B160 Validation of the BIOMEK 3000 for DNA Extraction, Quantitation, and PCR Set-Up

Mark Powell, MS, Rhonda Clark, PhD, Kevin J. MacMillan, MS, Lisa Gefrides, MS, and Roger Kahn, PhD, Harris County Medical Examiner's Office, 1885 Old Spanish Trail, Houston, TX 77054*

Attendance at this presentation will impart upon attendees a roadmap for validation of automated systems for DNA extraction, quantitation set-up, PCR dilution, and PCR set-up. Attendees will understand the substantial time savings available by simply adopting a novel approach to validation of automation systems. By an initial focus on the validation of post-extraction tasks such as quantitation set-up, PCR dilution and PCR set-up rather than the typical automated extraction validation, users will be able to implement use of their automation tools in casework and also use the robot itself to aid in the complex extraction validation.

This presentation will have an immediate impact on the forensic community by changing the focus of automation away from the complicated and time-consuming task of extraction validation to a more efficient model of validation of post-extraction tasks. Automation users will be able to implement automation for casework in a far more timely fashion and allow their robotic systems to aid in further validation of extraction.

Of interest to attendees and in particular BIOMEK 3000 users, a step by step analysis of the validation procedure will be presented. From initial programming of the instrument to the complicated task of optimizing robot extraction, this presentation will provide attendees an opportunity to learn some valuable time-saving lessons prior to embarking on their own path to automation.

Over the course of validation the Harris County Medical Examiner's (HCME) Office overcame some significant challenges in order to bring the BIOMEK 3000 online for casework. The first challenge was to optimize the robot for microcentrifuge tubes instead of the standard 96 well trays. The solutions to this challenge will be of particular interest to casework operations as tubes tend to be the norm for storage of extract product, as is the case at HCME. This challenge was overcome and tubes are the basis of all the BIOMEK programming.

The validation results of Quantifiler set-up, PCR dilution preparation (normalization) and Profiler Plus and COfiler amplification set-up will be discussed, highlighting the time and money savings afforded compared to the manual equivalent. By focusing on automating these methods, the HCME was able to begin using two Biomek 3000s for casework in as little as three months.

The more labor intensive validation of the Biomek 3000 for automated extraction will also be detailed in this presentation. A comprehensive validation will be outlined as well as comparison of two commercially available extraction kits (Promega DNA IQ and Invitrogen Chargeswitch) to current casework manual methods (Chelex 100 and Phenol/Chloroform).

Along with the challenges presented by validation of robotic systems for casework, this presentation will detail some of the post- validation pitfalls that exist, including maintaining calibration of the systems in manner suitable to pass an ISO audit.

Automation, Extraction, PCR Set-Up

 ** Presenting Author*