

ENHANCING FORENSIC INVESTIGATIONS WITH NEXT GENERATION SEQUENCING

Traditional forensic DNA analysis focuses on repeating units of DNA, referred to as short tandem repeats (STRs), which are highly polymorphic regions of non-coding DNA. Using Next Generation Sequencing (NGS) technology, additional alternative markers such as single nucleotide polymorphisms (SNPs) and mitochondrial DNA (mtDNA) can be assessed in forensic applications such as identity, ancestry, lineage, and phenotypic trait prediction.

Applications of NGS in forensics

Nuclear DNA analysis



NGS of nuclear DNA provides size- and sequence-based information for a variety of identity-informative markers and is suitable for good quality and compromised or degraded DNA samples.

Case types: Criminal investigations

Mitochondrial DNA analysis



NGS of mtDNA is an alternative identification approach used when nuclear DNA is not present or is too highly degraded or compromised. Analysis of mtDNA provides maternal lineage-based genetic information for both the nuclear family (i.e., mother and child) and extended family reference (e.g., grandmother, maternal cousins).

Case types: Missing persons, unidentified human remains, and mass disaster victim identification efforts

Externally visible characteristics prediction



NGS may help improve the ability to predict the physical traits of an individual using discriminatory SNP markers.

Case types: Missing persons, unidentified human remains, and mass disaster victim identification efforts

Kinship testing



NGS may help interpret cases of relatedness using discriminatory SNP markers.

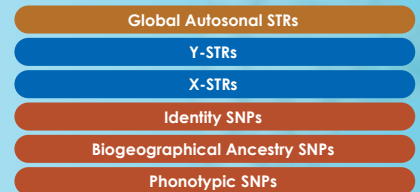
Case types: Cold cases, mass disaster victim identification efforts, missing persons, unidentified human remains, paternity testing, familial DNA searching, and forensic genetic genealogy



NGS TECHNOLOGY OFFERS SEVERAL ADVANTAGES

- Increased power of discrimination. The increased sensitivity of NGS generates more data across the 20 Combined DNA Index System (CODIS) Core Loci.
- Improved performance with challenging samples such as degraded DNA, low quantity DNA or complex DNA mixtures.
- Ability to infer phenotype, ancestry, genealogy, and parentage.
- Improved efficiency with high-throughput capabilities.

ForenSeq DNA signature prep kit



MiSeq FGx™ FORENSIC GENOMICS SYSTEM

Ampath Laboratories is proud to be the first ISO 17025 accredited DNA testing laboratory in South Africa and offers NGS-based forensic testing using the Illumina MiSeq FGx™ Forensic Genomics System. Using the ForenSeq DNA Signature Prep Kit, this system offers a streamlined workflow for forensic NGS analysis.

For more information and pricing, please contact

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