B3 DNA Event Tracking Assists Troubleshooting

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The goal of this presentation is to demonstrate how computer tracking and automation of forensic DNA analysis steps can assist in data interpre- tation and reduce forensic lab errors.

In addition to eliminating paper copies, documenting audit trail, and reduced man-hours in record keeping, the two major impacts are first to track forensic DNA analysis and interpretation based on techniques derived from proven computer science methodology but not simply utilizing sub- jective human judgment as the primary instrumentality. Second, by the aid of computer tracking records, prevent, detect, and eliminate both forensic DNA scientists' inadvertent and willful lab errors. The outcome of such simple normal tracking technique is to eliminate the false positive errors without compromising the positive identifications using DNA evidence.

DNA evidence has been used in hundreds of thousands of court cases in the US, not only for conviction, but also exoneration. To further facil- itate the application of this powerful tool, available resources need to be used in an efficient, equitable manner. Software can assist in managing the workload by automating the laboratory process, thereby producing con- sistent data interpretation, reducing lab errors and improving repro- ducibility and robustness.

The increasing use of DNA evidence as part of crime scene investiga- tions over the past 15 years has produced a substantial growth in the number of DNA results generated. Electronic record keeping, sample portion tracking, batch logging and total event capture are some of the steps that enable analysts and the courts to remain confident of this increasing torrent of lab results. Software can assist analysts by structuring the process to manage standard operative protocols (SOPs), assist with proper result attribution, and document all events related to a result. Minimizing manual steps in data logging, along with capture and analysis of DNA sample batch information (including unique QC sample information), including results, can help to avert the serious consequences associated with lab process failures.

The Crime Lab of the Baltimore City Police Department (BPD) designed a Laboratory Information Management System (LIMS) to assist in tracking and detecting lab events in the handling and analysis of DNA samples. Sample tracking, SOPs, Reagent Inventory, Equipment Monitoring, Maintenance, Repair, Calibration, Batch worksheets, Result Capture and Reporting are all managed within the LIMS. Mock casework examples will be used to demonstrate these features, and illustrate how they combine to ease case management and troubleshooting. Moreover, it will be demonstrated how electronic capture of the regular monitoring of test outcomes with standards and controls allows recognition of gradually emerging problems with reagents, equipment, controls, standards, and overall procedures that might otherwise be overlooked.

Quality Controls, QC Samples, Computer Tracking

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