B125 An Improved Capillary Electrophoresis (CE) System for Human Identification

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After attending this presentation, attendees will better understand the challenges to implementing new forensic technologies such as Next Generation Sequencing (NGS) and rapid DNA, will understand why CE will remain the method of choice for forensic DNA laboratories, and will learn about the advantages of using eight-color Short Tandem Repeat (STR) multiplexes and a CE system in the forensics workflow, such as the use of more mini-STRs to provide improved results with degraded samples, more usable data from inhibited samples, and improved overall efficiencies.

This presentation will impact the forensic science community by suggesting improvements that eight-color STR multiplexes will offer to the forensic DNA workflow, including more usable data from inhibited samples, enhanced results when degradation is present, and improved overall efficiencies.

Rapid DNA and NGS hold great promise for the forensic community to extend the reach and depth of DNA typing. While both of these approaches are powerful complements to traditional CE STR typing, neither approach is likely to replace CE analysis for the majority of forensic samples in the near future. CE will very likely remain the "workhorse" of forensic DNA typing. As such, improving upon CE technology is critical for the advancement of forensic DNA typing.

The Spectrum CE System offers increased spectral capacity by allowing the continued analysis of existing four-, five- and six-color multiplexes, as well as a new family of eight-color multiplex STR systems. With the inclusion of additional colors, more loci can be designed in the smaller size ranges. This will increase a laboratory's chance of success with degraded samples, a situation that forensic laboratories often encounter with their casework samples. Additionally, improved multiplex configurations will provide more complete and informative results with inhibited casework samples, which are quite commonly processed in forensic casework laboratories. The narrower range of product amplicon sizes will enable more consistent results with variable "direct amplification" samples. This CE system also offers increased workflow flexibility with four continuously accessible plate positions, and allows laboratories to process more samples at one time than is currently possible with existing CE instrumentation. This design improves laboratory efficiency by reducing scheduling conflicts, increasing overnight/weekend throughput, and reducing the number of instruments needed in the laboratory. Lastly, the system's analysis software, which has been specifically intended for human identification and forensics applications, offers several benefits, including time savings, ease of use**,** accuracy, and additional integrated post-genotyping applications.

Capillary Electrophoresis, DNA Typing, Eight-Color STR Multiplex