DNA PROFILES FROM FINGERPRINTS WETTED WITH BODY FLUIDS AND DEVELOPED BY THE COLUMNAR THIN FILM METHOD

Stephanie L. Plazibat, B.A., Akhlesh Lakhtakia Ph. D., D. Sc., Stephen E. Swiontek, M.S., and Reena Roy, Ph. D., Pennsylvania State University

DNA and fingerprint analyses are the two major methods of identification used in forensic science. If these two methods can be implemented on the same sample, identification of a suspect or a victim can be greatly improved. In this research project, fingerprints wetted with body fluids are deposited on brass, which is commonly encountered at crime scenes. The fingerprints are then developed with the columnar thin film (CTF) method. A CTF is an ensemble of parallel nanoscale columns.

After the fingerprints have been developed, the substrate is either scraped or swabbed to collect the residue comprising the fingerprint, the body fluid, and the CTF. The DNA is extracted from the collected residue using the DNA Investigator Kit and the BioRobot EZ1 automated extraction system. The quantity of the extracted DNA is determined using Real Time PCR technology. An optimal amount of DNA is amplified using primers and reagents contained in various amplification kits available in the forensic community. DNA from the amplified product is detected by capillary electrophoresis injection on the Applied Biosystems 3130xl Genetic Analyzer. The generated data is analyzed using GeneMarker® HID Software from SoftGenetics®.

Complete DNA profiles were generated from fingerprints wetted with body fluids and developed by the CTF method. The profiles were concordant with the reference samples of the donors.