EVALUATION OF COLLECTION TECHNIQUES FOR CONTACT DNA SERVICES

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Currently, the Georgia Bureau of Investigation Forensic Biology section uses the two swab method to collect cellular material from porous and non-porous surfaces. This method requires sterile water to be applied onto the cotton swab and then the swab is rubbed onto the desired area on the evidence followed by a dry swab. This collection method is an inexpensive and easy way to collect and preserve DNA until extraction is conducted. During the extraction methods a "piggy back" spin is used. The analyst makes holes with sharp tweezers in the top of a deep well cap tube and places cuttings of the cotton swab(s) into the deep well cap of the tube. The sample is then placed into centrifuge for 2-4 minutes at approximately 14000rpm which allows the reagents, cellular debris and DNA to flow back into the tube. The deep well cap with the swab cuttings are discarded and the deep well cap is replaced. Not only does the current method involve additional sample handling but the swab(s) are potentially exposed to other samples during centrifugation thus increases the risk of contamination.
The following collection methods were compared to the current collection method to see if the other collection method(s) obtain more quantifiable DNA, more complete DNA profiles and/or reduces the risk of contamination:

- CEP™ swab and the Spin Eze® tubes are made by FITZCO. The CEP™ swab head is made from FP705™ paper that is high purity cotton pulp, absorbent and non-reactive. Spin Eze ® tube comes with a basket with a mesh bottom that can be inserted into Spin Eze ® tube during centrifugation.
- Copan 4N6FLOQSwabs™ and a Nucleic Acid Optimizer. The 4N6FLOQSwab™ consists of nylon fiber strands attached to molded plastic that contains high hydrophilic activity that allows efficient sample collection and release. The Nucleic Acid Optimizer consists of a semi-permeable basket inserted into a 2ml microtube. The swab can easily snap off at the breakpoint into the basket and reagents are added into the basket during extraction procedures.
- 2% SDS on cotton swabs. A wet swab with 2% SDS solution is rubbed onto a desired sample area and followed by a dry swab.

During this study, each collection method was evaluated with a number of thumbprint slides and mock samples commonly seen in contact DNA services to see which method obtains more quantifiable DNA, more complete DNA profiles and/or reduces the risk of contamination. It was determined that more mock samples collected with cotton swabs containing 2% SDS solution contained sufficient amount of human DNA during quantification and obtained more full DNA profiles compared to the remaining collection methods. In order to reduce the risk of contamination and obtain more complete DNA profiles during contact DNA typing services, it was recommended that swabs containing 2% SDS solution be implemented in conjunction with Fitzco Spin Eze® tubes during DNA extractions.