The Evaluation of Eight Commercially Available STR Kits

Materials and Methods:

Methods:
- Two separate known male DNA standards were prepared allowing the determination of the ratio of the allele size to the 160-bp ladder.
- The variance was calculated as follows: the CV was calculated on the whole set of gel images for each allele size.
- The kit data were analyzed using the Applied Biosystems Genotyper software.

Results and Discussion:
- Sensitivity: Concentrations of each allele that fell below 75 RFUs for each kit are depicted in table 1.
- Profiler Plus® and Powerplex® exhibited comparable peak heights to each other for each concentration.
- Powerplex S5 was higher than Powerplex® Y-href at each concentration.

Heterozygosity:
- As a sample concentration decreases, the number of loci with heterozygosity greater than 85% also decreases.
- At concentrations of 0.5 ng and below, Powerplex® 16 did not maintain a minimum heterozygosity of 60% at 2001/75.

Amplification Artifacts:
- Several loci were present in the MiniFiler®, Powerplex® 16, Powerplex S5, and Powerplex® Y-href kits.
- No elevated stutter was observed with Cofiler FR3, but slight -A was observed for Powerplex® S5.
- Little or no stutter was observed with Powerplex® 16.

Mistakes:
- Excess noise, offscale/overloaded
- Excess noise, TH01
- Excess noise, Amel, not callable
- Highlights of stutter appear as a homogenate was observed with Powerplex® S5
- Excess noise, not observed, not observed.

References:
- Database (2006), www.promega.com
- Study Contact and Author Affiliations:
- Technical Support, Applied Biosystems
- Database (2006), www.promega.com

Conclusions:
- In general, the concentrations at which heterozygosity fell below 85% was always higher than the concentration at which peak heights fell below TTHRs.
- Powerplex® 16 appeared to be more sensitive than Powerplex® S5 and Powerplex® Y-href.
- Diabetes affected the electrophoresis of TH01, not observed.
- Powerplex® S5 exhibited electrophoretic effects at higher RFU values.
- Powerplex® Y-href exhibited electrophoretic effects at lower RFU values.
- alf and Powerplex® Y-href performed similarly. Each kit had alleles that were below the RFU of 75 RFUs.
- Laboratories should perform appropriate validation studies in order to establish minimum guidance which should include assessment of LOD, LOQ, and electrophoretic threshold for each amplification kit and protocol.
- The mixture series performed as expected when compared to single samples at comparable concentrations.