

Red Cell Enzyme Polymorphisms Among Bodhs and Dards of Ladakh, Jammu and Kashmir, India

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ABSTRACT The distribution of two red cell enzyme polymorphisms-ADA and GPI among the two scheduled tribes - Bodhs of Changthang and Dard Bodhs of Khaltse in Ladakh, Jammu and Kashmir are reported.

The data on the distribution of red cell enzyme polymorphisms serve as an useful tool in anthropological studies. In India, such specific studies are, however still relatively few, and for Jammu and Kashmir state only one investigation is available (Chahal et al., 1989).

Ladakh region of Jammu and Kashmir provides ample opportunities for studying genetic differentiation in a remote area, predominantly inhabited by several scheduled tribes. This region has received from time immemorial wave after wave of immigrants from different directions, and thus takes on the character of a miniature museum of races commingling in all sorts of permutation and combinations. Some of the populations either have lived side by side or they coalesced and merged into each other. The diversity of people of Ladakh maintained by cultural, linguistic and geographical barriers is in fact unique. It is therefore that an attempt has been made in the present study to investigate red cell enzyme polymorphisms (ADA and GPI) among two scheduled tribes of Ladakh - Bodhs of Changthang and Dards (Dard Bodhs) of Khaltse.

Nyoma and around Changthang sub-division, and Dard Bodhs of village Bema and around Khaltse sub-division of Leh district of Ladakh (Jammu and Kashmir) in 1991. Both the tribes practice Buddhist religion and endogamy and are primarily engaged in agriculture. The Bodhs of Changthang are nomad, but recently a number of them have settled in and around Changthang situated at 4050 m above mean sea level. The Dard Bodhs (also referred as Minaros by Michael Pissel) are considered to be pure Aryans and are confined to village Bema and surrounding areas of Khaltse block of Leh district. They are different from other Buddhists of Ladakh and speak Dardi language.

A total of 47 blood samples of unrelated subjects - 22 of Bodhs residing in Changthang and 25 of Dard Bodhs residing in Khaltse were collected. Haemolysates were typed electrophoretically following Murch et al. (1986) and Harris and Hopkinson (1976) for adenosine deaminase (ADA) and glucose phosphate isomerase (GPI), respectively. Gene frequencies were calculated by gene counting.

MATERIAL AND METHODS

Material for the present work was collected from two scheduled tribes - Bodhs from village

RESULTS AND DISCUSSION

The phenotypes and gene frequencies of adenosine deaminase (ADA) and glucose phosphate

Table 1: Distribution of red cell enzymes ADA and GPI among two scheduled tribes of Ladakh

Enzyme System	Bodhs			Dard Bodhs		
	Phenotype		Gene Frequency	Phenotype		Gene Frequency
	Number	Per cent		Number	Per cent	
ADA						
1-1	21	95.45	ADA ¹ -97.7	20	80.0	ADA ¹ -90.0
2-1	1	4.55	ADA ² -2.3	5	20.0	ADA ² -10.0
2-2	0	0.00		0	0.0	
Total	22	100.00		25	100.0	
GPI						
1-1	17	77.27	GPI ¹ -88.6	25	100.0	GPI ¹ -100.0
3-1	5	22.73	GPI ³ -11.4	0	0.0	GPI ³ -0.0
Total	22			25	100.0	

isomerase (GPI) among Bodhs and Dard Bodhs are given in table 1. In both the enzyme systems, there was no significant departure from Hardy-Weinberg equilibrium expectations in the distribution of the phenotypes.

The frequency of ADA² is considerably higher (10.0 per cent) among the Dard Bodhs than among Bodhs (2.3 per cent). The gene ADA² is rather frequent among the population groups of India, but among Mongoloid populations, a low frequency of this gene has been observed (Mourant et al., 1976). The high frequency of ADA² observed among the Dard Bodhs in the present study, is therefore similar to that reported among various populations of Western Himalayas (Chahal et al., 1982; Bhasin et al., 1983), while a low incidence of the gene among Bodhs of Changthang is akin to Mongoloid frequencies. By contrast, the ADA² frequency in Sunni Muslims sampled from Kashmir valley (Chahal et al., 1989) is relatively high (15.2 per cent).

For glucose phosphate isomerase (GPI) system, rare variant 3-1 has been encountered only in the Bodh sample from Changthang; the 5 variants detected give a GPI³ frequency of 11.36 per cent. The rare gene GPI³ has previously been reported among Sunni Muslims of Kashmir valley (Chahal et al., 1989) and various populations of north-west India (Papiha and Chahal, 1984), but the frequency recorded here is perhaps one of the highest so far reported from this region.

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