STR CONCORDANCE STUDY USING TWINS AND TRIPLETS FROM MALAWI, AFRICA, AND THE UNITED STATES

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A Concordance Study Between the Ampf*l*STR Profiler Plus™ and Ampf*l*STR COfiler™ DNA typing system™ (Perkin Elmer Biosystems), and the *GenePrint*® PowerPlex™ 16 System (Promega Corporation) was carried out using samples from twins and triplets.

Advances in Polymerase Chain Reaction (PCR) technology now permit testing of limited quantities of DNA, thus yielding genetic information about individuals. The newer loci used for such studies are often short tandem repeats (STR), facilitating amplification even when DNA might be degraded or of limited quantity. Such testing can be used for gene mapping, diagnostics, paternity tests, and forensic identification.

The goal of this research was to determine if the current primer sets, *GenePrint®* PowerPlex™ 16 System and the Ampf*l*STR Profiler Plus™ and Ampf*l*STR COfiler™ DNA typing system™ from the two commercially available manufacturers, Promega Corporation and Perkin-Elmer Biosystems respectively, produce concordant results. Since these two kits use different primer sets, there was a possibility that this might lead to allelic dropout when using one kit and not the other.

To test if results were consistent, 16 sets of twins from Malawi, Africa, 5 sets of Caucasian twins and two sets of triplets from the United States were examined to find identical (common genome) versus fraternal (sharing at least 50% of the genome) twins. Whole blood spotted as dried blood spots on filter paper were available from the African twin pairs and buccal samples from the twins and triplets from the United States were collected. All samples were extracted using organic extraction. The quantity of extracted DNA was determined by using the slot blot hybridization method using the Perkin Elmer QuantiBlot® kit.

PCR multiplex amplification was performed using the Ampf*l*STR Profiler Plus™ and Ampf*l*STR COfiler™ kits (Perkin Elmer) following the manufacturer's recommended protocol. Thirteen Short Tandem Repeat (STR) loci and the Amelogenin locus were detected using the two kits and two separate reactions.

Fifteen STR loci and the Amelogenin locus co-amplified using the three-color detection system provided by the *GenePrint*® PowerPlex™ 16 system. All sixteen loci, using three different dyes, namely fluorescein (FL), TMR, and JOE were amplified simultaneously in a single tube in the Perkin-Elmer GeneAmp® 9700 thermal cycler. All loci from the three kits were detected using the ABI Prism® 310 Genetic Analyzer.

Amplified STR alleles were separated by capillary electrophoresis which is capable of resolving amplification products varying in size by a single base pair. This allows for accurate allele identification and sizing. All alleles were detected and called correctly, using the two separate systems. The results of the STR and Amelogenin locus typing using these two kits on the same sample pairs were concordant. These results indicate that either kit may be used to provide the genetic identification.