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A₁A₂B₀ AND MN BLOOD GROUPS AND SICKLE CELL TRAIT
AMONG AMMA KODAVAS OF KODAGU DISTRICT
OF KARNATAKA STATE

Kodagu district in Karnataka state is the homeland of two distinct, picturesque populations — Kodavas and Amma Kodavas. They both speak Kodagi language. They follow the same customs and practices. The salient differences between these two endogamous groups are that the Kodavas eat nonvegetarian food and drink liquor while the Amma Kodavas are strict vegetarians and teetotallers and follow a few brahminical rituals. The Kodavas number about 66,000 while the Amma Kodavas are about 3,000 in number. Both of them are tall, fair looking people. They claim themselves Kshatriyas with a status next to Brahmans. The Kodavas concede that the Amma Kodavas are higher in status to themselves.

The Southern Regional Office of the Anthropological Survey of India has conducted studies on both these population groups in 1978 and 1979. The study included blood groups, anthropometry, dermatoglyphics, Colour blindness, Sickle Cell trait, PTC taste sensitivity and demography. A few papers on the study of Kodavas have already been presented at the *Xth International Congress of Anthropological and Ethnological Sciences*, 1978 [Sastry et al. 1978; Yaseen Saheb et al. 1978].

The present paper includes results of A₁A₂B₀ blood groups, MN blood groups and Sickle Cell trait examination at about one hundred of Amma Kodavas. Care was taken to see that only unrelated individuals were included in the sample.

A₁A₂B₀ blood groups:

High titre anti-A, anti-B and group 0 sera were used for AB₀ testing. All these sera were supplied by *Haffkine Institute*, Bombay. The moist chamber method [Boorman and Dodd, 1957] was utilised for

Table 1. A₁A₂ B0 blood groups among Amma Kodavas

	Phenotypes			Gene frequencies
	Observed number	Observed %	Expected No.	
O	62	50.82	62.01	$p=0.1602$ $q=0.1267$ $r=0.7130$
A ₁	26	25.41	31.00	
A ₂	5			
B	24	19.67	24.00	
A ₁ B	4	4.10	4.95	
A ₂ B	1			
	122	100.00	121.96	

AB0 tests. Group A bloods were subsequently grouped by anti-A₁ sera by Micro-tube testing technique [Race and Sauger, 1954]. Controls were used in all series of tests. The results are presented in table 1. The gene frequencies were calculated as per the formulae given by Mourant [1954]. The Chi^2 value which is negligible indicates a satisfactory agreement with the known mode of inheritance [Bernstein, 1930].

Table 2. Comparison with other Karnataka population groups. Data after Sastry [1970] and Sastry et al. (unpublished)

Sl. No.	Population	No. tested	Phenotype numbers			
			O	A	B	AB
1.	Brahman	133	56	31	36	10
2.	Iyengars	100	39	24	28	9
3.	Vokkaliga	100	46	23	25	6
4.	Lingayat	110	50	19	37	4
5.	Adi Karnataka	225	95	51	68	11
6.	Adi Jambuva	100	43	22	26	9
7.	Muslim	100	45	24	29	2
8.	Kodava	209	97	58	43	11
9.	Amma Kodavas	122	62	31	24	5

The Amma Kodava data is compared with other available data from Karnataka state [Sastry, 1970] and presented in table 2. The data on "9×9" contingency table yields a Chi^2 value of 23.76 for 24 degrees of freedom and is insignificant.

MN blood types:

Anti-M and anti-N sera were the products of Biotest laboratories, Vienna. Two per cent saline suspensions were used in the tests. Micro-tube technique was employed. The method prescribed by the manufacturer was followed strictly. The gene count method [Weiner and

Table 3. MN blood groups in Amma Kodavas

	Phenotypes			Gene frequency	χ^2
	Observed number	Expected number	Observed %		
M	69	66.56	66.34	$m=0.80$ $n=0.20$	1.45 (1 d.f.)
MN	29	33.28	27.88		
N	6	4.16	5.77		
Total	104	100.00	99.99		

Vaisberg, 1931] was employed to calculate gene-frequency estimates. Table 3 gives the blood types and gene frequencies. Observed and expected values agree with each other. The Chi^2 value is insignificant.

Sickle Cell trait:

Samples of blood from unrelated individuals were tested by applying the sodium meta bi sulphite ($Na_2S_2O_5$) technique of Daland and Castle [1948]. A 2% solution of the salt was prepared daily immediately before the testing was done. This solution was used for about 3 hours. A small drop of fresh blood from the finger tip was taken directly on to a microscope slide and then was mixed with a drop of metabisulphite solution and the mixture was covered by a cover slip. The first observations were taken after 20 minutes and the final ones after 30 minutes. No cases of positive sickling were detected among this population.

Conclusion:

A₁A₂B0 blood groups indicate that all the population groups of Karnataka are probably the offshoots of one main group. The "9×4" contingency table gives an insignificant Chi^2 value. The "2×4" contingency table which compares this data with the Kodavas gives a Chi^2 value of 0.73 which is insignificant again. Thus it may be opined that the Kodavas and Amma Kodavas are probably one group and they might have branched off into two groups in the recent past. This is in accordance with the historical evidence given out in *Kaveri Mahatyam*.

The MN blood groups when compared with the Kodavas again give the same type of picture. The Chi^2 value between the Kodavas and Amma Kodavas gives a value of 1.29 which is again insignificant.

The Amma Kodavas do not possess the Sickle Cell trait at all. The Kodavas possess this even though at a very insignificant level.

Finally it may be opined that the Kodavas and the Amma Kodavas belonged to the same parent stock in the past and might have become two groups due to some bio-ecological reasons.

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GRUPY KRWI UKŁADU AB₀ I MN ORAZ SIERPOWATOŚĆ KRWINEK
U AMMA KODAVAS, OKRĘG KODAGU, STAN KARNATAKA, INDIE

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Autorzy zebrali dane dotyczące częstości markerów genetycznych wśród 122 osobników należących do grupy etnicznej Amma Kodavas z południowych Indii. Porównanie obserwowanych częstości z występującymi u innych grup ludności Indii pozwoliło stwierdzić, że lokalne grupy zamieszkujące stan Karnataka wywodzą się z jednej populacji. W szczególności grupy Kodavas i Amma Kodavas różniące się do pewnego stopnia kulturowo można uznać za jedną populację w sensie biologicznym.