



B100 Rapid DNA Analysis for Disaster Victim Identification

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After attending this presentation, attendees will understand the applicability of Rapid DNA analysis technology to Disaster Victim Identification (DVI) and family reunification. Attendees will also learn: (1) the impact of tissue degradation on the selection of samples for generations of Short Tandem Repeat (STR) profiles in mass casualty events; and, (2) the use of field-based kinship analysis software to assist in both victim identification and family reunification.

This presentation will impact the forensic science community by presenting processes that enable rapid identification of human remains and kinship identification in field-forward settings. The ability of first responders, primarily individuals without backgrounds in laboratory-based forensic DNA analysis and genetics, to perform STR analysis as well as sophisticated genetic analysis offers the potential to change the current paradigm in DVI. In particular, eliminating the interval between the disaster and receipt and analysis of samples at a laboratory will minimize deterioration of sample quality and time-to-profile generation and, most importantly, will accelerate familial reunification and bring closure to grieving family members.

The fully integrated Rapid DNA Analysis™ and kinship determination system is based on 27-locus FlexPlex™ chemistry. This six-color assay is modeled after Promega's® Fusion 6C chemistry with two additional Y-chromosomal Short Tandem Repeat (Y-STR) loci (DYS570 and DYS576) and the substitution of Penta D with D6S1043. The assay contains all expanded Combined DNA Index System (CODIS), United Kingdom, INTERPOL, European Standard, German and Australian core loci, and D6S1043, an important STR marker broadly used in China. Accuracy, concordance, precision, resolution, Personal Health Record (PHR), sensitivity, species specificity, and all other relevant measures meet or exceed required metrics. Developmental validation of the system is in progress.

Data demonstrating the functionality of the Accelerated Nuclear DNA Equipment (ANDE) Rapid DNA system for fully integrated, fully automated processing of a number of DVI sample types will be presented, with a focus on bone, muscle, and liver. Data on Rapid DNA processing of degraded tissues will also be presented based on mock samples exposed to excessive heat, explosive materials, microorganisms, and other conditions associated with mass casualty events. Data supporting the use of automated kinship analysis software and database creation will also be presented.

In conclusion, this study demonstrates the broad applicability of Rapid DNA analysis in mass disasters with an easy-to-use mobile system that can generate STR profiles from a broad range of sample types and perform kinship analysis.

Rapid DNA Analysis, Disaster Victim Identification, Kinship Analysis