlarında yaşayan 216 kişinin serum örnekleri incelenerek haptoglobin tipleri tesbit edildi. Bu işlemler sırasında poliakrilamid jel elektroforezi yönteminden yararlanıldı. Her iki grupta da, en sık görülen fenotiplerden olan Hp 2-2 ve 2-1 bulundu. Hp¹ ve Hp² gen frekansları, direkt gen sayımı yöntemiyle ölçüldü. Sonuçlarımız, *Hindistan'* da yaşayan öteki toplumlarda tesbit edilen verilerle karşılaştırıldı.

Summary

Serum samples from 216 unrelated individuals from two endogamous populations namely the *Kotas* and the *Badagas* residing in the *Nilgiri Hills, South India* were screened for haptoglobin types using polyacrylamide slab gel electrophoresis. Only two of the common phenotypes Hp2-2 and Hp2-1 were observed in both the groups. Hp¹ and Hp² gene frequencies were calculated by direct gene counting method and the results are compared with other *Indian* population groups.

Keywords : *Haptoglobin - Polymorphism - Tribes - Population genetics - Nilgiris (India)*

INTRODUCTION

The serum haptoglobin (Hp) which specifically binds with hemoglobin exists in three common phenotype forms in human populations. They are designed as Hp1-1, 2-1 and 2-2, and are under the control of two autosomal codominant alleles Hp¹ and Hp² (1,2). Upon electrophoresis Hp1-1 appears as a single band whereas Hp2-1 and Hp2-2 exhibit multiple band patterns. As such the Hp system has potential application in population genetic studies.

The *Kota* tribe, one of the earliest inhabitants of the *Nilgiri Hills*, *South India*, is strictly endogamous living in isolation for many centuries. Another endogamous group, the *Badagas* constitute the single largest community though they are relatively recent settlers in the region. Since there has been no attempt so far on the interpopulation comparison of the *Nilgiri* groups based on haptoglobin polymorphism, it was felt desirable to report the distribution of haptoglobin in the *Kotas* and the *Badagas*.

MATERIALS AND METHODS

Venous blood from 216 unrelated individuals belonging to the *Kota* (n=103) and the *Badagas* (n=113) groups was collected. Serum was separated from the clot and 10 μ L of serum complexed with hemoglobin was subjected to discontinuous nongradient polyacrylamide slab gel (7.5% resolving gel; 4% stacking gel) electrophoresis as developed by us based essentially on the method of *Davis* (3) as described by *Blackshear* (4). After electrophoresis the staining for haptoglobin was done using o-dianisidine as described by *Giblett* (5). After recording the phenotypes, the gene frequencies for Hp¹ and Hp² were calculated by direct gene counting method.

RESULTS AND DISCUSSION

The distribution of the Hp phenotypes and the gene frequencies in the *Kotas* and the *Badagas* are shown in Table 1. It is noteworthy that the phenotype Hp1-1 was absent in both the groups. Also, no variant phenotype was observed. The distribution of Hp2-2 is more in the *Kotas* than the *Badagas* whereas Hp2-1 occurs more frequently in the *Badagas*. There were no significant departures from the *Hardy Weinberg* expectations between the observed and the expected number of phenotypes in both the groups. As for the allelic frequencies, Hp¹ occurs only slightly more frequently in the *Badagas* than the *Kotas* while the reverse is the case for Hp² gene. These observations are suggestive of the two hill populations being more or less homogeneous for the Hp system.

Table 1. Distribution of Serum Haptoglobin (Hp) in the Kotas and the Badagas

Population	Number tested	Hp phenotype			Gene frequency	χ^2 (d.f.:1)
		1-1	2-1	2-2		
<i>Kotas</i>	103	Obs. : 0	22	81	Hp ¹ : 0.1068	1.468*
		% : 0	21.36	78.64	Hp ² : 0.8932	
		Exp. : 1.17	19.65	82.17		
<i>Badagas</i>	113	Obs. : 0	31	82	Hp ¹ : 0.1372	2.858*
		% : 0	27.43	72.57	Hp ² : 0.8628	
		Exp. : 2.13	26.75	84.12		

(*)not significant at 5% level.

While this is the first study among the *Badagas* for Hp polymorphism, there is however in the literature one report on the *Kotas* (6), with which the gene frequencies presently found are comparable. The absence of Hp1-1 phenotype in the *Kotas* as observed by us now is probably due to the low sample number as *Ghosh et al* (6) were able to report the low occurrence of this phenotype (2.22%) after studying 540 *Kotas*. The Hp¹ frequencies in the *Kotas* and the *Badagas* are within the range 0.07-0.37 reported for other Indian (tribal/non-tribal) population groups (7-11). Generally this allele is found distributed less in *South India* (7,8,11) with progressive increase towards the East and West (9) and ultimately very high in the North (9,10).

There is however no possible explanation available as yet for the distinctly high *South Indian* figure and in fact the highest (0.37) in Indian population for Hp¹ frequency being found among the tribal *Todas* (7,9) of the *Nilgiri Hills*, which region is inhabited by many tribal groups. In the present context it seems suffice to infer that both the *Kotas* and the *Badagas* differ genetically as revealed by the Hp system from the cohabiting *Todas* who incidentally also differ from the *Irulas* and *Kurumbas* (7) of the same *Nilgiri Hills*.

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