WISCONSIN LEGISLATIVE COUNCIL
INFORMATION MEMORANDUM

The Use of DNA Evidence in Criminal Proceedings

INTRODUCTION

DNA is shorthand for deoxyribonucleic acid. DNA is the biological material which contains all the genetic information within living organisms, including human beings. The ability of a cell of a human body to replicate itself is due to the presence of the DNA "blueprint" in the chromosomes within the nucleus of each cell.

Each human cell contains 23 pairs of chromosomes within its nucleus. One-half of each pair of chromosomes is provided by each parent at the time of conception. Although most of the information stored in human DNA includes general information common to all humans, some of the information is unique to a particular individual. Only identical twins have identical DNA.

The DNA information unique to a particular individual is stored in genes known as polymorphic genes and their location on a DNA molecule is called a polymorphic site or locus. By isolating and identifying certain segments of the DNA molecule contained in human tissue samples (e.g., blood, skin, hair follicles or semen stains) it is possible to identify the individual who is the source of the DNA. Like fingerprints, DNA evidence can be useful in criminal investigations and prosecutions.

DNA evidence was first admitted in a criminal trial in the United States in a 1988 Florida case. [*Andrews v. State*, 533 So. 2d 841, 850 (Fla. Dist. Ct. App. 1988); rev. denied, 542 So. 2d 1332 (Fla. 1989).] Since that time, DNA evidence has engendered controversy, both in the scientific and legal communities.

The purpose of this memorandum is to explain briefly the science of DNA identification analysis, rules governing the admission of DNA analysis as evidence in criminal proceedings, collection of DNA evidence in Wisconsin and issues relating to the use of DNA evidence in Wisconsin.

DNA IDENTIFICATION ANALYSIS

Background

DNA identification analysis is the process of isolating and identifying segments of the DNA molecule. The scientific community developed the technique in order to study human genetics. This research lead to the discovery in the early 1980's that the same DNA segment has different lengths in different individuals and that various analysis techniques could be used to match samples of human DNA.

Analysis Techniques

Two analysis techniques are most often used in forensic DNA analysis. These are known as Restriction Fragment Length Polymorphism (RFLP) and Polymerase Chain Reaction (PCR). The most commonly used technique is RFLP.

The first step in the RFLP analysis is to extract DNA from the evidentiary tissue sample by the use of solvents. Next, the extracted DNA is cut into smaller segments by the use of a restriction enzyme. The location of these restriction sites and the resulting DNA fragment lengths differ among individuals.

The next step is to sort the DNA fragments by the procedure "gel electrophoresis." Because DNA fragments have a negative electrical charge, the application of an electrical current causes the DNA fragments to move through agarose gel, with shorter fragments grouped toward the positive pole and the longer fragments toward the negative pole. [See Figure 1.]

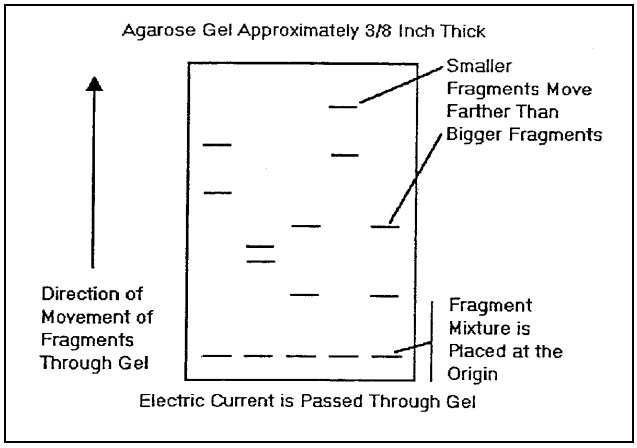

Figure 1. DNA Fragment Separation by Electrophoresis.[1]

The DNA fragments are then transferred to a nylon membrane by a procedure called "Southern Blotting." [See Figure 2.]

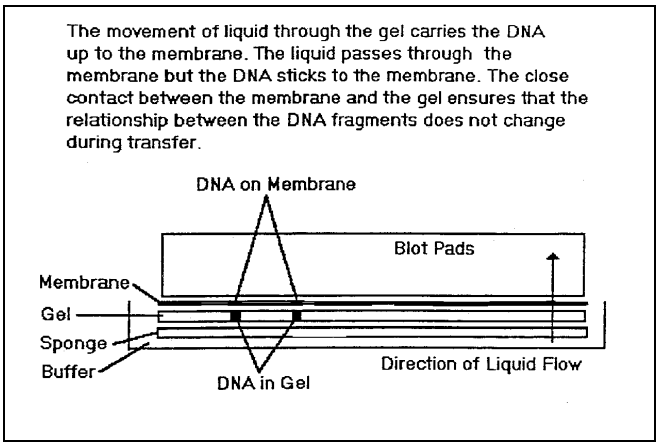

Figure 2. Southern Blotting Transfers the DNA to a Nylon Membrane[1]

In order to visualize the DNA that has been fixed to the membrane, a radioactive DNA probe is applied. When placed on the membrane, the probe seeks out and attaches (i.e., "hybridizes") itself to any complementary sequence on the target DNA. After the probe hybridizes to the target DNA fragment on the membrane, the location of the radioactive fragment can be determined by placing an x-ray film in contact with the membrane. The resulting autoradiograph shows a DNA pattern, similar to the bar code used in merchandising, that can be used like fingerprints to compare the suspect's DNA with DNA found on samples at the crime scene. [See Figures 3 and 4.]

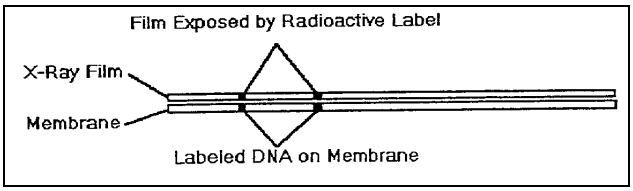

Figure 3. Autoradiography[1]

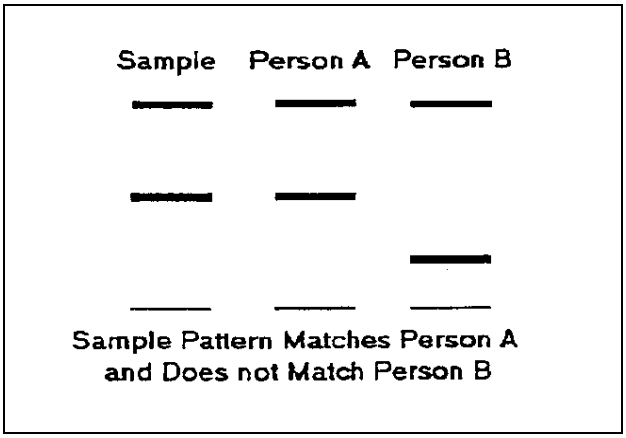

Figure 4. Pattern Comparisons[1]

A statistical probability calculation determines the uniqueness of the matched DNA patterns. This statistical calculation is expressed in terms of the probability that the match would occur by chance in this population group.

The major disadvantage to using RFLP analysis is that DNA samples which have been degraded by exposure to prolonged sunlight or extensive soiling cannot be used.

The second most commonly used method of DNA identification analysis is PCR. The first step in PCR is extraction of the DNA from the evidence sample. After that the PCR technology differs greatly from the RFLP technology. In the PCR technology, a small amount of DNA is amplified until it is sufficient for analysis. Amplication refers to the process by which copies of DNA are made using a polymerase (enzyme) chain reaction.

The major drawback to using PCR amplication analysis is that it is particularly susceptible to contamination.

DNA EVIDENCE USE IN CRIMINAL PROCEEDINGS

Rules of Evidence Applicable to DNA Evidence in Federal Courts and Most State Courts

All scientific evidence in criminal trials, including evidence derived from DNA identification analysis, must satisfy the test of admissibility in effect in a particular jurisdiction. In general, courts use one of two tests. The so-called "Frye" test, which was pronounced by the U.S. Circuit Court for the District of Columbia in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), or one of its variations, is used in a majority of state jurisdictions. Under the *Frye* test, a novel scientific technique must have gained general acceptance in the relevant scientific community before it will be admitted by the court.

The second test follows the basic relevancy standard of the Federal Rules of Evidence (Rules 401, 402, 403 and 702) and is used in a minority of state jurisdictions. For admissibility under the Federal Rules, scientific evidence must have some relevance to the issues in the case, and its probative value must outweigh the potential for prejudice. In *Daubert v. Merrill Dom Pharmaceuticals, Inc.*, 509 U.S. 579, 1135 S. Ct. 2786 (1993), the U.S. Supreme Court ruled that the Federal Rules of Evidence have replaced the *Frye* test in federal court trials. Additionally, the Court defined a new federal standard:

> [U]nder the rules, the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable. [1135 S. Ct. at 2795.] Determining reliability entails a preliminary assessment of "whether the reasoning or methodology underlying the [expert] testimony is scientifically valid and . . . whether [the] reasoning or methodology properly can be applied to the facts in issue. [*Id.* at 2796.]

The court provided a nonexclusive list of factors that may be used to determine scientific validity: (1) whether a theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error in using a particular scientific technique and the existence and maintenance of standards controlling the technique's operation; and (4) whether the theory or technique has been generally accepted in the particular scientific

field. [*Id*. at 2796-97.] While the *Daubert* test applies to federal courts, most state courts continue to follow the *Frye* test.[2]

Rules of Evidence Applicable to DNA Evidence in Wisconsin Courts

Wisconsin courts have rejected the *Frye* requirement of general acceptance within the scientific community as a prerequisite to admissibility. In *State v. Walstad*, 119 Wis. 2d 483, 351 N.W.2d 469 (1984), the Wisconsin Supreme Court confirmed that Wisconsin's expert witness relevancy standard, as promulgated by the Supreme Court and codified in s. 907.02, Stats., determines the admissibility of expert testimony:

> **Testimony by experts**. If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

Although many states are still wrestling with the issue of admissibility of DNA evidence, the relevancy test adopted by the Wisconsin Supreme Court in *Walstad* permits the admission of scientific evidence, including DNA evidence, regardless of whether the evidence meets the reliability requirements set forth in *Frye* and *Daubert*. As noted by the Wisconsin Supreme Court in *Walstad*:

> The fundamental determination of admissibility comes at the time the witness is "qualified" as an expert. In a state such as Wisconsin, where substantially unlimited cross-examination is permitted, the underlying theory or principle on which admissibility is based can be attacked by cross-examination or by other types of impeachment. Whether a scientific witness whose testimony is relevant is believed is a question of credibility for the finder of fact, but it clearly is admissible. [351 N.W.2d at 487.]

Consistent with *Walstad*, the Wisconsin Court of Appeals in *State v. Peters*, 192 Wis. 674, 534 N.W.2d 867 (1995), a case specifically dealing with the question of the admissibility of DNA evidence, rejected the argument made by the defendant on appeal that DNA evidence should not have been admitted because the trial court had failed to make a determination as to the reliability of the evidence. In making this ruling, the Court of Appeals held:

> Once the relevancy of the evidence is established and the witness is qualified as an expert, the reliability of the evidence is a weight and credibility issue for the fact finder and any reliability challenges must be made through cross-examination or by other means of impeachment. *Walstad*, 119 Wis. 2d at 518-19, 351 N.W.2d at 487. Thus, the trial court was not required to determine that the DNA evidence and the statistics derived therefrom were reliable. Rather, the trial court's obligation was to determine whether the testifying witness was qualified as an expert, whether the evidence was relevant and whether it would assist the trier of fact. [534 N.W.2d at 873.]

WISCONSIN DNA DATABANK

Legislation creating the current Wisconsin DNA Databank was enacted in the 1993 Legislative Session (1993 Wisconsin Act 16) and revised by legislation enacted in the 1995, 1997, and 1999 Legislative Sessions. [See ss. 165.76, 165.765 and 165.77, Stats., in particular.]

The law originally required the submission of a biological specimen to the DNA Databank for analysis of any person who, on or after August 12, 1993, is: (1) imprisoned or placed on

probation, parole or aftercare supervision for first- or second-degree sexual assault [s. 940.225 (1) and (2), Stats.] or sexual assault of a child [ss. 948.02 (1) or (2) or 948.025, Stats.]; or (2) found not guilty or not responsible by mental disease or defect and is under state institutional care for first- or second-degree sexual assault or sexual assault of a child. Subsequently, persons found to be "sexually violent" under ch. 980, Stats., on or after June 2, 1994, were also required to provide a biological specimen to the Databank.

Most recently (1999 Wisconsin Act 9), the law was revised to require the submission of biological specimens for inclusion in the DNA Databank from persons: (1) in prison on or after January 1, 2000 for ***any felony*** committed in Wisconsin; (2) released on parole, extended supervision or placed on probation in another state on or after January 1, 2000 and are on parole, extended supervision or probation in Wisconsin for a violation of a law in the other state that DOC determines would constitute a ***felony*** if committed by an adult in Wisconsin; and (3) sentenced or placed on probation for ***any felony*** conviction on or after January 1, 2000. [ss. 165.76 (1) (ar), 165.76 (1) (f) and 973.047 (1f), Stats.]

A law enforcement agency investigating a crime and a defense attorney representing a client are also authorized under the law to submit a biological specimen and request a DNA analysis of the specimen. [s. 165.77 (2) (a), Stats.]

The Department of Justice (DOJ) is responsible for administration of the DNA Databank. The DNA Databank is located in the State Crime Lab in Milwaukee, one of three crime labs administered by the DOJ.

ISSUES RELATING TO THE USE OF DNA EVIDENCE IN WISCONSIN

At a hearing before the Assembly Committees on Criminal Justice and Corrections and the Courts on March 1, 2000, spokespersons for the Wisconsin Innocence Project (hereinafter, "the Innocence Project"), Frank J. Remington Center, University of Wisconsin Law School, presented recommendations for changes in state law to improve the "truth-finding" function of the criminal justice system through the use of DNA evidence. Innocence Project recommendations include:

- Mandate preservation of biological evidence in criminal cases.

The Innocence Project notes:

> No statute or other uniform rule governs the preservation of biological evidence. The experience varies widely from jurisdiction to jurisdiction; some Wisconsin police agencies preserve biological evidence indefinitely, while in other cases the evidence is destroyed before the direct appeal process is concluded. Once such evidence is destroyed a prisoner's ability to provide his or her innocence may be lost. Concomitantly, once the evidence is destroyed the state loses the ability to use this powerful DNA evidence to find and convict the true perpetrator.

- Create a statutory procedure for obtaining DNA testing of biological evidence in post-conviction cases, without regard for the defendant's ability to pay, where testing might prove innocence.

The Innocence Project has learned: "In the last ten years, the United States and Canada have exonerated more than 65 individuals with the use of DNA testing," citing findings set forth in the Innocence Protection Act of 2000 for this conclusion. [Proposed U.S. Senate Bill 2073, 106th Cong. S. 101 (a) (5) (2000).]

- Eliminate the current one-year statute of limitations for seeking a new trial based on newly discovered evidence.

The Innocence Project observes that current law ". . . requires that motions for new trials based

on newly discovered evidence be made within one year of conviction." While the Innocence Project authors recognize that "due process" may require courts to consider newly discovered evidence outside the one-year window [citing *State v. Bembenek*, 140 Wis. 2d 248, 409 N.W.2d 432 (Ct. App. 1997)], they suggest that elimination of the one-year limitation is particularly warranted in the case of DNA evidence.

In addition, the Legislature recently considered legislation (1999 Assembly Bill 497) to eliminate the time limitations on prosecution for first- and second-degree sexual assault of a child and repeated acts of sexual assault of a child (ss. 940.225 (1) or (2), 948.02 (1) or (2) and 948.025, Stats.). Proponents of the legislation argued that the current statutory time limits for the commencement of prosecution of crimes (generally, three years for misdemeanors and six years for felonies; see s. 939.74 (1), Stats.), fail to recognize the advent of DNA analysis to prove the guilt or innocence of alleged sex offenders. The bill, as amended by both the Assembly and Senate, received strong bipartisan support in the Legislature but the Legislature adjourned before final action could be taken on the measure.

This memorandum was prepared on October 11, 2000, by Shaun Haas, Senior Staff Attorney, Legislative Council Staff.

This Information Memorandum is not a policy statement of the Joint Legislative Council or its staff.

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[1] Figures 1, 2, 3 and 4 are from: Dirk W. Janssen, Serology Section Head, Wisconsin State Crime laboratory, Milwaukee, *Forensic DNA Analysis An Introduction to Science and Technology* (February 27, 1992).

[2] The Uniform Rules of Evidence, as promulgated by the National Conference of Commissioners on Uniform State Laws and recommended for enactment by the states, deals with expert testimony in Rule 702. Rule 702 combines a modified historic *Frye* standard governing the admissibility of expert testimony as a procedural rule with the reliability standards established in *Daubert*. Under this formulation, a principle or method is either presumed to be reliable or unreliable depending upon whether it has substantial acceptance within the relevant scientific, technical or specialized community. The presumption of reliability or unreliability can then be rebutted by resort to, among others, the reliability factors or absence thereof established in *Daubert* for determining the admissibility of expert testimony. Establishing a modified *Frye* standard as a procedural rule is an accommodation of the conflict in the decisional law among the several states between applying the historic *Frye* standard of reliability, the *Daubert* standard of reliability and varying other approaches to the admissibility of expert testimony.

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