A146 Effect of Inhibitors in STR Amplifications From Forensic Samples

Bruce R. McCord, PhD, Department of Chemistry, Florida International University, University Park, Miami, FL 33199; Silvia Zoppis, MD, Department of Legal Medicine, University of Rome "Sapienza", Viale Regina Elena 336, Rome 00161, ITALY; and Maribel E. Funes-Huacca, PhD, Florida International University, University Park 11200 SouthWest 8th South, Miami, FL 33199*

After attending this presentation, attendees will examine allele specific effects of PCR inhibition on STR and Y-STR amplifications and to correlate these data with results from real time PCR measurements.

This presentation will impact the forensic science community by demonstrating the effects of PCR inhibition on locus specific allele dropout by illustrating the ways real time PCR can be used to predict inhibitory effects.

All who use PCR are likely to be impacted by inhibitors at some time, but the wide range of forensic sample types and variety of sampling conditions encountered make forensic scientist particularly vulnerable. PCR inhibitors generally exert their effect through direct interaction with DNA or via interferences with thermostable DNA polymerases. The presence of inhibitors in samples has been the focus of much published literature. Common sample types known to contain inhibitors include blood, fabrics, tissues, bones, and soil.

Inhibitors can produce various effects on amplified DNA including peak balance problems, locus specific dropout, enhanced stutter, and poor sensitivity. The mechanisms may vary with type of inhibitor and sequence of amplicon. Therefore, it is important to understand concentration effects and mechanisms so that inhibition cannot be confused with degradation, dropout, and mixture effects.

STR amplifications were examined with two different commercial kits, STR and Y-STR. The effect of testing different inhibitors on the relative intensity of various alleles in the electropherograms was looked at in both amplifications. Humic acid, collagen, and calcium phosphate was used in different concentrations to evaluate the profiles of alleles inhibited in the amplifications. The effect of DNA template concentration was also examined. These data were correlated with information from real time PCR melt curves and Ct values. Overall, the results show interesting effects with respect to allele loss that appear to correlate with the type of inhibitor and the length of the amplicon.

Inhibition, STR, Y-STR, Real-Time PCR

 ** Presenting Author*