



B6 Investigation of the Performance of the Promega PowerPlex® 16 System for Testing of Low Copy Number (LCN) STR DNA Samples

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After attending this presentation, attendees will be shown a number of DNA – STR profiles from the Promega PowerPlex® 16 system during validation of the system for Low Copy Number analysis.

This presentation will impact the forensic community and/or humanity by discussing some of the findings associated with low copy number analysis with the Promega PowerPlex® 16 system.

The International Commission on Missing Persons has setup a DNAled identification system in the former Yugoslavia. The initial phase of the identification effort utilized short tandem repeat (STR) analysis to match bone samples with family reference samples. The Promega PowerPlex® 16 System (PP16) has been highly successful for testing of bone samples even 10 – 12 years postmortem. However, for some bone samples the PP16 system was not able to amplify many loci using the standard 32 cycle PCR protocol. In most of the samples that failed testing using the PP16 system it has been shown that they contained less than 100 pg of DNA, as analyzed by the Applied Biosystems® Quantifiler™ system, as well as significant levels of PCR inhibitors.

A number of studies have shown that increasing the number of PCR cycles can yield more DNA STR data. With this increase in sensitivity it has also been shown that there is an increased risk of producing artifactual peaks, peak imbalances, and there is an increased risk of contamination. As a first step to try and obtain more STR data from the DNA extracts, with low levels of DNA recovered, the PP16 system was tested at increased cycles and optimized for low copy analysis on these extracts.

To study the effects of LCN analysis on the PP16 system various DNA samples, containing between 20 pg and 500 pg of DNA, were amplified between 32 and 36 cycles. The effects of the various levels of DNA were compared for the occurrence of stutters, artifacts, heterozygote balance and allelic drop out. The results from this study are compared to previously published data for the PP16 system as well as that of the Applied Biosystems® AmpF/STR® SGM Plus™ kit.

LCN, STR, DNA