A44 Collection of Touch DNA by a Handheld Vacuum Device

Shahida K. Flores, BS, 1319 Smither Drive, Apartment 7301A, Huntsville, TX 77340; and David A. Gangitano, PhD, 14723 TC Jester Boulevard, Apartment 1118, Houston, TX 77068*

After attending this presentation, attendees will become familiar with a new collection technique for touch DNA evidence.

This presentation will impact the forensic science community by demonstrating that a handheld vacuum device can be used for enhanced collection and recovery of touch DNA. This may prove to be a useful tool during evidence collection at the crime scene or in the laboratory.

Touch DNA itself has revolutionized the forensic community in the last few years by increasing the number of items of evidence that can be processed for DNA analysis. This has not been more evident than with property crimes where it is common for an object or surface to come in contact with a perpetrator's skin. During the contact of skin to surface, epithelial cells are sloughed off and deposited along with oil, sweat and other cellular components present on the skin. A hand grasping a doorknob, a face pressed against a window, a finger on the trigger of a gun, are all examples of skin to surface contact that can leave behind valuable touch DNA evidence. However, this kind of contact typically leaves behind only a small number of cells so an efficient method of recovering and collecting such evidence would greatly increase the likelihood of generating a full DNA profile.

Currently, the most common method for recovering and collecting touch DNA from a hard surface is a swabbing method. A cotton swab moistened with either water or detergent is rubbed over the entire surface area where touch DNA is suspected to be present. Other methods such as cutting, scraping, and tape lifting aren't as applicable to hard surfaces as swabbing. The use of a handheld vacuum device for recovering and collecting cells would not only provide another method for collecting touch DNA from hard surfaces but would also provide a comparative method in order to determine the percentage recovery of DNA from swabbing.

The concept of the handheld vacuum device and the way it operates is fairly simple. Liquid buffer containing a surfactant is applied to the surface where the touch DNA is present. The device is turned on after attachment of a collection nib and vial. The negative pressure created by the vacuum allows the liquid buffer containing the suspended cells to be propelled into the collection area. The nib, acting as a filter, collects the epithelial cells while the vial, acting as the liquid storage unit, collects the buffer solution.

In the first part of the study, optimization of the device was carried out by testing various liquid buffers and surfactants in addition to testing nibs of various pore sizes and surface areas. Quantification results and generated profiles relating to each variable were analyzed. The optimal buffer and nib were chosen for the second part of the study. A comparison study between the handheld vacuum device and a moistened cotton swab was performed to determine if there was a significant difference in the quantity and quality of touch DNA collected. This was done by comparing quantification results and generated profiles. A standard organic extraction was performed on all samples in combination with a concentration and purification step. The samples were treated as low

yield and the final elution volume was 40 ul. Samples were amplified with PowerPlex 16 and run on an ABI 310 Genetic Analyzer.

Touch DNA, Collection System, Handheld Device

 ** Presenting Author*