



### **B153 A Comparison Study of Commonly Used Commercial STR Kits on Trace Evidence Samples**

*Esperanza Anguiano, BS\*, Robert C. Giles, PhD, Cynthia B. Smitherman, BS, and Phuong Nguyen, BS, Orchid Cellmark, 13988 Diplomat Drive, Suite 100, Farmers Branch, TX 75234*

This goal of this comparison study is to assist the forensic scientist in selecting the most appropriate STR amplification system and amplification volume to apply when working with limited known quantities of DNA sample in order to maximize the amount of usable data obtained.

This presentation will benefit the forensic community by serving as a guide when faced with trace amounts of DNA sample and/or with concentrations well below the optimum required as it will demonstrate which commercially available STR kit and amplification volume is more likely to yield the most useful genetic information; thereby, increasing the overall success for solving forensic cases involving trace evidence.

Currently, forensic laboratories employ a wide variety of commercially available STR kits in the genotyping of DNA samples for human identification purposes. These commercial kits are the methods of choice for DNA analysis and have proven to be reliable techniques. However, one of the limitations with these methods is the recommended DNA concentration requirements. This factor alone limits the amplification success, specifically, when trace amounts of DNA samples are handled. The availability of STR kits that amplify up to 16 loci, i.e., ABI's AmpFISTR® Identifiler and Promega's PowerPlex16 kits has helped improve the situation by requiring a single amplification. More recently, other STR kits, i.e., ABI's AmpFISTR® Y-Filer™ and MiniFiler™ kits, have been introduced with lower recommended DNA concentration requirements and are expected to improve the sensitivity of the overall DNA genotyping process. The value of a comparison of the efficiency of these commercial kits for use on trace evidence samples is vital information for forensic scientists working case samples with limited biological material.

This study will demonstrate the efficiency of commercial STR kits including ABI's AmpFISTR® Identifiler™, Y-Filer™, and MiniFiler™; as well as Promega's PowerPlex16™ kits when trace amounts of DNA are used for amplification. Furthermore, data obtained from the amplification of trace amounts of DNA in a full and half PCR reaction volumes will reveal the amplification volume at which each of the kits tested affords the best sensitivity.

This comparison study will assist the forensic scientist in selecting the most appropriate STR amplification system and amplification volume to apply when working with limited known quantities of DNA sample in order to maximize the amount of usable data obtained. The forensic scientist will be made aware of the benefits and limitations of commercially available kits commonly used in casework samples.

This presentation will benefit the forensic community by serving as a guide when faced with trace amounts of DNA sample and/or with concentrations well below the optimum required as it will demonstrate which commercially available STR kit and amplification volume is more likely to yield the most useful genetic information; thereby, increasing the overall success for solving forensic cases involving trace evidence.

#### **Trace, Amplification, STRs**