RECOVERY OF DNA FROM AGED-BLOODSTAINS ON UN-TREATED PAPER

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Many reference DNA sample repositories or "DNA banks" are now in existence, primarily for support of epidemiological and genetic research or to enable identification of forensic evidence or human remains. Whole blood, plasma, and buccal epithelium are convenient and minimally intrusive sources of DNA for current DNA analysis technologies. The nature of the sample, how it is collected, and how it is stored are critical issues for the ultimate utility of any DNA banking effort. Whole blood has the great advantage of providing immediate visual evidence that a sample of adequate size has been obtained.

Successful STR typing requires that samples contain an adequate quantity of DNA and that this DNA can be isolated from polymerase chain reaction (PCR) inhibitors (heme, proteins, and many other whole blood components). The multiplex kits used detect PCR amplification products ranging in size from 100 through 450 nucleotide base pairs (bp). The kits included PowerPlex® 16 System (Promega Corp. Madison WI) and AmpF/STR® SGM Plus™ (Applied Biosystems, Foster City CA). Analysis of the PCR products was accomplished using an ABI PRISM® 310 Genetic Analyzer.

We have examined over 300 anonymous bloodstains that have been stored on un-treated Schleicher & Schuell 903™ paper (S&S 903™) from 2-15 years at ambient temperatures with no humidity control. As well as samples that were stored at –20°C for 6 years. Our examinations included different methods of extraction (Chelex®, and Salting-out) as well as evaluation of the quality of the recovered DNA (yield gel), and typeablity of the DNA obtained.

All samples yielded typeable DNA. A loss of some of the larger STR loci was noted in some of the older and more degraded samples. Images of yield gels indicate that the DNA extracted from the 6 yr old samples stored at –20°C has intact DNA greater than 12 kb in size while the ambient samples appeared as smears of DNA with sizes ranging from 12kb down to approximately 100bp.