SIMPLIFIED TYPING OF THE Y CHROMOSOME MINISATELLITE MSY 1

Mindy Banton[1], Ashley Hall[1], and Jack Ballantyne[1, 2]
[1]Department of Chemistry, University of Central Florida, Orlando, FL
[2]National Center for Forensic Sciences (NCFS), University of Central Florida, Orlando, FL

The most variable locus known on the Y-chromosome is the minisatellite locus MSY1 (DYF155S1) that consists of a variable number of tandem repeats of an A-T 25bp core sequence [1]. Allelic variation exists at this locus not only in the lengths of alleles but also in the precise sequence of the core unit. Allele lengths ranged from ~1200-2800 bp. The original report described the use of minisatellite variant repeat (MVR) analysis to discern four different types of repeat structure. Each allele is characterized by an MVR code, which is the precise linear arrangement of the four different repeat structures.

The MVR method as published is relatively complicated and labor intensive requiring the excision of bands out of gels and the use of radioactivity to type the sample. We have adopted a simplified approach to initially characterize the allelic variation due to length differences only. Briefly, the locus is amplified using a quasi-long distance PCR protocol followed by size fractionation on agarose gels and subsequent detection with the sensitive unsymmetrical cyanine dye, SYBR Gold. At least 8 alleles can be successfully differentiated by this method (ranging in length form 1400-2200 bp) and the results of a population study describing the allele frequencies and discriminatory power (DP) will be presented. We are in the process of developing an allelic ladder to aid in the typing process, and our efforts in this regard will be described.

We envision that the additional discrimination afforded by MVR typing of the MSY1 locus could be a useful addition to the Y-STR panels currently employed. The simplified typing protocol described in the present work could be used as an initial screen to include or exclude individuals as potential donors of a body fluid stain. If an individual were included as a donor only then would a more technically demanding MVR protocol be employed. Hence, it would also be advantageous to develop a modified MVR analysis method more applicable to routine forensic use. To this end, we have obtained encouraging preliminary data employing the use of dye labeled sub-unit specific primers and detection on the ABI310 capillary electrophoresis platform.

[1] Jobling, Bouzekri and Taylor. Hypervariable digital DNA codes for human paternal lineages: MVR-PCR at the Y-specific minsatellite, MSY1 (DYF1551S1). Hum. Mol. Genet. (1998) 7 643-653