**VALIDATION, DATABASE AND CASE WORK APPLICATIONS OF Y-PLEX™6, MULTIPLEX Y-CHROMOSOMES STR GENOTYPING SYSTEM**

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A number of Y-chromosome specific STR markers are now available to the academic and forensic community. The availability of these markers provides an opportunity to be able to type male DNA samples. Specifically, in a crime setting with mixed DNA samples from multiple males, it is now possible to compare the suspect and the evidence samples on the basis of the haplotypes that can be generated using the Y-specific markers.

The presentation will describe the development, validation and casework applications of the Y-PLEX™6 STR kit. This kit is a multiplex system that analyzes six tetranucleotide STR loci providing information for seven alleles. The Y-STR markers included in the Y-PLEX™6 STR kit are DYS393, DYS19, DYS389II, DYS390, DYS391, and DYS385. Analysis and identification of Y-chromosome based genetic marker has a limited but highly useful role in DNA based human identification. A series of experiments have been performed in order to assess the validity of this system as per DAB guidelines for use in forensic casework analysis. The standard deviation for the migration of all alleles in the allelic ladder was less than 0.1 base pair. Different combinations of male and female DNA mixtures were analyzed. The presence of female DNA did not interfere with the identification of male DNA up to a ratio of 1:50 male to female. DNA from twenty-four animal species was amplified using the Y-PLEX™6 STR kit. None of the DNA sample resulted in amplified product. Blood and semen samples were spotted on a 100% cotton cloth exposed to soil, liquid soap, gasoline, 10% bleach, and *E. coli*. The DNA samples exposed to soil and liquid soap did not amplify. The sensitivity studies suggest that the male DNA quantity between
0.5-2 ng give good amplification, with RFU's more than 200 for all alleles.

Haplotype databases of over 500 Caucasians, African American and Native American populations and power of discrimination of they system will be presented. Applications of Y-STR analysis in resolving difficult forensic casework involving male-female mixture, aspermic male sample and fingernail scraping will be discussed.