AUTOMATIC DETECTION OF SPERMATOZOA FOR LASER CAPTURE MICRODISSECTION

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In sexual assault crimes, differential extraction of spermatozoa from vaginal swab smears is often ineffective, especially when only a few spermatozoa are present in an overwhelming amount of epithelial cells. Laser capture microdissection (LCM) enables the precise separation of spermatozoa and epithelial cells. However, standard sperm staining techniques are non-specific and rely on sperm morphology for identification. Moreover, manual screening of the microscope slides is time-consuming and labour-intensive.

We propose an automated screening method to detect spermatozoa stained with Sperm HY-LITER™ (Independent Forensics, Hillside, IL), a fluorescent kit for the detection of human spermatozoa which does not rely on morphological characteristics or non-specific staining for identification. Different ratios of spermatozoa and epithelial cells were used to assess the automatic detection method. In addition, real postcoital samples were also screened. Detected spermatozoa were isolated using LCM and DNA analysis was performed. Robust DNA profiles without allelic dropout could be obtained from as little as 30 spermatozoa recovered from postcoital samples, showing that the staining had no significant influence on DNA recovery.