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UPDATE is published by the National Center for Prosecution of Child Abuse (NCPCA), a program of the American Prosecutors Research Institute, the training, research and development division of NDAA. Items may be reprinted if attributed to APRI, NDAA, and NCPCA. Please provide copies to NCPCA. Contact us if you have inquiries or article suggestions at 703.549.9222.

Update

Demystifying DNA: How to Use DNA in Child Abuse Cases

by Paula Wulff¹

Child abuse cases present many unique challenges for prosecutors, not the least of which may be a young victim's inability to communicate what happened or to identify the abuser. Consequently, prosecutors must rely on various types of evidence to substantiate a charge of child abuse. One type of evidence available to them is the use of Deoxyribonucleic acid or DNA. DNA evidence can be used not only to identify an assailant but also to negate a suspect's claim that they were not present at the crime scene. DNA may also be used to support the State's theory of events. DNA evidence can substantiate key elements of the crime as well as link or exclude a suspect to the crime. Additionally, a suspect's attempts to destroy or remove DNA-related evidence after a crime may assist the prosecutor in establishing the suspect's purpose or intent. Thus, DNA evidence can be a powerful component in proving a case in which the victim is preverbal or in a case of homicide.

Generally speaking when people and/or objects come into contact with each other, this contact will result in the exchange of evidence of the contact. This is summarized as Locard's Exchange Principle.² This transferred material may be blood, semen, saliva, sweat, hair or skin cells. Note, however, an individual may intentionally take steps to reduce or mask any transfer by wearing gloves, a mask, a condom, or attempt to destroy any tell-tale transfer by washing the collection surface with bleach or another chemical. This transfer material may contain DNA. Simply put, DNA is a large polymorphic molecule found in all human cells with the exception of red blood and nerve cells. DNA is found both within a cell's nucleus (called nDNA) as well as its mitochondria (mtDNA). For example, human hair may contain nuclear DNA if the hair shaft is attached to its root, or simply mitochondrial DNA if the hair shaft broke off when it was shed.

What is DNA?

DNA, the genetic code found within each person, acts as a unique blueprint determining our individual characteristics. With the exception of identical twins, scientists hold that no two individuals' genetic blueprint is the same and this contributes to identification of an individual through DNA analysis. Visually, a DNA molecule looks like a twisted ladder with rungs connecting the two poles of the ladder. Chemically the poles are composed of sugar and phosphate and the rungs are composed of the organic bases

in a predictable manner: A (Adenine) and T (Thymine) always pair as one rung and G (Guanine) and C (Cytosine) as another. No base can join to itself, thus if the collected DNA is partially degraded and the forensic analyst only recovers one of the base pair chemicals, he or she can predict what the missing base should have been. This becomes important in determining the base sequence within the molecule. Scientists are able to identify the variation in individual DNA molecular sequencing which forms the basis for DNA profiling. While this may seem simple, a nuclear DNA (nDNA) molecule consists of three billion base pairs (bp) including twenty-one thousand genes while a mitochondrial DNA (mtDNA) molecule contains only 16,569 bp and 37 genes.³ Prosecutors should remember that nDNA can be used to specifically identify an individual, in part due to the increased number of base pairs, whereas mtDNA is less specific but can be used to include or exclude an individual as a suspect.

A cell's nucleus contains 46 chromosomes arranged into 23 pairs including the gender identifying chromosome (XX for females and XY for males). A child inherits half of his or her DNA from each parent, thus when an egg is fertilized, 23 chromosomes are inherited from the father and 23 from the mother. The inherited chromosomes enables scientists to establish both paternity and kinship among siblings, cousins etc. Across the human species, 99.99% of DNA sequencing is similar from person to person which results in the commonality of the human form (head, torso, arms, legs, etc.) regardless of race or gender. The remaining 0.09% is unique to each individual (except for identical twins) and is responsible for individual characteristics such as coloring, height and hair texture. This tiny percentage allows forensic analysts to distinguish one individual from another. Thus, when DNA is collected from a crime scene, the unique data obtained from the DNA enables scientists to identify a specific genetic blueprint or DNA profile which may lead investigators to the crime's prime suspect.

CODIS

What happens when the analysts identify a DNA profile from the crime scene evidence but it is not linked to a specific suspect? If certain conditions are met (for example the testing lab qualifies for uploading data and is accredited) the lab will then electronically send the profile information to the FBI's Combined DNA Indexing System (CODIS) which is a system of interconnected databases that enables local, state

and federal law enforcement to electronically search each other's DNA databanks to determine if there is a match to the crime scene evidence profile. When a DNA match is found through another database, this is referred to as a hit and may provide investigators with a name to associate with the source of the crime scene evidence. (Note: the CODIS system is organized into two indexes: a Forensic Index consisting of crime scene samples and a Offender Index composed of samples from convicted offenders). Currently CODIS contains over 6.5 million DNA profiles which have assisted law enforcement in more than 77,000 investigations.⁴

Confirmatory Sample

Whether the source of the crime scene evidence is identified through a CODIS hit or otherwise, a confirmatory sample must be obtained to verify that the profile obtained through the crime scene evidence matches the subsequently identified individual. This is important because prosecutors cannot reveal to the jury that the defendant was identified from a convicted offender database or as the source of evidence collected from another crime scene. There are a number of lawful means by which a confirmatory sample can be obtained: search warrant; consent; abandoned sample; or, a process known as a dragnet.

Search Warrant

During the course of an investigation, law enforcement may not be able to obtain a confirmatory sample from a suspect without resorting to obtaining a search warrant. Both federal and state courts have established legal requirements which must be met in order to compel a biological sample from a suspect and they require that law enforcement articulate either probable cause or reasonable suspicion to believe that the requested biological sample will produce evidence linking an individual to the crime or assist in the investigation.⁵ Prosecutors should be aware of the jurisdictional requirements for DNA search warrants. Occasionally, defendants have successfully avoided prosecution on the basis of technical errors resulting from an incorrect procedure or standard being used in obtaining the biological sample.⁶ Be aware, however, that sample collection is not considered to be a critical stage in the prosecution and therefore there is no requirement that defense counsel be present during the collection.⁷

Consent Forms

Another means by which law enforcement may lawfully collect a DNA sample is through the use of a consent form in which an individual voluntarily waives his or her Fourth Amendment rights, thus eliminating the need for law enforcement to obtain a search warrant or court order to obtain the confirmatory sample.⁸ Voluntary consent to obtain a sample should always be in writing and include language to allow the forensic data obtained from the sample to be used in future investigations. Note, that when a prosecutor relies on a consent form, he or she then assumes the burden of proving that the consent was freely and voluntarily given. A sample of a voluntary consent form can be found in DNA: Prosecutors Practice Notebook, a free, online DNA training found at www.dna.gov or by contacting NDAA directly.⁹

Abandoned Sample

During an investigation, law enforcement may not wish to alert a suspect by contacting them directly to obtain a sample. The Fourth Amendment does not prohibit law enforcement from seizing property that has been voluntarily abandoned if (1) the suspect intended to abandon it and (2) the suspect's decision to abandon the

property was not due to police misconduct. Typical items which have successfully been collected by law enforcement and processed for DNA include coffee cups, discarded cigarette butts, tissues or garbage left for regular curbside collection. It is important that law enforcement officers avoid manipulating the abandonment process as this may result in the sample and all data obtained from it being suppressed.

Dragnet

Another means by which law enforcement officers have successfully obtained biological samples is to conduct something similar to a DUI roadblock. Here officers must be careful to establish a set of neutral criteria in order to collect the sample, for example, gender, age, geographic region, to avoid potential defense challenges of profiling. Approximately 20 DNA dragnets have been conducted in the U.S. in the last 15 years.

Compelling Samples from Third Parties

On occasion in prosecuting child abuse cases, a prosecutor may be faced with the need to obtain a DNA sample from a third party in order to identify and prosecute an offender. An example of this is the case of *Commonwealth v. Nina M. Draheim*. In this case the defendant, an adult woman, was charged with two separate counts of rape of two teenaged boys, each of which resulted in the birth of a child. The prosecutor sought to obtain DNA samples from each of the children in order to prove paternity and thus the crime. The trial court denied the prosecutor's request stating that the case would have to be tried without this evidence. The prosecutor appealed the judge's ruling and the Supreme Judicial Court of Massachusetts reversed the lower court's ruling in a case of first impression that held that a sample of physical evidence could be compelled from the body of a third party as long as the State satisfied the requirements of the Fourth Amendment and the governing Massachusetts statute, citing that the state should be permitted the same access as defendants to potentially beneficial evidence from third parties.

Conclusion

Despite its challenges, using DNA-related evidence in prosecuting child abuse crimes can greatly enhance situations in which the victim cannot speak to the jury and can illustrate the circumstances of the crime beyond words.

- ¹ Paula Wulff is the Program Manager/Senior Attorney of NDAA's DNA Forensic Program. Ms. Wulff is also one of the authors of *A Litigator's Guide to DNA* (2008). Ms. Wulff thanks law intern Kaegan-Marie Williams for her research and analysis.
- ² Forensic Science The Basics, Siegel, Jay A., pg 12, CRC Taylor & Francis Group, 2007.
- ³ *A Litigator's Guide to DNA*, Michaelis, Ron and Wulff. Academic Press, Elsevier, 2008.
- ⁴ <http://www.fbi.gov/hq/lab/codis/clickmap.htm>
- ⁵ *Schmerber v. California*, 384 U.S. 757, 761-64, (1966); *Skinner v. Railway Labor Executives Ass'n*, 489 U.S. 602, 616 (1989); *Cupp v. Murphy*, 412 U.S. 291, 295 (1973); *In re Shabazz*, 200 F. Supp. 2d 578, 581 (D.S.C. 2002)
- ⁶ *McBride v. State*, 840 S.W. 111, 117 Tex. App. (1992)
- ⁷ *U.S. v. Wade*, 388 U.S. 218, 236 (1967)
- ⁸ *U.S. v. Matlock*, 415 U.S. 164, 171 (1974)
- ⁹ *Bumper v. North Carolina*, 391 U.S. 543, 548-49 (1968)
- ¹⁰ National District Attorneys Association, 703-549-9222
- ¹¹ *Shelly v. State*, 101 S.W. 3d 606 (Tex. App.-Houston 2003)
- ¹² *Commonwealth v. Ewing*, 857 N.E. 2d 1094 (2006)
- ¹³ *North Carolina v. Reed*, 631 S.E. 2d 320 (2007)
- ¹⁴ *Commonwealth v. Nina M. Draheim*, 849 N.E. 2d 823 (2006)

The National Center for Prosecution of Child Abuse is a program of the American Prosecutors Research Institute. APRJ is the research and development division of the National District Attorneys Association. This publication was prepared under Grant No. 2007-CI-FX-K005 from the Office of Juvenile Justice and Delinquency Prevention, U.S. Department of Justice. This information is offered for educational purposes only and is not legal advice. Points of view in this publication are those of the authors and do not necessarily represent the official position of the U.S. Department of Justice, and NDAA or APRJ.



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