



Pathology/Biology Section - 2016

H69 DNA Testing in Homicide Investigations

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After attending this presentation, attendees will: (1) recognize that the value of DNA testing in homicides is not limited to situations of sexual assault; (2) be familiar with a wide range of case types in which DNA testing can play an important role in the investigation and eventual adjudication of purported homicides; (3) understand that a variety of types of evidence may be suitable for DNA testing; and, (4) realize that such evidence may be located at the crime scene, either in the immediate vicinity of the murder victim, or elsewhere — at a sight separate from the main crime scene and/or present on the body or property of the victim or the suspect.

This presentation will impact the forensic science community by focusing attention on the many unique situations in which DNA testing can play an important role in the investigation and eventual prosecution of homicide cases. By examining several unique cases in which DNA testing was instrumental in the investigation, the forensic science community will be better able to recognize situations where similar testing may provide valuable investigative information.

With the advent of forensic DNA testing, and its eventual routine implementation, forensic science has been revolutionized over the past three-plus decades. From the early days when DNA testing first allowed for the “individualization” of persons, the technology has continued to make great progress. DNA testing now allows for the potential definitive identification of perpetrators of sexual assault and other crimes, when suitable evidentiary samples are collected for testing. In addition, DNA testing resulted in numerous exonerations, wherein previously convicted persons have been freed from prison as a direct result of the testing of samples collected and retained prior to the availability of DNA testing.^{1,2}

As DNA testing has become even more advanced, the ability to detect trace amounts of DNA has become so incredibly powerful as to produce concerns about potential cross-contamination of evidence by non-perpetrator DNA, whether it originates from the victim, an innocent bystander or other source, or even an investigator or forensic scientist.^{3,4} Despite these concerns, the reality is that DNA technology today represents a tool that is so potentially powerful that its usefulness in certain circumstances may not be readily appreciated. In this presentation, a series of homicide cases are presented wherein DNA testing provided valuable investigative information. The cases range from those in which DNA testing was probably not absolutely necessary but provided useful, corroborating information, to those where the DNA test results represented the primary evidence utilized to identify and subsequently charge/try a suspect.

Examples of case types presented include: DNA testing of bloody objects, such as weapons or clothing; DNA testing of a foreign hair found on a homicide victim; evaluation of articles of clothing or other objects for “touch DNA,” transferred from simple contact with the skin; DNA testing of a fired bullet at a crime scene; and DNA testing of dog feces at a crime scene.

Cases are presented with emphasis on the unique types of situations where DNA testing may provide valuable investigative information. These cases serve to illustrate the fact that the current state of DNA testing can allow for testing of various items of evidence that, prior to recent advancements in technology, might not have been considered very useful evidence, or if valuable in certain other regards, might not have been considered a viable source for potential DNA testing. All persons involved in homicide investigations, from police to death investigators to forensic pathologists, need to be aware of the powerful capabilities of the current state of DNA testing, and should consider attempting such testing whenever DNA transfer may have occurred in association with a homicide.



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Reference(s):

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2. Hampikian G., West E., Akselrod O. The genetics of innocence: analysis of 194 U.S. DNA exonerations. *Annu Rev Genomics Hum Genet* 2011;12:97-120.
3. Szkuta B., Harvey M.L., Ballantyne K.N., van Oorschot R.A. DNA transfer by examination tools – a risk for forensic casework? *Forensic Sci Int Genet* 2015;16:246-254.
4. Fonnelop A.E., Egeland T., Gill P. Secondary and subsequent DNA transfer during criminal investigation. *Forensic Sci Int Genet.* 2015;17:155-162.
5. DNA, Touch DNA, Homicide