DNA TYPING OF MIXED GENDER PHYSIOLOGICAL FLUIDS AND ASPERMIC EJACULATE USING Y-CHROMOSOME SPECIFIC STRs

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The differential extraction technique for isolating sperm DNA from the non-sperm (primarily the victim) DNA component of sexual assault evidence is not applicable to mixtures of vaginal fluid and aspermic ejaculate, including that from vasectomized individuals. However, such semen ordinarily contains other types of cells such as leukocytes and epithelial cells. The cellular content of neat semen from vasectomized donors was found to be approximately 2 x 10^3 cells per microliter, yielding an average concentration of 2.4 ng/µL genomic DNA. Prostate-Specific Antigen (P-30) analyses show a typical positive sexual assault swab contains the equivalent of about 1 µL of recoverable neat semen. Altogether, this suggests that P-30 positive, aspermic sexual assault swabs potentially contain enough DNA (0.5-2 ng) for typing the male component using Y-chromosome specific loci. Neat ejaculates from vasectomized males were typed at DYS-19, 389 I & II, 390, 391, 392, and 393 using fluorescently-tagged primers in two triplexes on an ABI Prism® 310 Genetic Analyzer. Typically, 0.1 to 1 µL of neat ejaculate was needed, although a few samples required up to 10µL. Laboratory prepared mixtures of up to 5,000 parts (10µg, the maximum attempted) female to 1 part (2 ng) male DNA were successfully typed. However, the primers and amplification conditions in this study yielded a non-specific DYS391-related peaks with high ratios of non-Y (female) DNA. The non-specific peaks did not directly interfere with typing, but consumed enough primer to reduce the triplex's sensitivity to DYS391. Preliminary results indicate that post-coital vaginal swabs (with vasectomized partners) can be readily typed with this system. A Y-specific quantitation method for establishing an upper limit to the concentration of Y-chromosome DNA is post-coital mixtures would be useful.