COMPARISON OF EVIDENCE STORAGE METHODS FOR TRANSFER OF DNA TO EVIDENCE PACKAGING

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Locard's exchange principle states that with contact between two items, there will always be an exchange. At crime scenes, cotton swabs are frequently used to collect biological evidence and placed in evidence packaging for transport. Therefore following Locard's exchange principle, if there is contact between the swab head and the evidence packaging, a transfer will occur. In situations dealing with a copious biological fluid stain, a small transfer/loss of the collected sample to the evidence packaging may not prove detrimental. Conversely, in cases with small/low quantity or a touch DNA sample, the effects of such a transfer may be more drastic. The collection, protection and preservation of genetic material are critical steps in the overall process of obtaining a DNA profile. Once genetic material is collected, it must be properly stored to avoid sample contamination or loss of DNA to evidence packaging.

This poster will describe a feasibility study comparing the DNA yields from diluted blood (a 1:6000 dilution to simulate low level samples) collected with cotton swabs. The swabs were air dried at varying time intervals prior to packaging (0 minutes, 30 minutes, 1 hour, 2 hours and 4 hours). The samples were packaged using two different methods, one where the swab head did not contact the packaging, and one where the swab head made contact with the packaging. A set of control swabs were allowed to air dry for 24 hours.

The packaged swab samples were subjected to brief transportation in a vehicle at ambient temperature, stored overnight at room temperature and processed after 24 hours. Each sample was isolated and purified using the Qiagen BioRobot EZ1 and DNA quantification was performed by RT-PCR (Quantifiler® Human DNA Quantification Kit). Based on the quantification results obtained, samples were subjected to concentration using Vivacon 500-30K DNA concentrators (Sartorius) followed by STR amplification using the Applied Biosystems AmpFℓSTR® Identifiler® PCR Amplification Kit. STR fragments were separated using an ABI PRISM® 3130 Genetic Analyzer. To detect any transfer of DNA, the evidence packaging that stored the swabs overnight was also sampled and analyzed in the same manner as the swab samples.

This poster will show the quantification and STR profile results for each of the drying times evaluated. The data supports that the highest DNA yield and most complete STR profiles were obtained from the storage method where the swab made no contact with the packaging. Low level alleles consistent with the original samples tested were observed in the transfer or loss of DNA to the evidence packaging. Therefore, depending on the nature of the samples being collected, a transfer or loss of DNA to the evidence packaging can negatively impact the resulting genetic profile. ⌘