

USING Y-CHROMOSOME MULTIPLEXES IN FORENSIC AND PATERNITY LABORATORIES

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Y-chromosome short tandem repeats (Y-STRs) provide valuable information in cases of rape and questioned paternity, and they allow for the genetic identification of male lineages. The present study validated a Y-STR 10-plex on the ABI PRISM® 3100 Genetic Analyzer for use in forensic and paternity laboratories at Orchid Cellmark. The 10-plex uses primer sets that reduce the lengths of the PCR amplicons, thereby making them more applicable in the analysis of degraded samples encountered in forensic casework. Following optimization of the polymerase chain reaction, father-son pairs were analyzed to ensure that each pair generated identical haplotypes. This study demonstrated that the 10-plex is sensitive to 0.125 ng of input DNA and that female samples mixed with male samples did not interfere with Y-STR haplotyping. In a sample of 525 males, there were three instances of locus multiplication, two at DYS19 and one at DYS435. Overall haplotype diversity was 0.996, suggesting that the 10-plex can effectively distinguish among male lineages. A larger multiplex, HaploSTaR-17, is currently in development. The HaploSTaR-17 multiplex analyzes 17 markers on the Y-chromosome, including all European minimal and U.S. haplotype loci. The HaploSTaR-17 will provide an increased discrimination among male lineages.