B95 A Ten Year Study of DNA Blood References Collected on Untreated Filter Paper and Stored at Room Temperature

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The goal of this presentation is to inform and to present to the audience the results of a long-term study examining the storage of whole blood DNA reference specimens collected on untreated filter paper and stored at both room temperature and at -20 ºC at the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR).

This presentation will impact the forensic community by discussing the results of a long-term study investigating the need to store blood reference specimens at -20 ºC versus room temperature.

The Department of Defense DNA Registry, a component of the Armed Forces Medical Examiner System (AFMES), consists of two operational branches supporting the identification of human remains from current death investigations. The first branch, the Armed Forces DNA Identification Laboratory (AFDIL) includes a nuclear DNA section that conducts PCR testing of the core CODIS STR loci to establish the genetic profile of the fallen service member. This profile is then compared to a whole blood DNA reference specimen profile that was collected from the individual upon enlistment into military service.

Since 1992, the storage and maintenance of over 5.1 million blood reference cards has been the responsibility of the second operational branch, the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR) located in Gaithersburg, MD.

Presently, whole blood is collected and spotted onto untreated filter paper. The reference cards are then allowed to air dry, and are sealed in a foil pouch with a desiccating agent and stored in a -20 °C freezer until it becomes necessary to generate a known genetic profile for comparison to the decedent.

The authors investigated the continued necessity to store blood reference cards at the AFRSSIR at -20 °C. A previous collaboration with the National Institute of Standards and Technology (NIST) investigated the short-term (~19 months) recovery of DNA at ambient temperatures (Kline et al. 2002). Since 1997, randomized, duplicate specimen storage study has been conducted of 500 samples stored on untreated filter paper maintained at both room temperature and at -20 °C. The 500 selected specimens represent collections from 437 separate locations world-wide. No more than two sets of specimens were used from any one collection site.

The results from these bloodstains extracted will be presented with three methods: Chelex, Qiagen, and DNA IQ (Promega), and quantification of these samples using the Applied Biosystem's Quantifiler Human DNA Quantification kit on the ABI 7000 Sequence Detection System. Preliminary results indicate there is no evidence of inhibition in either storage condition as measured by the internal positive control (IPC) from the Quantifiler results. Qualitative analysis of the electrophoretic data generated from the Promega PowerPlex 16 STR kit (as measured by peak height intensity) will also be presented. The evaluation will compare the results generated for each extraction method/storage condition combination. The results of this investigation will be used to evaluate the necessity of the AFRSSIR to maintain blood stain reference cards at -20°C for the foreseeable future.

References:

Kline MC, Duewer DL, Redman JW, Butler JM, Boyer DA. (2002) Polymerase chain reaction amplification of DNA from aged blood stains: quantitative evaluation of the "suitability for purpose" of four filter papers as archival media. *Anal Chem.* 74(8): 1863-1869.

Blood Reference Storage, DNA Typing, Untreated Filter Paper

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