PERFORMANCE EVALUATION OF THE AMPF/STR® PROFILER PLUS™ AND COFILER™ TYPING KITS USING AND ABI 310 GENETIC ANALYZER

Ed Buse, Jeanne C. Putinier, John Hartmann, May Hong and Amy Yap
Orange County Sheriff-Coroner Department, Santa Ana, CA

Short tandem repeat (STR) loci are currently in wide use for forensic identification and paternity testing. Two commercial multiplex typing kits, AmpF/STR® Profiler Plus™ and COfiler™ (Applied Biosystems, Inc.), together co-amplify 13 polymorphic STR loci (D5S1358, vWA, FGA, D16S539, D8S1179, D21S51, TH01, TPOX, CSF1PO, D5S818, D13S317, and D7S820) and amelogenin (a sex marker). Forensic laboratories use these kits to generate DNA profiles from crime scene samples. The associated PCR products can be simultaneously separated and detected by capillary electrophoresis using an ABI PRISM® 310 Genetic Analyzer.

Studies were designed to address internal (on-site) validation of the instrument, software and typing kits. Some additional developmental work was also performed. Specifically, the studies assessed the performance of the instrument (sensitivity, resolution, precision, and binning) and the typing (stutter, peak ratios, mixtures, specificity, and amplification of non-probative and environmentally-insulted samples).

Amplification conditions were found to be robust and the primer sets shown to be specific to human DNA, although allelic PCR products were detected in some primates at several loci. Stutter percentages and peak height ratios fell within the limits published by the manufacturer and the laboratories. We also found that the instrument can consistently resolve fragments differing in length by 1 base and that a ±0.5 base bin used by the Genotyper® software is appropriate for making accurate allele calls. Correct allele calls were obtained from non-probative and simulated case samples, as well as samples exposed to outdoor environmental conditions. The results support the conclusion that DNA extracted from biological samples routinely encountered in the forensic laboratory can be reliably analyzed with AmpF/STR® Profiler Plus™ and COfiler™ followed by capillary electrophoresis.