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Title: Review: Properties of sperm and seminal fluid, informed by research on reproduction and contraception.

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Highlights:

1. Review of the soluble and cellular components of seminal fluid
2. Review insights and contributions from studies of related to contraception compliance
3. Discussion of differential extraction and references for procedural variations
4. Review of DNA packaging in the sperm nucleus

Abstract

Forensic DNA testing is grounded in molecular biology and population genetics. The technologies that were the basis of restriction length polymorphism testing (RFLP) have given way to PCR based technologies. While PCR has been the pillar of short tandem repeat (STR) methods and will continue to be used as DNA sequencing and analysis of single nucleotide polymorphisms (SNPs) are introduced into human identification, the molecular biology techniques in use today represent significant advances since the introduction of STR testing. Large forensic laboratories with dedicated research teams and forensic laboratories which are part of academic institutions have the resources to keep track of advances which can then be considered for further research or incorporated into current testing methods. However, many laboratories have limited ability to keep up with research advances outside of the immediate area of forensic science and may not have access to a large university library systems. This review focuses on filling this gap with respect to areas of research that intersect with selected methods used in forensic biology.

The review summarizes information collected from several areas of the scientific literature where advances in molecular biology have produced information relevant to DNA analysis of sexual assault evidence and methods used in presumptive and confirmatory identification of semen. Older information from the literature is also included where this information may not be commonly known and is relevant to current methods. The topics selected highlight (1) information from applications of proteomics to sperm biology and human reproduction, (2) seminal fluid proteins and prostate cancer diagnostics, (3) developmental biology of sperm from the fertility literature and (4) areas where methods are common to forensic analysis and research in contraceptive use and monitoring. Information and progress made in these areas coincide with the research interests of forensic biology and cross-talk between these disciplines may benefit both.

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