STUDY OF 22 AUTOSOMAL AND 23 Y-CHROMOSOMAL STRS IN INDIAN POPULATIONS FOR APPLICATIONS IN FORENSIC HUMAN IDENTIFICATION

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Short tandem repeats (STRs) are the most preferred DNA-based markers in population genetic and anthropogenic studies due to their desired characteristics including high polymorphism content and mutation rate, amenability to multiplexing and ubiquitous abundance in the human genome. In forensic genetics, a panel consisting of 13 CODIS (Combined DNA Index System) STR loci is highly successful in forensic human identification (HID) purposes owing to its high power of discrimination. Due to the exponential increase in the number of stored DNA profiles in DNA databases across the globe, the chances of adventitious matches have increased. Consequently the number of STR loci has recently been raised up to 25 to gather more genetic information about the target populations and minimize the chances of accidental matches in forensic cases. Although STR-based studies consisting of 15-16 autosomal and 12-17 Y-chromosomal STR loci have been reported for various populations in India, studies with an expanded panel of markers to estimate the genetic diversity and allelic distribution of the target loci and their applicability in the field of forensic genetics is still largely unexplored. The present study aims to determine the allelic distribution across Indian populations as revealed by 22 autosomal and 23 Y-chromosomal STRs utilizing the PowerPlex® Fusion and PowerPlex® Y23 chemistries (Promega Corp., Madison, USA), respectively for HID application. The inclusion of the additional STR loci in the marker panel of these commercial kits as opposed to the previous kits will not only add to the information on the genetic diversity of the populations, but will also help in forensic cases due to their higher power of discrimination and ability to reliably match traces of biological material to the perpetrator even in samples with limited DNA degradation. On the other hand, the inclusion of rapidly mutating Y-STR loci in the PowerPlex® Y23 chemistry can help to distinguish even the close male relatives in various forensic cases owing to their higher mutation rate in comparison to other STRs. In the current study, autosomal and Y-STR genotyping was carried out using the above chemistries each for 400 unrelated male volunteers residing across thirteen geographic locations in India to obtain insights regarding genetic informativeness of the target loci and their applicability in forensic HID. The results will be discussed during the presentation.