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Forensic Identification by Using Insertion-deletion Polymorphisms

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ABSTRACT Forensic science is basically the determination of the human identity. With advances in science and technology and the availability of DNA profiling, it is possible now to determine the identity even in decomposed and mutilated bodies and even with parts of a body as trivial as a hair or a drop of a blood. Methods and materials: Short tandem repeat polymorphism (STRP) genotyping and single nucleotide polymorphism (SNP) are the well-known DNA profiling methods used in the forensic field, but having drawbacks like need of big amplicons, having higher mutation rates and requiring complicated procedures, and being expensive respectively. Insertion Deletion polymorphism (INDEL) is a natural genetic variation due to the insertion or deletion of nucleotide in the human genome, and INDEL typing requires smaller DNA samples and are the most abundant variations in the human genome. INDELs are analysed with a simple fluorescent PCT followed by capillary electrophoresis, at present Qiagen Investigator DIPplex® kit of 30 INDELs and a 38-INDEL multiplex assays are available. Objectives: INDEL typing is useful in forensic genetics, population genetic studies, and medical genetics as in human and kinship analysis. With the advent of INDEL-STP typing technique an autosomal DNA profile of a minor donor is also plausible. Conclusion: Personalized therapy is possible with INDEL typing as it is helpful in determining the source of genetic diseases. This paper explores the application of INDELs in forensic identification.