AN EVALUATION OF ADDITIONAL Y-STR LOCI IN THE POWERPLEX Y-23 KIT

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Chromosome Y-STR testing has found a useful niche in population genetics studies, historical investigations and forensic applications. For forensic investigations, Y-STRs can be especially useful for DNA mixture samples where low level male DNA is mixed in a high female DNA background. Large databases from the 17 markers of the Y-Filer STR kit (1) are available for the forensic community and provide relatively high discrimination among unrelated individuals with a discrimination capacity greater than 97% (NIST, unpublished data).

One limitation of Y-STR testing is the haploid nature of the Y-chromosome: a match between the evidence and the accused is evaluated in terms of how frequently the haplotype is observed in a relevant database. For common Y-STR haplotypes, additional markers can be useful for additional discrimination (2).

The PowerPlex®Y23 (PPY-23) kit was recently introduced to the forensic community and provides an additional 6 markers (DYS576, DYS481, DYS549, DYS533, DYS570, and DYS643) in addition to the 17 markers found in Y-Filer. We have evaluated the PPY-23 using a set of over 600 NIST population samples representing three US groups: Caucasian, African American, and Hispanics. In addition, nearly 400 Father-Son samples among U.S. Caucasian, African American, Asian and Hispanics were also evaluated with PPY-23 to characterize mutation rates. Finally, a concordance check was performed on all of the samples which were previously typed with Y-Filer. Here we will present a summary of the kit performance, population genetic parameters, and mutation rates for the new markers in the PPY-23 kit.

References:

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2. Decker, A.E., Kline, M.C., Vallone, P.M., Butler, J.M. (2007) The impact of additional Y-STR loci on resolving common haplotypes and closely related individuals. Forensic Sci Int Genet. 1:215-217. ⌘