

Distribution of the LH Blood Types in the Jains of Central India

Shyamal Koley and Jaspal Singh Sandhu

Department of Sports Medicine and Physiotherapy, Guru Nanak Dev University, Amritsar 143 005, Punjab, India

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ABSTRACT In the present paper, the distribution of the ABO and LH blood types has been reported in the Jains of Central India and the data were compared with those of the Hindu and Muslim populations of the same area. No significant differences were found in the distribution of both these blood markers among them.

INTRODUCTION

A new red blood cell membrane specificity in seed extracts of *Erythrina lithosperma*, a legume plant, was reported by Shrivastava et al. (1979) and was called LH by them. The name LH was given to this specificity to cherish the memory of Ludwik Hirszfild, the celebrated Polish serologist. In fact, the anti-LH lectin reacts with human red cells by either clumping them firmly or just weakly agglutinating them. The former type of reaction is called LH-positive and the latter LH-negative. Subsequent studies relating to immunochemical properties of anti-LH lectin, its genetics and distribution have been made by Shrivastava et al. (1979), Sehajpal and Shrivastava (1980, 1981), Reddy et al. (1981, 1985), Kaur (1983), Koley et al. (1991, 1992, 1993, 1994, 1995), Koley and Shrivastava (1992a,b, 1993, 1994) and Koley (1996).

In the history of the religious tradition of India, Jainism occupies a place of immense eminence, not because of the fact that it has a great impact of the Indian thought and culture. Its special contribution to the cultural heritage of India is the doctrine of ahimsa or non-injury to any living being, which in this century also, got the highest appreciation from Mahatma Gandhi for its application in social and political life.

The Jains, an important trading community, are numerically the second largest group in Central India after the Hindus. They were originated from Rajput, but at about the 8th century A.D., they got converted to Jainism.

Mahavira, a contemporary of Budha, was the

last fordmaker of Jainism. This endogamous group is vegetarian in diet. The Jains of Central India speak in Hindi and the Chief part of their religious duties is temple worship.

Since population differences are known to exist regarding the distribution of ABO and LH types (Shrivastava et al., 1979) and information from this particular community in these aspects was lacking, the present study was planned.

MATERIAL AND METHODS

A total of 355 blood samples were collected randomly from unrelated normal healthy Jain individuals from five districts of Sagar division, namely, Sagar, Tikamgarh, Chatterpur, Panna and Damoh, and were compared with the Hindus and Muslims of the same areas (Koley and Shrivastava, 1992a). Since sex differences are not known to exist in the LH system, the samples collected from both males and females were pooled for all analyses.

For the ABO typing, standard serological procedures were followed. The LH typing was done with the anti-LH lectin prepared as described by Shrivastava et al. (1979). The seeds for lectin were obtained from Botanical Survey of India, Calcutta.

RESULTS AND DISCUSSION

Phenotypic distribution of the LH types and allele frequencies in the Jains of Central India is shown in table 1. The Jains have the higher frequency (69.86%) for LH positive type than LH-negative (30.14%). The allele frequency of LH-positive type in the Jains is 0.8358. When compared with the Hindus ($\chi^2_{(1)}=0.26$) and Muslims ($\chi^2_{(1)}=0.00$), no significant differences ($P>0.05$) were found among them regarding the distribution of LH-types. Since blood group O individuals were found to be all LH-positive, this group has been excluded during calculation of Chi-square values.

Table 1: Distribution of the LH-types and allele frequencies in the Jains of Central India

Population	n	LH+		LH-		Allele frequencies	
		No. observed	% observed	No. observed	% observed	LH+	LH-
The Jains (Present study)	355	248	69.86	107	30.14	0.8358	0.1642
Hindus ¹	312	211	67.63	101	32.37	0.8224	0.1776
Muslims ¹	48	32	66.67	16	33.33	0.8165	0.1835

¹Koley and Shrivastava (1992a), $\chi^2_{(1)}$ Jains vs. Hindus = 0.26, $P > 0.05$
Jains vs. Muslims = 0.00

Table 2 gives the phenotypic distribution of ABO blood types with their allele frequencies in the Jains of Central India, as it is seemed that the LH specificity may be related to the ABO blood types (Shrivastava et al. 1979). The Jains have the highest frequency of blood group B (40.84%), followed by O (27.61%), A (21.97%) and AB (9.58%). When compared with the Hindus ($\chi^2_{(3)} = 2.83$) and Muslim populations ($\chi^2_{(3)} = 4.20$), statistically no significant differences ($P > 0.05$) have been found. The allele frequencies have the order $O > B > A$ in all of them.

The distribution of the LH types with blood group A in the Jains of Central India is given in

table 3. The Jains have the higher frequency of LH-positive type (53.85%) than the LH-negative one (46.15%). They have the lowest frequency of LH-negative type (46.15%) after comparison with the Hindus and Muslims (50.00% and 47.06% respectively), but the differences were not significant ($P > 0.05$) statistically ($\chi^2_{(1)}$; Jains vs Hindus: 0.24 and Jains vs Muslims: 0.00)

In table 4, the distribution of the LH types with blood group B in the Jains of Central India has been shown. The Jains have the higher frequency (64.14%) for LH-positive type than LH-negative type (35.86%). Once again, no significant differences ($P > 0.05$) were found when compared with the Hindus and Muslims

Table 2: Distribution of the ABO types and allele frequencies in the Jains of Central India

Population	n	Phenotype frequencies								Allele frequencies		
		O		A		B		AB		A	B	O
		No. observed	% observed	No. observed	% observed	No. observed	% observed	No. observed	% observed			
The Jains (Present study)	355	98	27.61	78	21.97	145	40.84	34	9.58	0.1732	0.2968	0.5300
Hindus ¹	312	82	26.28	86	27.56	117	37.50	27	8.65	0.2095	0.2769	0.5749
Muslims ¹	48	10	20.83	17	35.42	17	35.42	4	8.33	0.2554	0.2554	0.4886

¹Koley and Shrivastava (1992a), $\chi^2_{(1)}$ Jains vs. Hindus = 0.83
Jains vs. Muslims = 4.20

Table 3: Distribution of the LH-types with blood group A in the Jains of Central India

Population	LH+		LH-	
	No. observed	% observed	No. observed	% observed
The Jains (Present study)	42	53.85	36	46.14
Hindus ¹	43	50.00	43	50.00
Muslims ¹	9	52.94	8	47.06

¹Koley and Shrivastava (1992a)
 $\chi^2_{(1)}$ Jains vs. Hindus = 0.24, $P > 0.05$
Jains vs. Muslims = 0.00

Table 4: Distribution of the LH-types with blood group B in the Jains of Central India

Population	LH+		LH-	
	No. observed	% observed	No. observed	% observed
The Jains (Present study)	93	64.14	52	35.86
Hindus ¹	75	64.10	42	35.90
Muslims ¹	11	64.71	6	35.29

¹Koley and Shrivastava (1992a)
 $\chi^2_{(1)}$ Jains vs. Hindus = 0.00
Jains vs. Muslims = 0.00

($\chi^2_{(1)}=0.00$ in both the cases).

The distribution of the LH-types with blood group AB in the Jains of Central India is exhibited in Table 5. The Jains have the higher frequency (55.85%) for LH-negative type than LH-positive one (44.12%). After comparing the Jains with the Hindus and Muslim populations, here too, no significant differences ($P>0.05$) were found among them ($\chi^2_{(1)}=$ Jains vs Hindus: 0.07 and Jains vs Muslims: 0.04).

Table 5: Distribution of the LH-types with blood group AB in the Jains of Central India

Population	LH+		LH-	
	No. observed	% observed	No. observed	% observed
The Jains (Present study)	15	44.12	19	55.88
Hindus ¹	11	40.74	16	59.26
Muslims ²	2	50.00	2	50.00

¹Koley and Shrivastava (1992a)

$\chi^2_{(1)}$ Jains vs. Hindus = 0.00
Jains vs. Muslims = 0.00

From the results, it may be concluded that as for the distribution of ABO and LH blood markers, not much population differentiation has occurred in Central Indian populations under the influence of a rigid caste system, religious obligations and mating restrictions. Further, when the present data were compared with North Indian (Sehajpal and Shrivastava, 1981) and South Indian (Reddy et al., 1981) populations, some significant differences were observed. Between Central and North Indian populations, significant differences were observed in one population set out of four in each case of the distribution of the LH and ABO-types and distribution of the LH-types with blood group AB and three sets out of four in the distribution of the LH-types with blood group A. By contrast, between Central and South Indian populations, significant differences were found in one population

set out of three in the distribution of the ABO-types. Thus, the LH system could be used in population variation studies, particularly in association with the ABO system.

REFERENCES

- Kaur, K.: *The LH Red Blood Cell Membrane Specificity in Man and Selected Animals*. Ph.D. Thesis, Punjabi University, Patiala (1983).
- Koley, S.: Distribution of the ABO and LH blood types in the Kachchi of Sagar, Madhya Pradesh, India. *J. Hum. Ecol.*, 7: 195-197 (1996).
- Koley, S. and Shrivastava, P.K.: The distribution of the ABO and LH blood groups in some Central Indian populations. *J. Hum. Ecol.*, 3: 239-242 (1992a).
- Koley, S. and Shrivastava, P.K.: Genetics of the LH specificity: Further observations. *J. Ind. Anthropol. Soc.*, 27: 97-101 (1992b).
- Koley, S. and Shrivastava, P.K.: Four important properties of the anti-LH lectin. *South Asian Anthropol.*, 14: 51-54 (1993).
- Koley, S. and Shrivastava, P.K.: The anti-LH lectin-leucocyte reactions in patients with diabetes mellitus. *J. Hum. Ecol.*, 5: 147-148 (1994).
- Koley, S., Jain, R. and Shrivastava, P.K.: The LH specificity in diabetes mellitus. pp. 183-187 In: *Proceedings of the UGC National Seminar on New Horizons in Human Biology*, eds. IJS Bansal et al. Patiala, (1991).
- Koley, S., Jain, R. and Shrivastava, P.K.: Serum antibody titres against LH-positive and LH-negative red blood cells. *South Asian Anthropol.*, 13: 43-45 (1992).
- Koley, S., Saxena, Y.R. and Shrivastava, P.K.: The LH-specificity in diabetes mellitus: Further observation. *J. Hum. Ecol.*, 5: 201-204 (1994).
- Koley, S., Jain, R. and Shrivastava, P.K.: The distribution of the ABO and LH blood types in persons with abnormal erythrocyte sedimentation rate. *J. Hum. Ecol.*, 6: 213-215 (1995).
- Reddy, V.R., Naidu, G.P. and Shrivastava, P.K.: The LH red blood cell membrane specificity in three South Indian populations. *Acta Anthropogenet.*, 5: 189-194 (1981).
- Reddy, V.R., Reddy, G.O. and Reddy, B.K.C.: A study on the inheritance of LH blood types in Tirupati families. *South Asian Anthropol.*, 6: 145-147 (1985).
- Sehajpal, P.K. and Shrivastava, P.K.: Genetics of the LH red blood cell membrane specificity. *Acta Anthropogenet.*, 4: 85-88 (1980).
- Sehajpal, P.K. and Shrivastava, P.K.: Distribution of LH types in some North Indian populations. *Acta Anthropogenet.*, 5: 181-187 (1981).
- Shrivastava, P.K., Sehajpal, P.K. and Kaur, H.: The LH system: A new red blood cell membrane specificity in man. *Acta Anthropogenet.*, 3: 83-92 (1979).