

## **The Power of Y-STR Typing: Development, Applications, and Practices**

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Y-chromosome STR genetic markers are particularly useful for analyzing evidentiary samples derived from sexual assault cases and a variety of violent crimes. Because the Y chromosome is male-specific, Y STR typing allows characterization of low level male DNA that would otherwise be masked or overwhelmed in the presence of large quantities of female DNA. Additionally, because of the lack of recombination between markers on the Y-chromosome, these genetic markers can assist in resolving paternal lineage issues. There are multiplex Y STR kits that allow typing of a battery of markers, exceeding core requirements. Indeed, the number of Y STRs that can be typed in a multiplex has reached an impressive 23 loci with the advent of the PowerPlex® Y23 System (Promega Corporation). The commercial kits have been validated and can be applied to forensic casework analyses. However, implementation requires an understanding of the salient features of the Y chromosome, the ways that Y STRs can best serve forensic analyses, and the best way to present casework results. This presentation will present the biological basics of the Y-chromosome, the value of a large set of Y STRs for analyses, general applications of Y-STRs, validation studies, the use of Y STRs for database searching such as in CODIS and familial searching, supporting population data, and some fundamentals for statistical calculations. The goal is for the forensic scientist to become familiar with the value of Y STRs and why they are essential tools for forensic analyses, what criteria should be used for selecting a kit, processes for implementation and practice, and what are proper ways to interpret Y-STR typing results.