Detection of the *GenePrint*® PowerPlex™ 1.1 System Using a Xenon Lamp-Excited Image Analyzer

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There is an increasing trend towards the use of short tandem repeat (STR) loci for human identification and paternity testing. An important factor in this trend is the widespread availability of multiplex STR systems from commercial vendors. Many of these systems use fluorescence-based detection techniques. The *GenePrint*® PowerPlex™ System was formulated for detection instruments which use lasers as an excitation source. However, an alternate excitation source can also be used successfully.

The Genomyx SC™ Fluorescent Scanner (which uses a xenon lamp as its excitation source) was evaluated for its capability to detect amplification products of the *GenePrint*® PowerPlex™ 1.1 System. The detection properties evaluated were sensitivity and fidelity. Sensitivity was measured using amplicons of serially diluted K562 genomic DNA (10 ng to 0.156 ng). Complete allele profiles were consistently obtained using less than the 1-2 ng of template DNA recommended by the manufacturer. Detection fidelity was verified by correctly typing the NIST SRM 2391 DNA samples as well as samples from an in-house proficiency set.

In addition to evaluations of detection sensitivity and fidelity, experiments were performed to determine methods of reducing or eliminating "laddering," a term for a phenomenon unique to this scanner design. Laddering appears as a duplication of a partial or complete allele ladder on top of some sample images, making sample allele identification more difficult or impossible. This phenomenon occurred most frequently with the GammaSTR™ loci. It was determined that decreasing the amount of sample amplicon loaded into the detection gel would virtually eliminate laddering.