

Morphology to Molecular Anthropology: Castes and Tribes of India*

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ABSTRACT Within the various fields of research of the present Biological Anthropology the study of human evolution as well as the study of genetic variation in modern man, hold an eminent place. An important branch of Biological Anthropology is therefore Population Genetics, which deals on the one hand with exact genetic descriptions of human population, but which on the other hand tries to find out the reasons for genetic differences among them. To study these genetic differentiation processes in man, which are obviously still ongoing, reliable population data are necessary. Biological Anthropologists are, however, not only interested in the ethnic and geographic variation of the numerous genetic markers of the **human blood**, but are also concerned with the variation of **anthropometric, morphological and dermatoglyphic traits**. Human population studies using traits began with early population descriptions and currently utilise multivariate procedures for detecting evolutionary processes. The development of new techniques in **molecular biology** rendered possible to elucidate human variability and human prehistory. It may be concluded that there are differences in the occurrence of the frequencies of various biogenetical traits (genetic markers of blood, other genetic markers like colour blindness and tasting ability, different dermatoglyphic and somatometric traits) among the population groups inhabiting different geographical zones of India viz. North, West, East, Central, South and Islands. From the Himalayan region, some differences in the frequencies and mean values of distribution of various genetic markers and morphological traits have been observed among population groups of Western and Eastern Himalayan regions. Since sufficient studies are not available on the population groups of Central Himalayan region, it has not been possible to observe a differential trend regarding the occurrence of various traits, but it has been observed that the population groups in this area show more similarities with those of Western than Eastern Himalayan region. About the four groups *i.e.*, caste, scheduled caste, scheduled tribe, and community from India, various zones of India and Himalayan regions, conspicuous differences are observed among the scheduled tribes as compared to castes, scheduled castes, and communities. The correlations of frequencies of genetic markers and mean values of morphological traits with various climatic factors and altitude by different ethnic groups although showing significant differences, in general are not high. Nevertheless, it can be concluded that the variations in the frequencies of genetic markers and mean values of morphological traits distribution in the Himalayan region may be due to contacts between the various population groups of Western and Central Himalayas with population groups of Central Asia, and that of Eastern Himalayas with the Northern Mongoloid populations. In Central India admixture with the population groups of West India can be assumed. In South India, a different pattern of allele/haplotype frequencies and mean values is generally observed among the tribal

population groups, for which one of the main causes might be seen in small population sizes. Inbreeding is prevalence among certain communities like Muslims, Parsis etc. and in most of the different population groups particularly from South India, which might have also resulted in the marked variation in distribution of frequencies and mean values of different genetic markers and morphological traits. The variations observed for the various morphogenetic traits in the distribution of allele/haplotype frequencies and mean values among the Indian population are due to racial elements present among them in varying degrees, migrations and admixture from time to time and other factors of evolutionary changes like mating patterns, genetic drift, mutation and selection under different environments. However, such a holistic approach should not only consider the anthropometric, dermatoglyphic traits and so far less investigated serum protein and red cell enzyme polymorphisms, but should analyse especially the regional and ethnic distribution of the numerous nuclear and mitochondrial DNA polymorphisms, which turned out to be of highest importance to population genetics.