A67 ALS Detection and Collection of Touch DNA From Porous and Nonporous Substrates

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After attending this presentation, attendees will clearly understand the advantages of using visual enhancement techniques for touch DNA on porous and nonporous substrates. Attendees will also learn about different DNA recovery techniques for touch DNA on porous and nonporous substrates.

This presentation will impact the forensic science community by providing forensic laboratories with the information to adopt or modify their current protocols for enhancement and DNA collection.

The analysis of touch DNA is now an extremely important tool for crime solving. However, there remains a lack of easily accessible screening tests that would allow for location and detection of inconspicuous (touch or contact) stains. Further, collection methods vary lab-to-lab and there is no clear consensus on what collection methods/devices work best with common touch or contact stain surfaces. The development of new detection methods would improve the efficiency of touch DNA sample processing by offsetting the high costs and labor time frequently associated with repeated testing from these types of stains. Therefore, the first goal of this study was to determine if visual enhancement of potential touch or contact areas using an alternate light source (ALS) would be a viable method for improving DNA yield and subsequent STR analysis. If successful, ALS methods could be beneficial as they would mitigate the undesired effects of collecting "blind" swabs without generating the potential negative effects often associated with chemical enhancement. Equally important for a successful DNA analysis is the collection method used to retrieve the touch DNA from a substrate. The standard collection methods used in most laboratories remain either the double-swab technique (using deionized water) or cuttings taken directly from the substrate itself. In this study, several collection methods were investigated to determine

which methods, if any, offer improved DNA yields and/or STR success.

In this study, three alternate light sources (UltraLite™ ALS combined with the Blue Merge Technology, KRIMESITE™ Imager, and Spectroline® short-wave UV lamp) were used in conjunction with four DNA collection methods (tape lift, gelatin lift, swab with ddH_2O, swab with 0.01% SDS, and cutting) to detect and collect touch DNA from a

variety of forensic-type substrates (porous and non-porous). For all samples, DNA was extracted with Qiagen QIAamp™ DNA Mini kit, quantified with Quantifiler™ Human DNA Quantitation kit, and amplified with AmpFlSTR® Identifiler® PCR Amplification kit. Results showed that the use of an alternate light source greatly improved the DNA yield and resulting STR profiles when compared to blind collections. Based on the DNA sources included in the study, a regular short-wave UV light (Spectroline) was found most suitable for porous substrates while the Krimesite™ Imager was most beneficial for nonporous substrates. Further, the double-swab technique with 0.01% SDS provided higher DNA yields than all other collection methods tested. Based on these results, these lights used along with the double-swab technique (with 0.01% SDS) are recommended for future use when attempting to detect, locate, and collect touch DNA material from forensic samples.

Touch DNA, ALS, DNA Recovery

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