

The Human Y-Chromosome — Introduction into Genetics and Applications

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ABSTRACT: Human Y-chromosomal DNA analysis is becoming well established in forensic sciences. That is because human Y-chromosomal DNA polymorphisms are the only genetic markers that are able to specifically characterize and identify male culprit DNA in material from sexual assault or forcible rape cases where offenders are almost always males. Appropriate Y-chromosomal DNA markers evaluated for forensic applications with standardized nomenclature, typing and statistic methodology, and haplotype frequency databases are currently available to the forensic DNA community. As with any other kind of DNA evidence, the Y-chromosomal DNA analysis in forensic science requires not only a high standard of quality assurance but also appropriate scientific background knowledge to ensure correct interpretation of DNA profiles. The following overview article will provide an introduction to the molecular genetics of the human Y-chromosome and will discuss the advantages that Y-chromosomal DNA polymorphisms can offer to forensic applications, as well as the limitations to the types of information provided by the human Y-chromosome.

KEY WORDS: Y-Chromosome, legal medicine, microsatellites, paternity testing, short tandem repeat (STR), single nucleotide polymorphism (SNP).
