A46 Direct Amplification of Low Copy Number DNA on Two Substrates

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After attending this presentation, attendees will have a better understanding of the potential of direct amplification when applied to low copy number DNA situations. Attendees will also be informed on the effect that porous and non-porous substrates have on direct amplification of LCN DNA.

This presentation will impact the forensic science community by exploring inexpensive methods of LCN DNA profile recovery through direct amplification. This presentation will also test whether direct amplification of LCN DNA can be done on both porous and non-porous substrates.

The successful production of short tandem repeat (STR) profiles from evidence samples is the goal of analysis in a forensic biology laboratory. In order to provide the best chance for successful amplification of STRs, investigators must maximize the amount of DNA that is recovered from evidence samples and is available for amplification. Although modifications can be made to the amplification and analysis parameters, these modifications do not always eliminate the problems associated with low copy number (LCN) DNA analysis. With all of the inherent problems in LCN DNA recovery and analysis, increasing the amount of DNA in the amplification reaction would be most beneficial. Since some DNA is lost in the process of extracting DNA from a substrate, eliminating the extraction step and adding the substrate directly to the amplification reaction might be more effective in producing full STR profiles.

In the past few years, direct PCR methods, which eliminate the extraction step, have been developed by several organizations. In direct PCR methods, the solid substrate containing DNA is added directly to the amplification reaction. The conventional extraction preparation is bypassed, thus shortening the time between collection and analysis, and minimizing sample loss and contamination.

In this research, DNA was amplified directly from a porous piece of regular white cotton cloth, a non-porous plastic credit card, and a swab of a non-porous plastic credit card. Small areas containing DNA were cut out and directly inserted into the amplification tube. The amount of DNA on all samples was controlled by using a quanititated solution of extracted DNA. For comparison, a second set of credit card and cloth samples were organically extracted. Additional sets of mock evidence samples were processed containing DNA from volunteers that had either touched the credit card or worn the cloth. All extractions were quantitated using Applied Biosystems Quantifiler Human DNA Quantification Kit. All samples were amplified using Applied Biosystems AmpFlSTR Identifiler PCR Amplification Kit.

LCN DNA, Direct Amplification, Cloth

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