HAPTOGLOBIN POLYMORPHISM IN THE LADAKHI POPULATION

H. KAUR, P.K. SEHAJPAL, P.K. SHRIVASTAVA
Department of Human Biology, Punjabi University, Patiala, India

Haptoglobin polymorphism has been studied in 148 Ladakhis — a Mongoloid population inhabiting the northernmost region of India. With a frequency of 0.270 for the allele Hp^1 the Ladakhis compare favourably with other Mongoloid populations.

INTRODUCTION

While there is information available on haptoglobin polymorphism in most Indian populations, we have not yet come across any such study concerning the Ladakhi people. The present study, therefore, was designed to fill this gap.

Ladakh lies between 32°15′ to 36° latitude and 75°15′ to 80°15′ longitude in the Himalayas. It has common borders with China in the north-east and with Pakistan in the north-west. With an area of 97,872 km² Ladakh constitutes about 70% of the Jammu and Kashmir state. Its population density is among the lowest in the world, being only about 4 to 5 per km². The population of Leh and Kargil, the two principal towns in Ladakh, where this field work was done in July 1976, is approximately 9,000 and 3,000 respectively. Leh, the district headquarter, is situated some 230 km away from Kargil.

Ladakh was unknown to the rest of the world for long because there had been very little contact with the outside world. The terrain is inhospitable, forbidding and very arid. For the major part of the year it is snowbound. The air is extremely dry and the annual rainfall rarely exceeds 10 cm.

Ladakh is inhabited predominantly by a Mondoloid people speaking a Tibetan dialect and resembling the Tibetans in physical appearance. Buddhism and Islam are the two major religions followed in Ladakh. Marriages between Buddhists and Muslims were not unknown in the past, but now the two groups prefer to marry among themselves.

MATERIAL AND METHODS

Blood samples were collected from 148 individuals in the Ladakh District: 86 Muslims living at Kargil and the rest Buddhists from Leh. The Kargil sample consists largely of adult males and females who were visiting the local government hospital in July 1976 as out-door patients. This sample represents also a small number of grown-up boys studying in the only High School of the town. Nearly all the material collected at Leh came from the personnel of the Indo-Tibetan Border Police.

Blood (5 ml) was obtained intravenously from each individual under sterile conditions. A small aliquot from each vial was used for blood grouping and the rest was allowed to clot for the separation of serum. The serum samples thus separated were flown to our laboratory and stored at —20°C until used.

Potato starch (19 g, hydrolysed by ourselves) was dissolved in 200 ml gel buffer. The gel was poured on a thick glass plate measuring 18 cm × 12 cm so that it ensured a uniform thickness of 0.6 cm. Prior to electrophoresis, freshly prepared haemoglobin was added to serum samples in the ratio of 1 : 5 drops. The resolution of haptoglobins was carried out using Smithies' technique (1955) of horizontal starch-gel electrophoresis and Poulik's discontinuous buffer system (1957). The serum samples were loaded on thick filter paper strips and a voltage of 300 V giving a current of 50 mA was applied. The electrophoresis was carried out till the borate boundary had migrated 7 cm from the point of sample insertion. This usually took 3 to 4 hours.

CODEN: AGMGAK 26 305 (1977) — ISSN: 0001-5660
Acta Genet. Med. Gemellol., 26: 305-306

Table. *Distribution of Hp types in the Ladakhi population*

Sample	N	Absolute frequency				Gene frequency [a]	
		0	1-1	2-1	2-2	Hp^1	Hp^2
Muslim	86	2	5	35	44	0.268	0.732
Buddhist	62	0	1	32	29	0.274	0.726
(Combined)	148	2	6	67	73	0.270	0.730

[a] Hp^1 and Hp^2 gene frequencies were calculated by omitting the Hp 0 phenotypes.

RESULTS AND DISCUSSION

The results are summarized in the Table. Out of 86 Muslims studied, 2 (2.32%) were phenotypically Hp 0. No ahaptoglobinaemia was detected in the Buddhists. The frequency of Hp^1 allele is 0.268 for Muslims and 0.274 for Buddhists. In this respect, the Ladakhis are closer to the Japanese, Chinese, Thais and other Mongoloid people than they are to the non-Mongoloid populations of the Indian subcontinent. The Hp^2 allele shows a high frequency of 0.732 for Muslims and 0.726 for Buddhists and this is by and large true for other Indian populations, too. This agrees with the view held by Ingram (1963) that India may have been the birthplace of gene Hp^2 and that this allele is now in the process of spreading all over the world.

Acknowledgements

We wish to express our gratitude to the many officials in Ladakh who facilitated our work. One of us (H.K.) wishes to thank the University Grants Commission for the award of a research fellowship that made her participation in this study possible.

REFERENCES

Ingram V.M. 1963. The Haemoglobins in Genetics and Evolution. New York: Columbia Univ. Press.

Poulik M.D. 1957. Starch gel electrophoresis in a discontinuous system of buffers. Nature (Lond.), 189: 1477.

Smithies O. 1955. Zone electrophoresis in starch gels: Group variation in the serum proteins of normal human adults. Biochem. J., 61: 629-641.

Prabodh K. Shrivastava, Ph.D., Department of Human Biology, Punjabi University, Patiala-147002, India.