USE OF THE ANDE RAPID DNA ANALYSIS SYSTEM FOR FIELD-FORWARD DISASTER VICTIM IDENTIFICATION

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NetBio has previously developed a fully automated Rapid DNA Analysis System that produces STR profiles from buccal and blood samples for human identification in 85 minutes with no manual processing steps. To expand the applications of the system, two integrated microfluidic biochips have been developed, one for high DNA content samples (including bone, muscle, liver, blood, and buccal swabs) and one for low DNA content samples (including, skeletal remains that have been exposed to the environment for extended periods). Following a mass disaster, local DNA infrastructure is often inaccessible or overwhelmed by the number of samples to be processed. Similarly, distant forensic facilities can quickly reach processing capacity. The interval between the disaster and receipt of samples at a laboratory is critical in that sample quality deteriorates as the post-mortem interval increases.

The advantages of Rapid DNA Analysis in field-forward settings are significant and include: 1) samples can be obtained and analyzed at the site, eliminating transport time from site to lab; 2) nontechnical users can generate STR results, dramatically expanding the number of samples that can be processed in a given time; and 3) results become available in under 90 minutes, allowing forensic investigations and family reunifications to proceed more quickly.

In order to realize these advanatges, the ANDE system was designed to 1) be operable in field-forward settings with extensive ruggedization to allow transport to and operation on site; 2) utilize a single consumable with six-month shelf-life at room temperature. This critical feature allows various jurisdictions to have consumables on hand at all times, avoiding the need to tax a stressed logistics system by transporting consumables during a time of crisis; 3) utilize a single consumable and incorporate features to enhance ease-of-use by first responders, many of whom have minimal experience with DNA analysis; 4) incorporate several features to prevent sample mix-up; and 5) process samples quickly to allow family reunification and respectful and proper handling of remains in accordance with family wishes and religious, cultural, and legal requirements.

Data demonstrating the functionality of the ANDE Rapid DNA Analysis system for fully integrated, fully automated processing of a number of DVI sample types will be presented, with data from samples with a range of post-mortem indices (PMI). Ruggedization of the system, reagent stability, and logistical issues to allow immediate deployment will also be described.