COMPARISON OF THREE QUANTIFICATION METHODS ON QIAGEN'S ROTOR-GENE Q FOR DNA CASEWORK

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The QPCR-1 system for quantitation has been in use at the DuPage County Forensic Science Center since 2007. It is a duplex assay that simultaneously tests for total human and male-specific DNA and is based upon research by Nicklas and Buel. Since that time, two kits for quantitation of human and male DNA have been developmentally validated for forensic casework that are reportedly as robust and sensitive as QPCR-1 and can be used with Qiagen's Rotor-Gene Q. These kits are the Investigator Quantiplex HYres kit from Qiagen and the Plexor HY system from Promega. These kits were examined and compared to QPCR-1 to determine which system is the most cost-effective, efficient, robust, and sensitive in our laboratory.

Based on the samples run in this validation including NIST SRM 2372 components A, B, and C, and blood, buccal, and touch samples, the Plexor HY kit is the most sensitive for human DNA, but the Quantiplex HYres kit is most sensitive for male DNA. The Quantiplex HYres kit showed the highest degree of reproducibility in the resulting RFU values when samples were amplified using Identifiler Plus and PowerPlex Y23. The Quantiplex HYres kit is also the least expensive per reaction and has the shortest run time on the Rotor-Gene Q.