

GC Polymorphism in Two Endogamous Caste Populations of Visakhapatnam, Andhra Pradesh

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ABSTRACT The distribution of group specific component (GC) phenotypes of Malas and Madigas of Visakhapatnam, Andhra Pradesh have been investigated. The frequency of estimates GC^1 were 0.2132 and 0.2303 for Malas and Madigas, respectively. The results are compared with those of other Andhra populations.

INTRODUCTION

Biochemical genetic markers are of considerable importance in human population variation studies. The biological function of group specific component (GC), an α_2 -globin, is to bind the naturally occurring vitamin D. Genetic polymorphism of GC in man was first reported by Hirschfeld (1959) who described three phenotypic patterns GC 1-1, 2-1 and 2-2, controlled by a pair of autosomal codominant alleles GC^1 and GC^2 . A few variants due to rare alleles have been reported (Hirschfeld, 1962; Parker et al., 1963; Hennig and Hoppe, 1965) and there is evidence also for the existence of a silent allele (GC^0) at the GC locus (Henningsen, 1966). The locus for group specific component is assigned to chromosome 4.

The polymorphism of group specific component (GC) has been investigated extensively in world populations, albeit information available for populations of Andhra Pradesh is limited (Walter et al., 1978; Goud and Rao, 1980; Walter et al., 1981; Gopalam and Rao, 1981).

The present paper reports the distribution of GC phenotypes in two endogamous Scheduled Caste populations, Mala and Madiga of Visakhapatnam from the south Indian state of Andhra Pradesh.

MATERIAL AND METHODS

Plasma samples were collected from 355 (both sexes) randomly selected unrelated healthy adult individuals belonging to two endogamous Scheduled Caste populations (Mala = 190; Madiga = 165) residing in different localities of Visakhapatnam, Andhra Pradesh. The samples were analyzed using standard electrophoresis in acrylamide gels (Kitchin and Bearn, 1966). The gene frequencies were estimated by using maximum likelihood methods.

RESULTS AND DISCUSSION

The distribution of group specific component phenotypes and allele frequencies are shown in table 1.

The GC 1-1 phenotype frequency in Malas (62.10%) is higher than in Madigas (56.97%), while the heterozygous phenotype GC 2-1 registered higher incidence in Madigas (40%) than in Malas (33.16%). The GC 2-2 phenotype records higher frequency among Malas (4.34%) than in Madigas (3.03%).

The homogeneity chi-square test between observed and expected phenotype numbers is not significant in both the groups (Mala : $\chi^2=0.0248$; $d.f. = 1$; $0.90 > P > 0.80$; Mdiga : $\chi^2 = 2.7125$; $d.f. = 1$; $0.10 > P > 0.05$) indicating that they are in Hardy-Weinberg equilibrium for GC

locus. The inter-group homogeneity test (chi-square : 2.1823; *d.f.* = 2; $0.50 > P > 0.30$) also shows non-significant differences among these two Scheduled Caste populations.

Table 1 : Distribution of GC phenotypes and allele frequencies among two endogamous caste populations

Pheno- type	Mala		Madiga	
	Number Observed	Number Expected	Number Observed	Number Expected
1-1	118	117.62	94	97.75
2-1	63	63.74	66	58.50
2-2	9	8.64	5	8.75
Total	190	190.00	165	165.00
<i>Allele ± S.E.</i>				
GC^1	0.7868±0.030		0.7697±0.033	
GC^2	0.2132±0.030		0.2303±0.033	
χ^2_1	0.0248		2.7125	
	0.90 > p > 0.80		0.10 > p > 0.05	

Considering allele frequencies the GC^2 allele records higher value among Madigas (0.2303) than in Malas (0.2132). Comparison with other populations from Andhra Pradesh, shows that the range of GC^2 allele frequencies in caste populations of Andhra Pradesh is between 0.1946 and 0.2330, while it is between 0.1460 and 0.2400 in tribes. Therefore, it is evident that the present populations fall well within the range observed for the caste populations.

However, in order to understand the geographical distribution of GC alleles in this region, further investigations are needed.

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