AUTOMATION OF BUCCAL SWAB PROCESSING

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The testing of buccal cells on cotton-tipped or Dacron® applicators in large scale DNA profiling is desirable. The collection of the sample is non-invasive, relatively easy to perform, and collection materials are inexpensive. If collected properly, the cells on the swab yield a sufficient quantity of DNA for STR profiling. Presently, large scale sample introduction or aliquoting practices require manual cutting of the swab and placement into the correct well location in a 96 well tray or into individual tubes. Although this direct transfer of cells from the swab is more reliable and less expensive than performing an initial transfer to paper, the process is labor intensive due to witness requirements, and can lead to sample mix-ups, if not performed properly. With the prospect of collecting over 100,000 buccal swab samples per year in the State of Louisiana, an automated method for introducing buccal swab samples directly into the laboratory testing process was developed. This system reads and records the sample identification number, cuts the buccal swab using a non-contact laser-based method to prevent contamination and automatically places the swab into a designated location in a 96 well tray. The automated self tracking system assures sample integrity and reduces the man hours currently required to process buccal swab samples.

To demonstrate the effectiveness of this technique, cotton tipped and Dacron® buccal swabs were collected using standard methods. Two swabs were collected from each individual. One swab was cut using the non-contact cutting device, while the other was cut manually by a razor blade. The DNA yields between the samples were comparable, and the samples cut with the laser showed no PCR inhibition or artifacts in the resulting DNA profiles as compared to their controls. Results from proof-of-concept studies will be presented along with description of the non-contact laser cutting unit and the system management software.