Effective Use of DNA Evidence in Jury Trials

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This article was originally published in The Practical Prosecutor *magazine, 1996.*

INTRODUCTION

The advent of forensic DNA typing techniques in 1985 revolutionized the investigation and prosecution of sexual and other violent offenders. Previously, traditional serological analyses furnished investigators, prosecutors and others in the criminal justice system with important scientific information. These conventional testing approaches provided only limited information regarding the inclusion of suspected offenders. Commonly, analysis of a sexual assault sample might reveal that a suspect was not excluded as a potential contributor to a recovered semen sample. However, that same test result might also indicate that ten percent of the male population may similarly not be excluded.

The limitations of conventional serological testing have been underscored in some cases by post-conviction exoneration as a result of DNA typing. Publicized examples include the case of Gary Dotson, who was convicted in the 1970's in Illinois of a forcible rape, later recanted by the victim. In 1989, DNA analysis of the original evidence proved Dotson's innocence, despite a serological analysis at the time of the crime that reportedly coincidentally included Dotson within five percent of the population which could have deposited the same evidence.

In contrast to serological analysis, DNA testing techniques provide far greater discriminating information in instances in which potential donors of evidentiary biological samples cannot be excluded. Since the late 1980's the use of Restriction Fragment Length Polymorphism (RFLP) analysis has typically provided coincidental match probabilities in the millions or billions. Modern use of more sensitive polymerase chain reaction (PCR) based techniques commonly furnishes match probabilities in the thousands or millions.

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PREPARATION FOR PRESENTING DNA EVIDENCE

Once significant DNA typing results are obtained in an individual case, the prosecutor must develop an approach for the presentation of that evidence to the trier of fact. Admissibility concerns will not be addressed here, but have been – or predictably will be – successfully resolved in all jurisdictions.

Careful advance preparation is essential to the successful introduction of the results of any scientific testing technique. Numerous resources provide important information regarding the scientific background of DNA typing techniques. These include biology and molecular biology textbooks, scientific journals, symposia, seminars and other training sessions offered by scientists and lay professionals, reporters' transcripts of expert witness testimony in prior proceedings and discussions with persons familiar with DNA testing. The ability to consult such references is obviously impacted by time constraints.

Correct appraisal of results obtained through the use of DNA typing techniques is essential to the proper use of DNA evidence. The existence of "matches" and "exclusions" must be appropriately evaluated in the context of the specific facts of any individual case.

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Mixtures of DNA contributed by multiple parties may frequently complicate evaluation of the impact and meaning of typing results. Inability of the testing laboratory to glean any DNA information from single or multiple samples must be examined and frequently explained to the trier of fact.

The pretrial conference is an essential component of preparation for trial testimony involving DNA typing. This conference should include discussion regarding the exact nature of the evidentiary and known samples, the testing procedures used, the meaning of all results or lack of results, the qualifications and history of the testifying expert and areas of inquiry or specific complaints likely to be voiced during cross-examination.

COMMUNICATING DNA EVIDENCE TO A JURY

At least two fundamental approaches exist to the presentation of DNA typing evidence at a jury trial. One technique attempts, through the introduction of testimonial, physical and demonstrative evidence, to thoroughly educate a jury as to the foundation and details of DNA testing.

When using this approach, molecular biology theory may be offered to show how genetic characteristics are transmitted from parents to offspring. Demonstration may be made of the entire DNA testing process and its exploitation of the highly variable nature of specific portions of the DNA molecule. Presentation of raw data obtained during case-specific DNA typing procedures also may be offered to establish the basis for the ultimate conclusions rendered by the DNA examiner.

Proper preparation for any defense attack begins with familiarization with the scientific foundation for DNA analysis.

A second, preferred approach for the presentation of DNA typing evidence at trial seeks to provide to the jury only the information that is essential to communicate both the reliability of the testing method and the significance of the results obtained. Qualification of the DNA expert is essential to establish jury confidence in the testimony to be provided by that witness.

Areas which should be discussed include formal education, including degrees, certificates, honors and awards received, teaching experience, and training and experience with DNA testing. Forensic testing experience, authored publications, familiarity with scientific literature, seminar presentations, membership of scientific and forensic societies, and previous court expert testimony should also be addressed. Brief, yet informative, discussion of the basic techniques utilized in DNA typing may be provided.

The use of DNA typing techniques outside forensic investigations includes procedures which necessitate life and death decisions. These nonforensic applications include medical diagnostic procedures for the identification and treatment of genetic disease, identification of the remains of war dead and the protection of endangered animal species. Description of these nonforensic uses of DNA typing is perhaps the single most important piece of information which must be provided to the trier of fact.

Visual display of the autoradiographic (X-ray) results for RFLP, or dot blot analyses and autoradiographic data for PCR-based typing techniques can be provided. Exhibition of this type of data – particularly banding patterns which dramatically and easily demonstrate matches between samples – is frequently the most compelling form of demonstrative scientific evidence presented in a courtroom.

The basic method for calculation and case-specific interpretation of population frequency data, including its significance, must be described with care. References to probabilities should normally be avoided, inasmuch as such descriptions are frequently judicially equated with disfavored "probabilities of guilt." Differences in estimated population frequencies between major races should be provided. A jury may determine from the remaining evidence that the frequency data in one particular race is the only probative estimate (e.g., other evidence establishes that the perpetrator is Caucasian). Most importantly, the purpose of frequency data is simply to provide the trier of fact with a guide to the relative rarity of a DNA match between known and questioned samples.

Enlarged diagrams with listed evidentiary items, known samples, inclusion/exclusion notations and frequency estimates normally enhance jury understanding. Use of such outlines is particularly helpful in cases with multiple evidentiary specimens.

THE DEFENSE ATTACK

The nature of the defense assault on prosecution DNA typing evidence may vary. Leveled attacks include that DNA analysis is too new for reliability and accuracy to be ascribed to the results, or that the science underlying DNA typing is too complex and thus suspect. Other arguments may suggest that conflicting expert testimony demonstrates disagreement about the reliability of DNA results, that DNA typing is reliable only for purposes of exclusion (not inclusion), and that scientific debate regarding population frequency data undermines the significance of a match.

Proper preparation for any defense attack begins with familiarization with the scientific foundation for DNA analysis. Countering the defense attack may require demonstration of the length of time DNA typing has been utilized, the acceptability and use of DNA testing outside the criminal justice system, the absence of scientific data verifying defense expert assertions and the presentation of empirical proof supporting the validity of techniques used by prosecution experts.

Testimony provided by defense DNA experts may be used successfully to underscore the reliability and accuracy of forensic DNA typing. Cross-examination may be used

to emphasize the reliability of results obtained through the use of DNA typing in nonforensic applications. The minor nature of differences between forensic and nonforensic DNA typing and the rigorous nature of quality control and quality assurance procedures in forensic testing laboratories can also be emphasized through cross-examination of a defense expert witness.

Perhaps the most fertile area of examination involves the frequent existence of additional evidentiary sample. The defense expert witness frequently may be examined regarding familiarity with the testing laboratory's preservation of additional evidentiary material in the current case. The expert may then be questioned about the ease of defense retesting should sufficient concern exist about the accuracy and reliability of prosecution test results.

Defense expert testimony is often used to criticize frequency data presented to describe the approximate rarity of matching genetic characteristics. The appropriate scope and extent of cross-examination of such experts is dependent on the individual witness.

Traditional cross-examination techniques may be most effective. These include the dependency of the expert on income derived from forensic consultation and testimony, as well as the expert's absence of knowledge and experience in forensic DNA typing. Cross-examination of such experts is frequently best devoted to the existence of recent substantial scientific research affirming the validity of the population frequency data calculation procedures employed by DNA typing laboratories.

Rebuttal testimony of a disinterested nonforensic DNA scientist may be used to counter defense assertions. Numerous scientists are available to review laboratory protocols and case-specific data. Endorsement of results by such a scientist (e.g., a disease diagnostician) can often swiftly and successfully counter scientifically inappropriate defense assertions.

DEFENSE DNA TESTING

The prosecutor may, on rare occasions, be required to cross-examine a defense expert who presents the results of defense DNA testing. The procuring of all data, including reports, bench notes, autoradiographs, written protocols, photographs and related materials in possession of the testing laboratory must precede any such cross-examination. A consulting expert witness should conduct evaluation of any testing results which materially impact the current prosecution. The impact of results of scientific evidence testing which may demonstrate the innocence of a criminal defendant must always be considered and weighed carefully.

CONCLUSION

Biological evidence is commonly recovered in the investigation of sexual and other violent offenses. Effective presentation of DNA evidence at trial will normally resolve questions regarding the identity of depositors of evidentiary biological samples for the trier of fact. Proper preparation for such DNA evidence presentation will clearly enhance the prosecutor's goal of obtaining justice.

CHECKLIST:

- ✓ Preparation for forensic DNA evidence is the key to successful trial presentation.
- ✓ A comprehensive and detailed pretrial conference with each testifying DNA expert is essential.
- ✓ A concise but informative jury presentation of the nature and nonforensic uses of DNA typing is effective.
- ✓ Graphic display of typing results to the trier of fact can enhance jury confidence in expert conclusions.
- ✓ Defense expert testimony regarding DNA evidence can be successfully attacked, utilized and/or rebutted.
- ✓ DNA results of original and any subsequent testing must be considered and weighed in the determination of potential innocence of any charged defendant.