



### A95 A Comparison of Collection Methods for Low Copy Number DNA

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After attending this presentation, attendees will have a basic understanding of different methods commonly used to collect low copy number (LCN) DNA from a non-porous surface. Attendees will understand how the efficiency of five different methods compare to one another.

This presentation will impact the forensic science community by providing information on the relative efficiencies of different LCN DNA collection media. This will be helpful in casework situations where the amount of deposited DNA is minute and the efficient recovery of DNA is crucial. This project may also serve as a framework for future study on the collection of LCN DNA, where additional collection media or surface types may be investigated.

This project explores and compares the efficiencies of different media for collection of low copy number DNA and attempts to ascertain which, if any, of the tested media is likely to recover the largest portion of deposited DNA. The media include cotton swabs, buccal swabs, tape, cotton gauze, and FTA cards.

Full or partial genetic profiles can be obtained from DNA deposited by touch on a surface. A person will shed a variable number of epithelial cells and extracellular material upon coming into contact with the surface. The cellular and extracellular material left on the surface typically contains only a small amount of DNA from the contributor. In order to ensure successful DNA amplification and typing, it is important to collect as much of the deposited DNA as possible. Moistened cotton swabs are generally used for this purpose, but it is of interest whether or not a different medium would consistently collect more DNA. Known amounts of DNA (in the form of an extracellular standard or a known number of cells) were applied to a non-porous surface. Five different collection media were used to collect the deposited DNA: cotton swabs, buccal swabs, tape, cotton gauze, and FTA cards. These collection methods were selected based on their use by other research groups. The collected samples were extracted using an organic extraction method and quantified using real-time PCR.

In order to effectively compare the amounts of DNA collected by the different media, two methods were used in an attempt to deposit known amounts of DNA to a non-porous surface prior to collection. In the first set of experiments, a known volume of an extracellular DNA standard was deposited on the non-porous surface. In the second set of experiments, a method was developed for depositing a known amount of buccal cells to the non-porous surface. This was done by diluting a solution of buccal cells until 7 uL of the solution, applied to a glass microscope slide, would contain a number of cells that could be counted when viewed under the microscope. The cells were stained and counted using a compound microscope. The cells were then collected from the slide with one of the five collection media and DNA was extracted using an organic extraction method.

#### **Low Copy Number (LCN), DNA Collection, DNA Quantitation**