A Streamlined Approach to STR Analysis

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Increased reliance on DNA technology by law enforcement and other branches of the criminal justice community has created a tremendous demand on the limited resources of DNA laboratories. In response to these demands and developing technologies, DNA laboratories have reduced manual protocols for many of the steps involved in DNA analysis. Working toward the goal of streamling protocols and creating a more efficient DNA analysis system our laboratory evaluated and subsequently validated the Qiagen BioRobot® M48 for extraction, the ABI Prism® 7000 Sequence Detection System /Quantifiler™ Human Kit for quantitation, and ABI Identifiler® Kit for amplification. Our evaluation of these combined technologies revealed numerous advantages over the previously utilized techniques of manual extraction, Quantiblot® quantification, and the two amplification kit system of Profiler Plus® and Cofiler®. This poster presentation will address these advantages, from a better quality product and using less sample, to an increased efficiency in terms of analyst time. To automate the extraction procedure we chose to validate the BioRobot® M48 made by Qiagen®. This unit uses magnetic bead chemistry to isolate DNA from samples. This varied from the manual extraction procedures previously used at our lab including Chelex®, Qiagen® manual procedures and differential extractions. The instrument is capable of extracting a wide variety of biological samples in an efficient manner, with a design platform that prevents contamination issues. The quality of the extract product proved to be very high. To increase the efficiency of the quantitation step our laboratory chose to validate the real time PCR method using the ABI Prism® 7000 Sequence Detection System in conjunction with the ABI Quantifiler™ Human Kit. This system has many advantages over the Quantiblot® procedure previously utilized. Some of the advantages of this system are; a wider range of detection, a more accurate assessment of DNA quantity, less sample consumption, and minimal amount of analyst hands-on time. The final component of this project consisted of validating a one amplification, one capillary electrophoresis run system for detection of the 13 core loci. Our laboratory previously used the ABI Profiler Plus® and Cofiler® kits which required two separate amplifications to obtain results on the 13 core loci. We chose the ABI Identifiler® kit which amplifies the 13 core loci plus an additional two STR loci. The one amplification kit not only conserves sample but also saves a tremendous amount of analyst time. Since incorporating this analytical scheme we have observed several advantages over the previous technologies. The ease of use of each procedure allows for definite timesavings at each step. This time savings allows for analysts to invest more time into examining evidence, working on the interpretation of evidence, writing reports, reviewing reports, etc. In addition, each new procedure has allowed us to be more efficient with sample consumption while producing a higher quality product.