

S. NARA HARI, V. S. D. KUMAR, A. P. REDDY, T. RAMACHANDRAIAH

SEROLOGICAL AND BIOCHEMICAL INVESTIGATIONS AMONG THE GOLLAS OF ANDHRA PRADESH, INDIA

India, the land of numerous castes and tribes with varying cultural traditions and different environmental setups provides a unique opportunity for conducting various types of studies on human biology. Accordingly a number of works have been carried out in the field of demography, morphology, anthropometry, dermatoglyphics, serology and biochemical genetics on various tribes and castes from this country.

The present paper reports frequencies of $A_1 A_2 B O$, Rh(D), MN blood group systems, ABH (O) secretion in saliva, serum proteins like haptoglobins (Hp), transferrins (Tf) and albumin among the Gollas of Andhra Pradesh, which were hitherto unreported.

The Golla is a backward pastoral caste community whose hereditary occupation is tending sheep and cattle, selling milk etc [Thurston 1909]. They are also known as Yadavas. These people were once nomadic in nature but now some of them are settled and some leading semi-nomadic life in search of pastures. There are two main subdivisions among the Gollas, viz. Puna Golla and Puja Golla between whom no intermarriage would take place. The present study is confined to Puna Gollas only.

MATERIAL AND METHODS

Blood samples were collected by finger-prick method in five localities of Chittoor District, Andhra Pradesh following random sampling method from 196 unrelated Golla individuals.

The first two drops of blood were collected into a labelled test tube containing 0.85 N saline solution and the next four drops of blood into a heparinized test tube where it was allowed to clot for two hours at room temperature. These samples were brought in a thermos flask to the laboratory immediately after collection. The serum from the clot was pipetted out, centrifuged at 2,000 rpm to get rid of corpuscular

elements and stored in small aliquots at -20°C until subjected to electrophoresis. Samples of saliva were collected by cotton swab technique [Race & Sanger 1968]. Standard techniques and procedures were followed in the analysis of blood grouping, secretor status and serum proteins [Race & Sanger 1968, Davis 1964]. Due to some technical difficulties and deficit of chemicals the sample size varies from system to system (Tab. 1).

Table 1. Phenotype and gene frequencies of serological and biochemical markers among the Gollas of Andhra Pradesh, India

Number tested	phenotype	frequency	gene	frequency
196	A ₁	0.2143	p ₁	0.1390
	A ₂	0.0357	p ₂	0.0259
	B	0.2347	q	0.1557
	O	0.4592	r	0.6794
	A ₁ B	0.0306		
	A ₂ B	0.0255		
196	Rh ⁺	0.9082	D	0.6970
	Rh ⁻	0.0918	d	0.3030
196	Secretor	0.7602	Se	0.5103
	Non-secretor	0.2398	se	0.4897
73	M	0.3288	m	0.5959
	MN	0.5342	n	0.4041
	N	0.1370		
83	Hp ¹⁻¹	0.0241	Hp ¹	0.1646
	Hp ²⁻¹	0.2650	Hp ²	0.8354
	Hp ²⁻²	0.6626		
	Hp ⁰⁻⁰	0.0482*		
82	TfCC	0.9512	TfC	0.9756
	TfCD	0.0488	TfD	0.0244
	TfDD	0.0000		
Albumin	Normal	1.0000		

* excluded from gene frequency calculations

RESULTS AND DISCUSSION

The analysis of various genetic markers reveals the following main points.

A₁,A₂,B,O: The Gollas show higher frequency of A than B. This and the A₁/A₂ frequencies show similarity to earlier findings. A careful observation of the distribution of blood groups among the castes and tribes reveals that excepting the Gollas most of the caste populations:

of Andhra Pradesh show the general Asiatic trend i.e. $O > B > A > AB$. However, this trend is partly reversed in case of the tribals: $O > A > B > AB$. Chi-square values computed for frequencies of this system indicate that the Gollas show insignificant difference with most of the neighbouring caste populations although they possess slightly higher frequency of A group.

Rh(D): The incidence of Rh(-) is found to be slightly higher (Tab. 1) than in some of the caste groups of Andhra Pradesh, so far reported. This may be due to selective adaptability.

MN: This system shows the trend $MN > M > N$ (Tab. 1). The gene frequency of m is found to be higher than n , a characteristic feature of Asiatic populations. Comparatively, the Gollas fall close to Pallar of Tamil Nadu, Bhils of Madhya Pradesh and Parsis of Maharashtra in m gene frequency.

ABH(O) secretion in saliva: The frequency of secretors among the Gollas (tab. 1) is found to be higher than the non-secretors, which is quite in agreement with the earlier Indian works. It seems that there may be more prominent geographical effect on the whole than the ethnic element in the distribution of *Secretor* genes in India. The incidence of blood group-wise secretion shows a trend of: $O > A > B > AB$ that supports Clarke et al. (1960) statement that group O people secrete more H substance than A group people who secrete more than B group people and AB people secrete the least.

Haptoglobins: Hp^{0-0} phenotype is found to be relatively more frequent in this population (tab. 1) than in the Andhra Pradesh populations reported so far. This may be attributable to a high incidence of haemolytic jaundice observed among the Gollas in the present study. The frequency of Hp^1 allele is comparatively lower than Hp^2 allele. This is not uncommon in the Indian context, but relatively higher than the Andhra Pradesh groups so far reported. The haptoglobin picture available on some Indian populations indicates that Hp^1 frequency is significantly lower in tribals than in the caste groups in the same geographical setting.

Transferrins: Out of 82 samples tested for transferrin variants 4 were confirmed TfCD types (4.88% — Tabl. 1). Generally, the Indian caste populations show a very low frequency of Tf variation. It is noted that Tf D variation is confined to Southern (Andhra) and Eastern Indian regions (Oraons, Bengalis, Muslims and Assamese). No Tf B variation was observed in the present study and also in other tribes of Andhra.

Pradesh. In India the Tf B variants were reported among Parsis of Bombay [Undevia et al. 1973], Bengal Muslims [Papiha & Wastell 1974], Punjabi Jats [Sing et al. 1974], Khasi of Assam [Goedde et al. 1972] and in the caste groups of Andhra Pradesh [Rao et al. 1975]. Therefore, the absence of Tf B variants among the tribals of Andhra Pradesh and other parts of India is a notheworthy phenomenon.

Albumins: No albumin variant was detected electrophoretically in the present study. In fact the albumin variants are very rare among the populations of Andhra Pradesh except for the reports of Rao and Rama Swamy [1976] and Goud [1977]. Hence the present study population does not deviate from its neighbouring people of Andhra Pradesh with respect to this trait.

Comparison with other pastoral communities of India: The results obtained in the present study are compared with those pertaining to other pastoral communities like the Todas of Nilgiri Hills, Nandiwallas and Dhangars of Maharashtra to see the ethnic affiliation of Gollas. Except for ABO blood groups and haptoglobins, the Gollas fall close to these pastoral communities. This probably indicates a common original gene pool. However, a firm conclusion must await accumulation of much more data.

Acknowledgements

The authors express their sincere gratitude to Professor V. R. Reddy, Head of the Department of Physical Anthropology for providing them with laboratory facilities and to Dr. M. Suryanarayana, Lecturer in Social Anthropology, for his critical comments and suggestions during preparation of the manuscript. Two of the authors (SNH and VSDK) are grateful to CSIR, New Delhi for awarding fellowships.

REFERENCES

- Clarke C. A., R. B. McConnell, P. M. Sheppard, 1960, *A genetical study of the variations in ABH secretion*, Ann. Hum. Genet., 24, 295.
- Davis B. J., 1964, *Disc electrophoresis II Method and application to human serum proteins*, Ann N. Y. Acad. Sci., 121, 404.
- Goedde H. W., H. G. Beckmann, S. Singh, B. M. Das, M. R. Chakravarti, H. Delbruck, G. Flatz, 1972, *Genetic Survey in the population of Assam*, Hum. Hered., 22, 331.
- Goud J. D., 1977, *Population genetics of five endogamous tribal groups of Andhra Pradesh*, Ph. D. thesis, Osmania University, Hyderabad.
- Papiha S. S., H. J. Wastell, 1974, *Transferrin variants in the Indian subcontinent*, Human Genetics, 21, 69.

- Race R. P., R. Sanger, 1968, *Blood groups in Man*. Blackwell Scientific Publications, Oxford.
- Rao P. R., J. D. Goud, B. Rama Swamy, 1975, *Serum albumin and transferrin variation in tribal and non-tribal Andhra populations*, Paper presented at II Ann. Cons. Indian Soc. Hum. Genet, Calcutta.
- Rao P. R., B. Rama Swamy, unpubl., *Population genetics in caste groups of Andhra Pradesh*.
- Singh S., K. N. Sareen, H. W. Goedde, 1974, *Investigation of some biochemical genetic markers in four endogamous groups in Punjab, II Red cell enzyme polymorphism*, Hum. Genet., 22, 133.
- Thurston E., 1909, *Castes and tribes of Southern India*, Cosmo Publ., Delhi.
- Undevia J. V., R. L. Kirk, E. M. McDermid, 1973, *Serum protein systems among Parsis and Iranis in Bombay*, Hum. Hered., 23, 492.

Department of Physical Anthropology
S. V. University, Tirupati 517 502, India

BADANIA SEROLOGICZNE I BIOCHEMICZNE PASTERZY GOLLA Z ANDHRA PRADESH W INDIACH POŁUDNIOWYCH

S. NARA HARI, V. S. D. KUMAR, A. P. REDDY, T. RAMACHANDRAIAH

Autorzy zbadali częstość fenotypów i określili częstość genów dla układów grupowych (ABO, Rh, MN, Wydzielacz) oraz białek osocza (haptoglobiny, transferyny, albuminy) u 196 niespokrewnionych osobników z grupy Puna Golla, prymitywnych pasterzy żyjących na południu Indii. Wyniki zestawiono w tabeli 1. Z porównania wyników niniejszego opracowania z danymi dotyczącymi grup ludzkich sąsiadujących z Golla można wnioskować, że ludy pasterskie południa Indii miały w przeszłości wspólną pulę genów (np. Toda, Golla, Nandiwalla, Dhangar) jednakże wniosek ten wymaga potwierdzenia na obszerniejszym materiale.