EFFECTIVE EVIDENCE SCREENING AND DOCUMENTATION FOR DNA ANALYSIS

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The intent of this study was to establish an accurate and efficient system for identifying and documenting biological material suitable for downstream DNA testing. Several testing methods were validated to achieve this goal. An array of additional tools was also selected to effectively locate samples and document examination findings.

Acid phosphatase, Abacus PSA cards, and microscopy are the established combination of presumptive testing for selecting samples to be carried through differential extraction. Recent changes to the JPSO sexual assault kit, which now includes breast, bite mark, neck, and shoulder swabs in addition to routine intimate swabs, necessitated the addition of a presumptive test for saliva. The identification of saliva can be critical in confirming or disproving specific acts in sex crimes investigations. The SALIgAE® test is sensitive to a range of saliva concentrations that occur in forensic biology cases. The test is easy to use and the color change results are easy to interpret when measured against a negative control. Mixture studies were performed and demonstrated that other body fluids, environmental substances, and fabric dyes do not interfere with the detection of saliva with this test. This study has shown that the SALIgAE® saliva test can give a false positive result in the presence of feces. This should be kept in mind while processing casework samples, particularly samples that would likely contain feces such as anal swabs.

Studies performed for phenolphthalein, o-tolidine and Hexagon OBTI determined that these tests are acceptable for blood evidence screening in forensic DNA casework. Although these catalytic tests are highly sensitive to minute traces of hemoglobin they remain subject to interference by catalases, peroxidases, etc. An additional one-step immunographic assay, the Hexagon OBTI test, detects the presence of human hemoglobin. This study indicated the OBTI test is both specific for human hemoglobin and insensitive to a variety of environmental substances.

In addition to presumptive tests, dedicated documentary tools are available in each of four evidence examination laboratories (EEL). The cordless Ultralite ALS with BMT head is used for screening of evidence for bodily fluid stains. Stereomicroscopes and light microscopes with integrated digital cameras are in each EEL for documentation of blood spatter, hair roots, sperm cells, and other very small samples.

One Wacom Cintiq 21UX graphic tablet monitor for hand written digital note taking is combined with a laptop docking station and a 24 inch widescreen HD monitor in each evidence examination laboratory. Each EEL also contains a digital camera with standard and macro lenses.

The application of these validated methods and dedicated tools has increased the organization's accuracy and efficiency for bulk evidence examination. These improvements enable the analyst to easily document evidence and proceed to extraction of high quality biological material well suited for DNA analysis. ⌘