

B49 Internal Validation of the Applied Biosystems[™] RapidHIT[™] ID System Using ACE and INTEL Cartridges

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Learning Overview: After attending this presentation, attendees will have an understanding of the studies performed and results from the validation of the Applied BiosystemsTM RapidHITTM ID System for processing both reference standards and crime scene evidence for forensic casework.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees that this validation will provide a budding resource that can process DNA samples more expediently than conventional processing methods.

Rapid DNA is the accelerated processing of crime scene or reference samples to develop a DNA profile without human intervention in less than two hours. The addition of Rapid DNA technology to a DNA laboratory can significantly advance the workflow, as conventional DNA processing currently requires a minimum of two days to complete, from sample intake through data analysis.

Other areas in law enforcement, such as booking stations, can also benefit from integrating this technology. As the implementation of Rapid DNA expands, the development of a Rapid DNA infrastructure among agencies is critical to ensure the responsible handling and processing of samples for DNA analysis. An established Rapid DNA network will not only continue to supply the CODIS database with DNA profiles, but also expedite the processing of time-sensitive DNA samples and casework.

The Applied BiosystemsTM RapidHITTM ID System is a fully automated instrument capable of taking human DNA samples from sample to profile in approximately 90 minutes.¹ The RapidHITTM ID System utilizes Short Tandem Repeat (STR) -based identification and review through an incorporated expert system. The instrument accepts two types of sample cartridges: the ACE Cartridge, which is used for single-source reference samples, and the INTEL Cartridge, which is designed for lower template, crime scene evidence samples. Both cartridges use the GlobalFilerTM Express STR typing chemistry for amplification.

The integrated software, RapidLINKTM v1.0, is capable of producing electropherogram results for analyst review using GeneMarkerTM HID STR Human Identity Software.² The RapidLINKTM software has the capability to link multiple RapidHITTM ID systems across a shared network, allowing multiple data sites to be managed from one location. This network of instruments allows the user to share and review results in real time and equips the user with a databasing function for samples that are not eligible for CODIS upload.

The validation study conducted for the RapidHITTM ID System consisted of a contamination assessment, sensitivity, reproducibility, repeatability, National Institute of Standards and Technology (NIST) traceability, mixtures, and known/mock sample types for both the ACE and INTEL Cartridges. All of the validation samples were processed with the accredited laboratory's conventional DNA analysis methods and compared for consistency.

After assessing the RapidHIT^M ID analysis results in tandem with the results generated from traditional forensic DNA methods, it was determined that the instrument is capable of obtaining concordant DNA profiles. Therefore it was concluded that the RapidHIT^M ID System is a reliable tool for the expeditious processing of reference and crime scene samples, allowing for quick inclusions and exclusions with the potential to further criminal investigations.

Reference(s):

- ^{1.} Applied BiosystemsTM. RapidHITTM ID System v1.0. *User Guide*. November 2018.
- ^{2.} Applied Biosystems[™]. RapidLINK[™] Software v1.0. User Guide. November 2018.

Rapid DNA, RapidHIT[™] ID, Validation