INTERNAL VALIDATION OF QIACUBE AUTOMATED WASH PROTOCOL FOR DIFFERENTIAL EXTRACTIONS

Cheryl Duda, Alaska Crime Laboratory

Manual DNA extraction of mixed stains has previously presented challenges to thoroughness, efficiency and consistency of forensic biology workflow. Biological screeners performed microscopic examinations to determine which items contained spermatozoa and were therefore suitable for DNA differential extraction. The manual extraction protocol included overnight digests, ensuring that differential extractions were a multi-day process. Variability between analysts had the potential to impact which samples were processed, as well as affecting the efficacy of the separation process.

The internal validation of the QIAcube automated wash protocol included studies that addressed sensitivity, precision and accuracy, reproducibility, mock casework samples, mixtures, NIST-traceable samples, contamination, and comparison to existing protocols. The studies demonstrated that the QIAcube automated wash protocol, followed by purification on Qiagen BioRobot EZ1 XL instruments, results in improved yields and cleaner separation of the sperm fractions. The multi-day protocol was decreased to less than four hours. Furthermore, low-level mock casework samples which produced negative microscopic results, and which might otherwise have had no further analysis performed, contained enough spermatozoa to yield male profiles suitable for comparison.