Storage, Preservation, and Retention

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Background

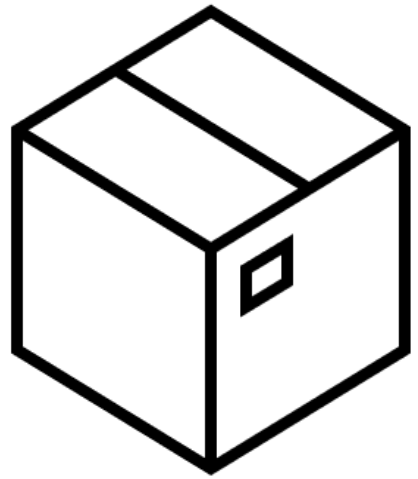
In October 2023, Towson University was awarded a cooperative agreement from NIST to develop a standardized DNA training curriculum for the United States that addresses the components in ANSI/ASB Standard 115, *Standards for Training in Forensic Short Tandem Repeat Typing Methods Using Amplification, DNA Separation, and Allele Detection*. 2020. 1st Ed.

This presentation addresses the knowledge-based portion of the training program and covers the topic outlined in 4.2.3h in ANSI/ASB Standard 115.

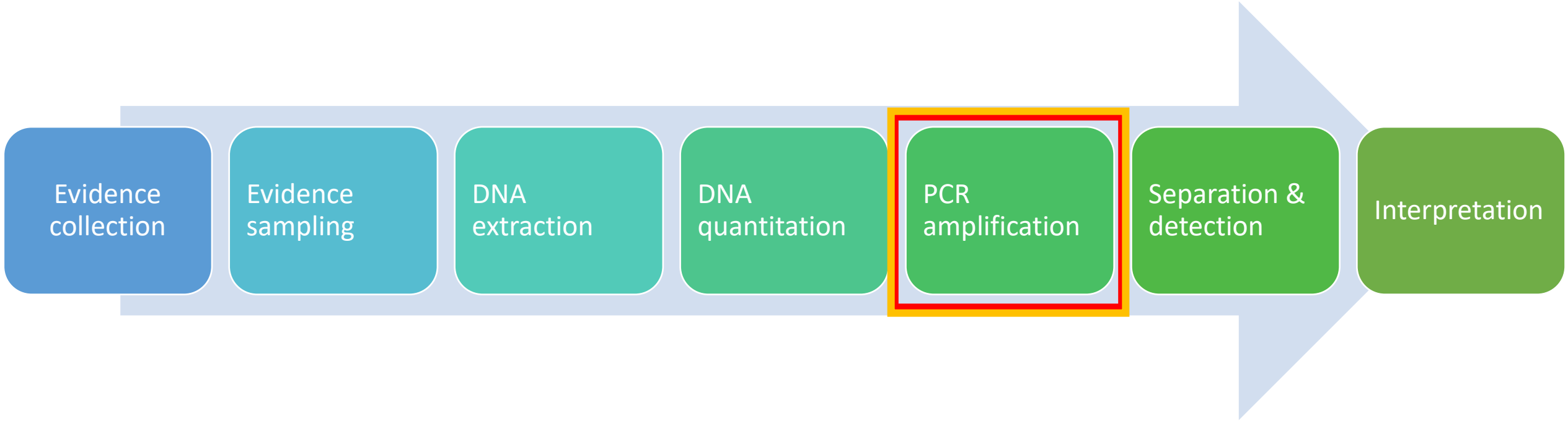
Learning Objectives

This material will provide trainees with an understanding of:

- The storage, preservation, and retention of amplified DNA product according to laboratory policy.



From Crime Scene to the Lab



DNA Extract & Amplified Product Storage and Retention

- **Separate** storage areas shall exist for reagents, consumables, DNA extracts, and PCR amplified products.
- Important to properly handle, store and retain DNA extracts as this DNA may be the only source of material for future testing.
- Historically, extracted DNA has been stored in water, TE buffer, or in a preservative and then refrigerated (short term) or frozen (long term).
- Stability and recovery of DNA extracts is dependent on the quantity and quality of the extracted DNA prior to storage as well as the type of tube and temperature used for storage.

Study Questions

- How and where should evidence and amplified DNA be stored?
- How should extracted DNA be stored?
- How can extracted DNA be preserved?
- How should amplified DNA product be preserved and stored?
- When must samples and evidence be retained and when can it be discarded?

Extracted DNA Storage and Preservation

- DNA extracts may be assigned their own sample numbers and barcodes or be considered work product for consumption in testing
- Preservative added to protect the DNA integrity or eluted as lab protocol indicates
- Extracted DNA samples are stored at -4 °C or -20 °C in the pre-PCR area or discarded following testing and case resolution (if indicated)
- Label with 4-digit code or barcode
- Manage location in LIMS via barcoded storage boxes

https://micronic.com/wp-content/uploads/2019/09/090919-41-v.1-1024x1024.jpg

Amplified DNA PCR
Product Storage and Retention

- Applicable reagents, consumables, and PCR product shall be stored separately in post-PCR areas.
- May be assigned a sample number or barcode or be discarded following testing and analysis based on lab SOP
- Store amplified samples at 4°C or –20 or –80 °C, as designated, in the designated post-amp space
- Retain samples until electrophoresis results are confirmed; discard only if no repeat is needed.

Evidence Retention

- Evidence is stored until the case clears court or as required by law and laboratory policy
- Store biological evidence in sealed, labeled breathable paper bags or in containers with desiccant at room temperature conditions for long periods
- Homicide case evidence may be stored indefinitely until the parties are deceased
- Evidence should be retained until final disposition to owner or destruction
- Final disposition should be documented

https://www.southwestsolutions.com/wp-content/uploads/2010/09/PoorlyOrganizedEvidence-resized-600.png

Suggested Readings

- Ballou, S. et al. The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers, NISTIR 7928, April 2013. http://dx.doi.org/10.6028/NIST.IR.7928
- FBI, Quality Assurance Standards for DNA Databasing Laboratories, effective Sept. 1, 2011. https://ucr.fbi.gov/lab/biometric-analysis/codis/FBI%20Director%20Databasing%20Standards%20Revisions%20APPROVED%20and%20final%20effective%209-1-11.pdf
- FBI, Quality Assurance Standards for Forensic DNA Testing Laboratories, effective Sept. 1, 2011. https://ucr.fbi.gov/lab/biometric-analysis/codis/quality-assurance-standards-for-forensic-dna-testing-laboratories