DIOMICS X-Swab™: A NOVEL BIO-SPECIMEN COLLECTION TOOL FOR INCREASED TRACE MATERIAL RECOVERY AND PCR ENHANCEMENT

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Recovery of DNA from evidentiary samples is critical for successful DNA typing. Degraded samples or materials with low levels of DNA often yield incomplete or unusable DNA profiles. For this reason, tools are needed to increase the yield of useable DNA for forensic STR typing and other laboratory analyses of low level and challenged biological samples.

Currently, it is common practice to collect biological samples likely to contain DNA by swabbing. However, recovery of DNA using commercially available cotton, and other materials, swabs has been determined to be relatively inefficient, where much of the target material remains trapped within the swab matrix and thus is not usable for downstream analyses. The X-Swab™ (Diomics Corporation, Carlsbad, CA), made of the proprietary synthetic material Diomat™, is an innovative bio-specimen collection tool designed to enhance the collection of biological material from a variety of substrates. This unique synthetic material is highly absorptive and will dissolve under certain extraction conditions, thus increasing the amount of biological material released from the substrate during laboratory analysis.

Preliminary results using X-Swab™ have demonstrated superior DNA yields from blood and saliva samples, recovering and yielding on average approximately 80% of DNA from samples. X-Swab™ also demonstrated greater low level DNA recovery when compared to a collection device marketed for maximum DNA collection and elution efficiency, i.e. the Copan 4N6FLOQSwab™ (Brescia, Italy). Furthermore, the Diomat™ material has been demonstrated to improve DNA STR profile quality when co-purified with the DNA, potentially expanding the applications of this tool beyond the enhanced recovery of DNA from biological samples.

This presentation will explore a more comprehensive characterization of X-Swab™, its use for swabbing various substrates, alternate extraction strategies, and a film-based collection format (similar to contact tape lifts). Sensitivity and specificity capabilities will be shown that support that this new DNA collection device will be a substantial improvement in collection of trace materials.