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Molecular Anthropology: Population and Forensic Genetic Applications

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ABSTRACT Molecular anthropology - the study of human genetic polymorphisms - is fast and ever-growing branch of anthropology that holds a great promise for both past and future. Indian subcontinent with its remarkable environmental, geographical, morphological, genetic, cultural and linguistic diversity provides immense promise for anthropological investigations to address origins of its people, population movements, analysis of genetic architecture in human diseases and gene-environment interactions. Several types of DNA polymorphisms have been discovered in the human genome and have been found to be very productive in addressing molecular anthropological questions. This paper traces the usage of some of these polymorphisms in the study of populations of India. Using a battery of *Alu* insertion polymorphisms, genetic structure and affinities of North and Western Indian populations are evaluated. *Alu* polymorphisms are also used to investigate the origin of the Sinhalese of Sri Lanka. In addition, forensic applications of *Alu* polymorphisms are demonstrated. These results suggest that there is fundamental genomic unity among Indian populations and geographic location, caste affiliation and migration/gene flow contribute significantly to the observed genetic variation in contemporary populations.