ABSTRACT: Insightful insights into criminal investigations are now made possible by forensic DNA analysis, revolutionizing the field of forensic science and advancing the cause of justice. Establishing a person’s identity, connecting suspects to crime scenes, and clearing the innocent have all benefited greatly from the identification and characterization of specific DNA biomarkers. The sensitivity, accuracy, and effectiveness of forensic DNA analysis have been significantly improved over time by significant advancements in DNA technology, making it a crucial tool for forensic investigations all over the world. We hope to give a thorough overview of the developments and uses of forensic DNA biomarkers in this review article. We’ll go over the fundamental ideas behind DNA analysis, go over the various DNA biomarkers used in forensic science, and look at how important they are for resolving difficult criminal cases. Additionally, we will discuss the newest developments in forensic DNA biomarker research as well as the recent technological advancements that have advanced the field.

Key words: STR, VNTR, RAPD, SNP, Next Generation Sequencing, RFLP.
in forensic investigations.

**Advantages**: AFLP can generate high-resolution DNA fingerprints and detect genetic variations across the genome.

**Limitations**: AFLP analysis is complex, expensive, and requires specific primers and optimization. It has limited compatibility with forensic DNA databases and is less commonly used in routine forensic casework.

**RAPD (Random Amplified Polymorphic DNA)**

**Suitability**: RAPD is not widely used in forensic science and has limited applications in this field.

**Advantages**: RAPD can provide DNA profiles quickly and with minimal sample requirements.

**Limitations**: RAPD has limited discrimination power and reproducibility. It is less robust and less reliable compared to other DNA analysis techniques, making it less suitable for forensic investigations (Lee et al., 1994).

**SNP (Single Nucleotide Polymorphism)**

**Suitability**: SNPs have limited applications in traditional forensic science but are gaining prominence due to advancements in technology and expanding databases.

**Advantages**: SNPs can provide information on ancestry, phenotypic traits, and kinship analysis. They have applications in mass disaster victim identification and can complement traditional DNA profiling methods.

**Limitations**: SNP analysis has lower discrimination power than STR analysis for individual identification. It requires specific genotyping platforms, and comprehensive SNP databases are still evolving (Sobrino, B., et al. 2005).

In summary, STR analysis is the most suitable and widely used technique in forensic science due to its high discrimination power, compatibility with databases and reliability. SNP analysis, while having limitations is gaining importance in certain forensic scenarios.

**REFERENCES**


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