

# A MORPHO—GENETICAL STUDY ON THE MIZO

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A part of the great wave of the Mongoloid race spilling over into eastern and southern Asia, the Mizo moved down from Myanmar (Burma) in many scattered bands towards the end of 18th century. They were always on look-out for some new pastures, and that led to some occasional feuds amongst themselves, which gave rise to the system of chieftainship. The British administrators carefully utilized this institution to run administration (Bhattacharya, 1986).

In 1898 the two districts, Aizwal and Lunglei were amalgamated and made as one of the districts in Assam. Later the district was declared as "an excluded area" according to the Government of India Act of 1935 and was placed directly under the Governor. In 1954 the name of the district was changed from 'Lushai Hills' district to 'Mizo' district. With the implementation of the North-East Reorganisation Act of 1971 the Mizo district was renamed as 'Mizoram'. It was made a union territory on 21st January, 1972, and eventually, on 7th August, 1986 this union territory became the 23rd state in Indian union through the 53rd constitution amendment, passed by the parliament.

With the advent of christianity in 1894 and with introduction of modern education by the christian missionaries, more than 95% of the Mizo people have embraced the christian faith and 60% of them are now literate (Goswami, 1979).

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arms in natural way. The subjects were classified as Right over Left ( $R > L$ ) or Left over Right ( $L > R$ ), depending on how they clasped their hands and folded their arms.

*Tongue rolling and Tongue folding* : The subject was asked to roll their tongue by extending it from the mouth. Some had the ability to roll the tongue into a distinct 'U' shape, while the others couldn't do so. The observations were recorded as positive and negative respectively. For tongue folding the subject was asked to extend the tongue and fold it without touching the lips. The observations were recorded as positive and negative respectively for those, who could fold and those, who couldn't.

### Results

Table 1 shows the ABO blood group frequencies in the Mizo population. It is found that the frequencies of O and A blood groups are equal and higher than that of B blood group. The gene frequencies p, q and r are 0.2524, 0.1400 and 0.6076 respectively. Both  $D/\sigma$  and  $x^2$ -values indicate that this population is in equilibrium in respect of this trait.

Table 2 shows the frequency of Rh-blood groups in the Mizo. It is seen that the frequency of Rh-ve is only about 1.82%, and the frequency of the gene 'd' is 0.1350. The  $X^2$ -value shows that this population is in equilibrium in respect of this blood group system.

As already mentioned, in the present study we have followed the serial dilution technique of Harris and Kalmus (1949) in order to find out the frequencies of tasters and non-taster among the Mizo. It is found that the antimode falls on 7. So, we have classified the entire data into : a) Non-tasters—those who show the threshold value upto 7, and b) Tasters - those who show the threshold value above 7. Table 3 shows the distribution of tasters and non-tasters in the Mizo.

The frequencies of taster and non-taster in this population are 48.65% and 51.35% respectively. The frequency of non-taster gene (t) is 0.7166, and the  $x^2$ -value (0.0205, df = 1,  $0.90 > P > 0.80$ ) shows that so far this genetic trait is concerned this population is in equilibrium.

Altogether 111 individuals (51 males and 60 females) have been examined for red-green colour-blindness. But no individual has been found to be colour-blind.

Some morphological characters, as mentioned earlier, have been studied among the Mizo population in the present study. Table 4 shows frequencies of various morphological traits among the Mizo.

It may be noted here that in respect of all these morphological traits, given in Table 4, no statistically significant difference is noticed between two sexes, as it is expected in case of any autosomal trait. So, in the present paper we have pooled all data on both sexes together and presented the results in Table 4.

Since there is no standard classification for earlobe, in order to avoid confusion and arbitrariness we have classified earlobe into two categories: free and attached. It is found that the frequencies of free and attached earlobe are 40.54% and 59.46% respectively. In the Mizo it is found that the gene frequency of attached earlobe is 0.7710, when attached earlobe is considered as recessive trait (following Hilden, 1922; Powell and Whitney, 1937) but when free earlobe is taken as recessive character (following Carriere, 1922) the gene frequency is found to be 0.6367.

On the basis of the classification given by Minami (1952) we have studied the relative length of first and second toes. It is found among the Mizo that the frequencies of T, O and F are 40.99%, 40.09% and 18.92% respectively.

In present study the morphological traits, tongue-rolling and tongue-folding have been studied. It is observed that in this population about 75.68% can roll their tongues, while about 24.32% could not do so. So far tongue folding is concerned, it is found that like tongue-rolling equal percentages of this people can fold and can't fold their tongues.

Data on hand-clasping and arm-folding in the Mizo have been given in Table 4. In case of hand-clasping it is found that the frequencies of Right over Left and Left over Right are 51.35% and 48.65% respectively. But in case of arm-folding the frequencies of  $R > L$  and  $L > R$  are 33.33% and 66.67% respectively.

#### Discussion

It is seen that the frequency of 'p' gene is higher than that of 'q' gene in the Mizo and the same is true for most of the population of Arunachal Pradesh, Nagaland, Manipur, Mizoram and Meghalaya, whereas the populations of Assam and Tripura show higher 'q' gene

frequency (Majumdar, 1950 ; Bhattacharjee, 1957 ; Das, 1958, 1969 ; Phookan, 1975 ; Chakraborty, 1976 ; Kumar and Sastry, 1961 ; Flatz et al, 1972 ; Sengupta and Dutta, 1980 ; Jaiswal and Padmanabham, 1983 ).

It is further observed that the frequency of 'p' gene in the present sample comes very near to that found among the Konyak Naga of Nagaland (British Research Association Committee, 1939 ) and Rabba of Assam (Das, 1960 ), whereas the frequency of 'q' gene comes very close to that of the Gallong Abor (Kumar, 1954 ) and Pangi Abor (Das, 1985 ) of Arunachal Pradesh.

A comparative picture of the average ABO gene frequencies for the seven north eastern states, alongwith the world average (Mc Arthur and Penrose, 1949 ) and Indian average (Ghosh, 1969 ), is given in Table 5. The  $\chi^2$ -value ( $\chi^2 \approx 3.225$ , d. f = 3,  $0.50 > P > 0.30$ ) shows that there is no significant difference between populations of Mizoram in respect of this genetic marker. The gene frequencies of 'p', 'q' and 'r' in the present sample come very close to those of the world average, but differ from those of the Indian average.

It may be noted that Rh gene is either absent or present in a very low dose in Mongoloid populations. The Mizo, being one of the Mongoloid populations of north eastern part of the country, show the presence of the Rh gene in a very low dose. The only exception, so far noted, is the Riang of Tripura in which the Rh gene is present in exceptionally high dose i.e., 23.36% (Kumar and Sastry, 1961). Among the Meitei and Tangkhul of Manipur the Rh gene is present in a very low frequency i.e. between 1 and 2% only. Among the Khasi of Meghalaya and Kabui of Manipur it is completely absent. So, as far as the Rh system is concerned, the Mizo resemble greatly the other Mongoloid populations of this region.

The frequency of non-tasters in the present population is found to be higher than that of tasters. In all other populations, whether Mongoloid, Caucasoid or Australoid, the frequency of tasters is generally found to be higher than that of non-tasters. Recently, Das (1986) has made a review on the existing data on P. T. C. taste sensitivity among the populations of Assam. She has reported that the frequency of the non-taster gene (t) varies between 30% and 60%. Among the Mizo it is as high as 72%. The Keot have got the highest 't' frequency, (0.635) while the Khasi show the lowest (0.392). In the present Mizo sample this

frequency is higher than that in the Keot. However, in respect of this genetic trait the Mizo stand close to the other Mongoloid populations of this region.

The frequency of colour-blindness among the tribals and non-tribals of north eastern India varies between 1% and 10.4% (Barua, 1985). It is not surprising that among the Mizo no case of colour-blind has been detected. However, Mukherjee (1963) has reported that among the Khasi, the frequency of colour-blind individuals is about 3.3% and 1.8% among the Lushai. Jaiswal (1978) has found that the frequency of colour-blindness is 10.4% among the Apatani. Barua (1985) has reported that among the Hajong this frequency is 3.8%. Das and Choudhury (1975) have observed that among the Naga and Mikir it is present in 1.1%. It may be mentioned that Choudhury and Das (1974) have not found any colour-blind individual among the Nocte. In this connection one may recall the hypothesis on selection relaxation, proposed by Post (1952a). The frequency of colour-blind is generally found to be very low or absent among the tribal populations. The Mizo, being a tribal population, do not show any colour-blind person among themselves, which is quite in conformity with the hypothesis, proposed by Post (1962a and 1962b).

Of all the morphological traits, ear-lobe has been studied amongst most of the populations all over the country and north eastern region is no exception. In the present study it is found that the frequency of free ear-lobe in the Mizo is 40.54%. Das et al. (1978) have compiled all data on earlobe types in some populations of this region. It is seen that in respect of this trait the Mizo come closer to the Rajbanshi, Meitei, Mikir and Sema Naga, whereas Mizo have got lower frequency in comparison to the Ahom and Nepalee but higher in comparison to the Garo and Rabha. In most of the non-tribal populations of north eastern region, the frequency of free earlobe type is much higher than that found in the Mizo.

The relative length of first and second toes has been studied in a very few populations of this region, namely the Khasi, Rabha and Mikir (Das, 1968; Das and Uzir, 1959, 1961). In respect of this trait the Mizo stand quite apart from those three tribal populations. However, we need more data on this morphological trait from other tribal populations of this region, to arrive at any conclusion.

It is seen that in case of hand clasping the frequency of  $R > L$  is higher than that of  $L > R$  in the Mizo. This is by and large true for most of the populations of north eastern region, excepting the Tangsa of Arunachal Pradesh in which the situation is just reverse (Das et al, 1976). It may be pointed out that the Mizo came very close to the Sema Naga of Nagaland (Phookan and Begum, 1976) and the Gallong of Arunachal Pradesh (Das and Choudhury, 1975) in respect of this trait.

In case of arm-folding it is seen that the frequency of  $L > R$  is higher than that of  $R > L$  in the Mizo. It is also true for most of the populations of north-eastern India. However, the frequency of  $L > R$  type (66.67%) in the Mizo is found to be higher in comparison to the Brahmin, Kalita and Muslim of Assam and the Khasi of Meghalaya (Das and Barua, 1974). Similar high frequency of  $L > R$  has been found among the Nocte and Wancho of Arunachal Pradesh (Das et al, 1976) and among the Napalee of Assam (Phookan and Begum, 1976). The situation is just reverse among the Khowa of Arunachal Pradesh (Das and Borgohain, 1972).

In case of both tongue rolling and folding the Mizo show very high ability (75.67%) and stand quite apart from other Mongoloid populations of the region.

In the present paper we have tried to find out morphological and genetical characteristics of the Mizo on the basis of a few number of parameters. However it is well understood that with such limited morphological and genetical traits this study is far from complete. To understand the phylogenetic relationship of Mizo with other tribal and non-tribal populations of the region and of the rest of India, we need to have data on many other morphological and genetical parameters. In spite of the fact that in the present study only a limited number of parameters have been used, the Mizo still show a good deal of resemblance with the other Mongoloid tribal populations of north east region of India.

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Table—1 ABO blood groups in the Mizo population

Sex	No	O	A	B	AB
Male	51	21	18	9	3
		41.18%	35.29%	17.65%	5.88%
Female	59	20	23	12	4
		33.90%	38.98%	20.34%	6.78%
M + F	110	41	41	21	7
		37.27%	37.27%	19.09%	6.36%

Gene frequencies :  $p = 0.2524$  $q = 0.1400$  $r = 0.6076$  $D/0 = \pm 0.0158$  $X^2 = 0.831, df = 1, 0.80 > p > 0.70$

Table—2 Rh blood groups in the Mizo population

Sex	No	Rh <sub>+</sub>	Rh <sub>-</sub>
Male	51	51 100.00%	0
Female	59	57 96.61%	2 3.39%
M+F	110	108 98.18%	2 1.82%

Gene frequency =  $d = 0.1350$

$\chi^2 = 0.3427$ ,  $df = 1$ ,  $0.70 > P > 0.50$

Table—3 PTC taste sensitivity in Mizo population

Sex	No	Taster	Non - taster
Male	51	26 50.98%	25 49.02%
Female	60	28 46.67%	32 52.33%
M + F	110	54 48.65%	57 51.35%

Gene frequency :  $t = 0.7166$  $\chi^2 = 0.0205$ ,  $df = 1$ ,  $0.90 > p > 0.80$ 

World	52	Left over	0.1620	0.4320
India,	42	Right over	0.2238	0.5962
Bhutan,	37	Left		
Nepal,		Left over		
Ceylon,	74	Right		
Pakistan,				
and its				
adjacent				
areas				
as a				
whole				
Mizo	110	Left over	0.2324	0.6076

Table-4 Morphological characters in Mizo population

Traits	No ( M+F )	Types	Frequency	
			No	%
Earlobe	111	Free*	45	40.54
		Attached**	66	59.46
Relative length of first & second toes	222	I > II ( T )	91	40.99
		II > I ( F )	42	18.92
		I = II ( O )	89	40.09
Tongue rolling	111	Positive	84	75.68
		Negative	27	24.32
Tongue folding	111	Positive	84	75.68
		Negative	27	24.32
Hand clasping	111	Right over left	57	51.35
		Left over right	54	48.65
Arm folding	111	Right over left	37	33.33
		Left over right	74	66.67

Gene frequency : \* = 0.6367 ( when free earlobe considered recessive )

\*\* = 0.7710 ( when attached earlobe considered recessive )

Table—5 Average ABO gene frequencies

Population	Authors	P	q	r
Arunachal Pradesh	Bhattacharjee ( 1954, '55, '57 ) Naug ( 1969 ) ; Kumar ( 1945 )	0.2624	0.1811	0.5565
Assam	Sengupta ( 1987 ) ; Majumdar ( 1950 ) ; Phookan ( 1975 ) ; Das ( 1960, '73, '80, '85, '86 ) and Chakravarty ( 1976 )	0.1820	0.1842	0.6338
Manipur	Chakravarty ( 1986 )	0.2352	0.1679	0.5969
Meghalaya	Das ( 1968 )	0.1929	0.1109	0.6856
Mizorm	British Ass. ( 1939 ) ; Mitra ( 1936 )	0.2922	0.1810	0.5267
Nagaland	Bhattacharjee ( 1957 ) ; Chakravarty ( 1965 ) ; Mitra ( 1936 ) ; British Ass. ( 1939 )	0.2095	0.1079	0.6826
Tripura	Kumar ( 1954, 1958 ) ; Kumar and Sastry ( 1961 )	0.2327	0.3409	0.4264
World	Mc Arthur & Penrose ( 1949 )	0.2150	0.1620	0.6320
India, Bhutan, Nepal, Cylon, Pakistan, and its adjoining areas as a whole	Ghosh ( 1969 )	0.1834	0.2258	0.5908
Mizo	Present study	0.2524	0.1400	0.6076