B203 The Hamilton Star: A New Platform for DNA Analysis

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After attending this presentation, attendees will understand the advantages and disadvantages of use of different automation systems for the laboratory processes required to generate STR profiles from databank or casework evidence.

This presentation will impact the forensic community and/or humanity by demonstrating how those who follow the advice and protocols presented will increase their ability to solve large numbers of crimes quickly by generating DNA profiles for database searching and casework.

Over the past several years, DNA typing in the forensic community has flourished. With new laws being passed, government funding has created an abundance of samples and an increasing variety of sample types to be processed. New technology and new funding has stimulated public laboratories to re-open old cases and to work on backlogs and no- suspect cases. Nowhere are the effects of these changes felt more intensely than in private laboratories that assist the public laboratories, each with their own specialized needs and requirements. This variety of sample materials and the increase in sample numbers to the hundreds of thousands has demanded improvements in the efficiency of sample processing.

New bottlenecks in sample processing occur with every new process improvement. In these laboratories, a LIM system is being expanded to limit paperwork and to assist with sample tracking, freeing up some analyst time, and preventing QA incidents. Expert systems are being tuned and upgraded to eliminate additional analysis time. When the combination of these two systems is fully implemented, the new bottleneck will be the actual processing of the samples in the lab.

Many of the forensic processes currently used are easily automated with robotic liquid handlers. While Bode is not new to the field of automation, the need to incorporate new technology to increase both sample throughput and the variety of sample types requiring automation, while decreasing the requirement for analyst time spent, has become evident.

Several automated systems were evaluated with respect to pre- amplification processes such as DNA extraction, quantification, normalization, amplification, and cherry picking. The Hamilton Star system was selected because it includes high-throughput capabilities, cross-contamination prevention, barcode tracking capabilities, excellent precision, and significant process flexibility. This choice also supports the need for adaptable software to process samples according to many different client specifications regarding plate maps, sample types, sample numbers per plate, and various STR multiplex kit selections with a minimum of re-programming.

Development and validation of automated processes for DNA IQ extraction, DNA normalization of extract concentrations, and PCR set up protocols have been developed. The advantages that the Hamilton instrument brings to these processes and the improvements in laboratory efficiency provide a way to meet the increasing demands for DNA profiling in the forensics community.

Automation, STR Amplification, DNA Extraction

 ** Presenting Author*