



B46 An Internal Validation of the ANDE® 6C Rapid DNA Analysis System for Forensic Samples

Krista A. Herrera, BS*, Huntington, WV 25703; Brandy L. Plean, MS, Palm Beach County Sheriff's Office, West Palm Beach, FL 33406-3001; Ashley N. Henderson, BS, Barboursville, WV 25504-1450; Amy McGuckian, MSFS, Palm Beach County Sheriff's Office, West Palm Beach, FL 33406-3001; Kelly Beatty, MSFS, Marshall University Forensic Science Center, Huntington, WV 25701; Julie Conover Sikorsky, MS, Palm Beach County Sheriff's Office, West Palm Beach, FL 33406

Learning Overview: After attending this presentation, attendees will understand the results of the internal validation studies and suitable sample types for the ANDE® 6C Rapid DNA Analysis System.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing a thorough validation of a commercially available Rapid DNA system so laboratories can better evaluate their options when considering the implementation of this technology.

In forensic DNA analysis, highly variable regions known as short tandem repeats are tested to generate a DNA profile. The traditional processing of DNA samples is performed in a series of five steps: extraction, quantification, amplification, capillary electrophoresis, and data analysis. While there have been some technological advancements, the traditional DNA lab process can take two or more days to complete. The implementation of Rapid DNA technology in the forensic DNA laboratory has the potential to significantly reduce the time needed to process and generate a DNA profile.

Rapid DNA is the term used to describe the generation of a DNA profile, without human intervention, in less than two hours.¹ Rapid DNA is being incorporated into law enforcement booking stations as well as accredited forensic DNA laboratories.¹ Other applications that can benefit from the use of Rapid DNA include: human trafficking, disaster victim identification, immigration, military applications, and homeland security.² Although only recently accepted by the Combined DNA Index System (CODIS) in 2018, Rapid DNA instrumentation first became available as a commercial product in the early 2010s. Due to the wide availability of Rapid DNA instrumentation and the multitude of potential applications, there is a need for forensic DNA laboratories to develop a Rapid DNA infrastructure to ensure proper handling and processing of forensic DNA samples for CODIS entry. A strong foundation will not only continue to expand the CODIS database, but potentially lead to the generation of investigative leads in a timelier manner.

An internal validation of the ANDE® 6C Rapid DNA Analysis System was performed at the Palm Beach County Sheriff's Office to demonstrate reliability and robustness of the instrument. The ANDE® 6C Rapid DNA Analysis System is a fully automated instrument, capable of generating a DNA profile in less than two hours with minimal human intervention. The system uses the FlexPlex27 multiplex assay that includes 23 autosomal loci (D3S1358, D1S1656, D2S441, D10S1248, D13S317, Penta E, D16S539, D18S51, D2S1338, CSF1PO, D6S1043, TH01, vWA, D21S11, D7S820, D5S818, TPOX, D8S1179, D12S391, D19S433, SE33, D22S1045, and FGA), three Y-chromosomal loci (DYS391, DYS576, and DYS570), and amelogenin.³ The ANDE® 6C Rapid DNA Analysis System is approved for use at the National DNA Index System (NDIS) by an accredited forensic DNA laboratory for reference sample buccal swabs.¹

A series of studies were conducted on the Arrestee Chip (A-Chip) to define the performance and limitations of the instrument by evaluating contamination, sensitivity, reproducibility, repeatability, National Institute of Standards and Technology (NIST) traceability, mixtures, and known/mock sample types. All samples run on the ANDE® were processed via the laboratory's conventional typing methods and compared for concordance. Samples processed on the A-Chip include buccal samples from a variety of donors, collected at different timeframes, ranging from fresh to approximately eight years of age.

The results indicate that this technology has the potential to expedite the processing of select DNA samples resulting in a faster turnaround of preliminary associations to aid investigations.

Reference(s):

1. U.S. Department of Justice, Federal Bureau of Investigation. *Rapid DNA: General Information*. Accessed July 2019. <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/rapid-dna>.
2. "Where can ANDE be deployed?" Applications. ANDE®, accessed July 2019, <https://www.ande.com/law-enforcement/>.
3. ANDE® 6C Rapid DNA Analysis System Product User Manual. Part Number A0120001014 Rev E, February 2018.

ANDE®, Rapid DNA, Validation