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## ABSTRACT

Uniparental genetic structure of the Sahiwal population was investigated by analyzing mitochondrial DNA. We studied maternally unrelated individuals from major communities (i.e. Arain, Jutt, Rajput and Syed) belonging to Sahiwal city, Punjab, Pakistan. In order to explore the affiliations among major tribes of Sahiwal, a total of 20 samples was examined. An optimized protocol to extract mitochondrial DNA in pure form using Phenol Chloroform Isoamyl-alcohol method was developed. Complete Control region was amplified and further sequenced. Analysis of control region sequences revealed 185 polymorphic sites. A total of 20 unique haplotypes was identified defined by a particular set of nucleotides. Subsequently, the haplotypes were designated into suitable haplogroups according to the most recently updated mitochondrial phylogenetic tree. A total of six macro-haplogroups were reported that include haplogroup M, N, R, HV, H and U. The gene pool of Sahiwal showed a composite mosaic with a large proportion of South Asian haplogroup (70%) and rest of Arab origin (30%). Mitochondrial Phylogenetic tree constructed for major casts of Sahiwal showed an extensive matrilineal admixture between Rajput, Jutt and Arain lineages. There was no mixing of lineages of Syed samples with other casts of Sahiwal. Results of this study clearly demonstrate that mitochondrial DNA can be used as a genomic marker to find out the migration history.