EVALUATION OF PLEXOR HY QUANTIFICATION DATA AND CASEWORK APPLICATION CHALLENGES

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Forensic DNA testing laboratories face numerous challenges during casework. Limited and/or degraded/inhibited biological samples involving male and female contributors are often encountered as evidence samples; therefore, the ability to detect and quantify human and male DNA that will result in the subsequent generation of interpretable downstream STR typing results is a critical need within the laboratory. The Promega Plexor HY Kit is a Real-Time PCR system used for quantification of total human (autosomal) and human male (Y) DNA within a sample. This system uses multi-copy probes for targeting both human and male DNA in a single sample, allowing for increased sensitivity in DNA detection but increased challenges in male/female mixture analysis and downstream STR analysis. Plexor HY has been online at the US Army Criminal Investigation Laboratory (USACIL) since March 2012 after performing extensive validation studies including precision, reproducibility, comparative (including Quantifiler Duo), sensitivity, stochastic, mixture, contamination and known and non-probative samples to include oral swabs, bloodstains and semen stains. Supplemental studies utilizing the auto/Y ratio and standard curve metrics were performed in order to further optimize downstream STR results. Case review of Plexor HY and STR data involving over 700 samples in conjunction with a study involving 104 male and female participants was conducted for the purpose of assessing optimal template amounts for amplification with Identifiler Plus. Finally, a study was conducted to estimate a quantification value for both autosomal and Y DNA at which a sample could reliably be estimated not to produce a downstream interpretable STR result.

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