

Rapid and Efficient Stain Evaluation by Means of Y-Chromosome STRs

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Most violent crimes are perpetrated by males. Accordingly, male specific genetic markers may provide a powerful tool for gender determination or for confirming the presence of male specific components in a stain sample. Previous approaches such as that based in the detection of a Hae III monomorphic fragment of 3.5 Kb by RFLP and probing with Y-specific probes or those based in PCR amplification of the amelogenin gene only provide information about male contribution. Since 1992, Y-specific polymorphic STRs became available. The first and most thoroughly investigated Y microsatellite was formerly called Y27H39 (DYS19 in modern nomenclature), then a collection of such markers were validated for forensic applications probing to be robust markers for evidentiary material investigation. A set of five Y-STRs (e.g. *DYS19*, *DYS390*, *DYS391*, *DYS392*, and *DYS393*) was chosen for to be amplified in multiplex reactions. Validation studies allowed to obtain:

1. Unbiased gender determination,
2. Valuable information for male identification,
3. Unbiased identification of heterosexual rapists, and
4. Increased sample economy.

Due to the lack of recombination of the Y-chromosome region that harbors these STR haplotypes are not individual male-specific but patrilineage-specific. It might represent a restriction, however supplementing its use with autosomal STRs can efficiently circumvent it. The aim of this work is to present a comparative study of the over 300 cases in which Y-STRs were employed in paternity testing and forensic casework.