

STR DNA ADMISSIBILITY HEARINGS AND THE MINNESOTA LEGISLATIVE RESPONSE TO THE STATUTE OF LIMITATIONS FOR SEXUAL ASSAULTS

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MINNESOTA'S DNA HISTORY

The use of DNA typing techniques in Minnesota criminal cases has closely paralleled the development of new methods by the scientific community. In late 1988 and early 1989, a lengthy admissibility hearing was held in Minneapolis. The crime in which DNA testing was being offered involved the attempted rape and murder of a young woman in a Minneapolis parking ramp three blocks from the county court house. The attack took place at 9 am on a Friday morning. The trial court granted the State's motion to admit the results of the RFLP testing performed on blood found on the defendant's clothing, but certified the question to the Minnesota Supreme Court for a pre-trial ruling. In State v Schwartz, 447 N.W.2d 422, (Minn. 1989), the Supreme Court ruled that the admissibility of emerging scientific evidence such as DNA testing is governed by the FRYE (footnote, Frye v United States, 293 F.1013 D.C. Cir. 1923) standard. The court also ruled that while it had been demonstrated, as required by Frye, that DNA typing is generally accepted in the scientific community, because the testing lab had not complied with all of the TWGDAM guidelines, the testing results were not admissible.

Though the Schwartz decision excluded the testing results, it did provide a guide for future DNA cases in Minnesota. Schwartz mandated that DNA laboratories demonstrate compliance with appropriate standards and controls as a method of ensuring reliability. The court found that the TWGDAM guidelines should be considered the proper standards. Post-Schwartz, there were three additional lengthy FRYE hearings held in State v Jobe, 485 N.W.2d 407 (Minn. 1992), State v Johnson, 498 N.W.2d 10 (Minn. 1993) and State v Perez, 516 N.W.2d 175 (Minn. 1994). In each case, RFLP testing performed by the FBI in Jobe and Johnson, and the Minnesota Bureau of Criminal Apprehension (BCA) in Perez was ruled admissible. Following those decisions, RFLP DNA evidence was routinely received in courts throughout Minnesota.

Minnesota was one of the earliest states to provide significant funding for a DNA typing program. This enabled the BCA DNA typing laboratory to put a high quality DNA typing program into place. The Minnesota legislature had the foresight to provide sufficient funds for the establishment of a sex offender DNA profile data base. Because Minnesota's sex offender data base was operational so early, the first two "cold hit" DNA cases in the United States came out of Minnesota. Those cases, State v Perez, supra, and State v Bloom, 516 N.W.2d 159 (Minn. 1994) were assigned to this author. Perez involved the brutal rape murder of a young woman as she slept in her apartment, and Bloom involved the abduction rape of a young woman. Neither defendant had been identified as a suspect by conventional police investigation methods. A DNA profile produced from semen in each case was compared to the profile of a number of suspects developed in each case. Those suspects, including the male room mate of one of the victims, though not arrested, had been developed during the investigation. Several of them had prior convictions for sexual assault. All were eliminated by the DNA typing. There is no question that neither of these crimes would ever have been solved or successfully prosecuted without DNA typing.

Several years after RFLP typing became accepted in Minnesota, the Minnesota BCA began using PCR typing employing the DQ alpha and Polymarker (PM) kits. Testing using the D1S80 marker followed shortly thereafter. Once again, two lengthy Frye hearings were conducted and the court ruled these methods generally accepted. However, because the defendants plead guilty, those cases never reached the Minnesota appellate courts. After those two hearings, DNA results were routinely admitted in Minnesota courts. Because no defendant ever challenged admission of the PCR typing results, there is no Minnesota appellate decision on PCR typing. Up until 1999, BCA RFLP and PCR test results were used to successfully prosecute several other cold hit cases and numerous other violent offenders. Many of these offenders, including two serial rapists who together raped 15 young women over 9 month period, could not have been prosecuted without DNA typing.

PROSECUTION STRATEGY FOR MINNESOTA'S STR FRYE HEARINGS

In 1999, the Minnesota BCA discontinued RFLP typing and typing using the DQ alpha PM kits. Having studied STR typing for several years, the BCA began using STR DNA typing to analyze all crime scene samples submitted for DNA typing, BCA personnel and this author began discussing strategy for the expected court challenges to STR DNA typing. Because it was virtually certain that the judge assigned to rule on the case would not have any prior DNA experience, educating the judge was crucial. After the judicial assignment, an opening brief was submitted to the court. The opening brief detailed the similarities between older methods of DNA typing and STR typing, and stressed that STR typing is not at all a novel scientific procedure, but a procedure which incorporates well established scientific procedures. It was pointed out to the court that the initial steps of DNA typing such as extraction, purification and quantification are identical regardless of what DNA methodology is used. When STR typing is compared with the older types of PCR typing, the only differences are that the loci used are different and more numerous and STR typing is more automated. The brief also argued that other forensic testing such as ballistics, blood alcohol, etc. do not undergo extensive Frye hearings each time there are changes in the particular methodology used. As long as the general scientific principles used in the testing are generally accepted, admissibility based upon advances in testing methods does not justify a complete new judicial inquiry. Every attempt was made to keep the focus of the hearing on the methodology and not on how the details of the analysis may have changed.

Because the TWGDAM guidelines had been cited extensively in previous Minnesota DNA decisions, it was very important to address the issue of what guidelines or standards should be looked at by the courts. Therefore, the brief, directed the court to the fact that in 1994, Congress passed the DNA Identification Act. A section of that act provided for the formation of the DNA Advisory Board. That Board was given the authority to establish standards for DNA testing labs. Pursuant to that authority, the Board promulgated what are known as the DAB standards, and by law those standards took effect and superceded the TWGDAM guidelines on Oct. 1, 1998. Because the TWGDAM guidelines might arguably be read to impose stricter conditions for the acceptance of new typing methods, convincing the court that the DAB standards and not the TWGDAM guidelines were the operative "standards and controls" was deemed crucial. One need only review the adverse trial court decisions from Vermont and Colorado to appreciate the

importance of this distinction. Both of those courts based their decision to exclude STR typing results largely on two findings; first, that the state must show that the kits and instruments were generally accepted in the scientific community, and had failed to do so, and, secondly, on a perceived failure to demonstrate compliance with TWGDAM guidelines. (footnote to State of Vermont v Pfenning, Vt. Dist. Ct. # 57-4-96 (April 6, 2000.), State of Colorado v Shreck, Dist. Ct., Boulder Co., # 98CR2475, April 12, 2000) It is the strong belief of this author that those cases were wrongly decided. The Colorado case has been appealed to the supreme court of that state which will hopefully reverse the decision of the trial judge.

Another important strategy was to make the court aware of the many advantages of the STR methodology. Compared to RFLP testing, the time saved in the testing process is significant. Even without any backlog, RFLP testing can take months, while STR typing can be completed in a couple of weeks. The fact that STR typing looks at so many areas of the DNA provides two significant benefits. The first is that performing multiple tests at once decreases the chance of sample handling error. The second benefit is that testing 13-16 loci is really the equivalent of identity testing. The most significant area of controversy with the earlier DNA typing had been the calculation of the match probability. Not having to decide which statistic should be presented to the jury should be seen as a significant benefit by the court. Another benefit is that STR typing uses very little sample amount, such that there almost always is sufficient sample amount left for the defense to conduct its own independent testing, if they so choose. Finally, this testing process produces very objective testing results. These results can be reviewed and critiqued by experts hired by the defense, again, if they so desire.

At the suggestion of the scientists at the BCA, lengthy affidavits were prepared by the scientists. These affidavits addressed a number of subjects, including basic information about DNA, the history of DNA typing at the BCA, the experience and training of the scientist, basic information about polymerase chain reaction (PCR) and STRs, information about the kits and instruments used, and a detailed discussion of the validation studies conducted by the BCA and other laboratories.

This author would strongly encourage the use of affidavits for a number of reasons. We found that the affidavit format greatly aided in organizing a large amount of information for the court. As opposed to testimony about such technical topics as peak height ratio and dilution studies, explaining and condensing the results into an affidavit form made the material at least potentially understandable to a judge. And, as we all know, we understand and remember material much better when we see and hear it as opposed to just hearing it. Finally, by entering the affidavit into evidence, the testimony time of the scientist was greatly reduced. This author has never met a scientist who wishes that he or she could spend more time in court.

DEFENSE STRATEGY TO EXCLUDE STR TYPING RESULTS

Prior to the start of the DNA admissibility hearing, this author was able to learn what defense tactics had been employed in other admissibility hearings in other states. It became apparent that the strategy of the defense would be to concede that PCR STR typing was generally accepted in the scientific community, but to assert that the state must prove that the kits and instruments were themselves generally accepted. If able to convince the court that the state must make this

showing, the defense would argue that for two reasons, general acceptance of the kits and instruments could not be shown:

- ◆ There had not been sufficient validation of the kits and instruments, as demonstrated by the lack of published papers,
- ◆ There could not be general acceptance in light of the failure of the kit manufacturers to release the primer sequences.

To counter these two arguments, we argued strenuously that there was no legal precedent for a ruling requiring the state to demonstrate general acceptance down to the level of the kits and instruments. The question should not be whether the specific kits or instruments are generally accepted. If every change in procedure needed to be proven to be generally acceptable, a Frye hearing would be required for every minor improvement in technique. This has not occurred when, for example, there have been changes in the techniques used in ballistics testing or Breathalyzer testing.

MINNESOTA'S STR RULING

The state was able to persuade Dr. Bruce Budowle of the FBI and Dr. Arthur Eisenberg, Chairman of the DNA Advisory Board to testify at the Frye hearing. Their testimony proved to be very persuasive. Drs. Budowle and Eisenberg provided testimony that these particular kits and instruments (supplied by Applied Biosystems) were the most commonly used kits in the industry. They indicated that there was a wealth of experience in the forensic community about these kits, and that it was not necessary to know the exact composition of the primer sequences to determine if they were generally accepted. After a lengthy hearing spread over a period of two months, the court ruled in favor of the State. The major points of its ruling were that:

- ◆ PCR STR typing is generally accepted in the scientific community as an accurate and reliable method to type DNA samples,
- ◆ The State did not have to demonstrate that the kits and instruments were generally accepted, rather that the underlying method and theory of STR typing is generally accepted,
- ◆ That the State did have to demonstrate that the kits and instruments had been used in accordance with the appropriate standards and controls, and that those standards and controls were the DAB standards,
- ◆ That the BCA had demonstrated, as it was required to do, that the lab was proficient in the use of the kits and instruments, and finally,
- ◆ That the unavailability of the primers and validation studies done by the manufacturer did not constitute a discovery violation or prevent a finding of general acceptance.

Judge Anderson wrote that “The system simply has been shown to work, time after time, by lab after lab, with or without studies from PE Biosystems. The system is like a Model A Ford. Thousands of owners can tell us it works even if Henry Ford can’t or won’t explain it. The customers have thoroughly and scientifically validated this system.” State v Dishmon, Hennepin County, # 990473451, March 3, 2000.) Although Judge Anderson ruled that the State need not demonstrate that the kits and instruments were generally accepted, he also ruled that in the event an appellate court would rule that general acceptance must be shown, the record did in fact support a finding of general acceptance.

Three defendants had been joined together for this hearing. The hope was that one of these three cases would result in an appellate decision affirming the trial court’s ruling. However, as of this writing, two of the defendants had pled guilty, while the trial of the third defendant ended in a mistrial. This makes an appellate decision before the end of 2001 unlikely.

HOW CAN LABS HELP PROSECUTORS MEET THESE ATTACKS ?

There is much that lab scientists can do to assist prosecutors in presenting a powerful court case for STR typing admissibility. Scientists must remember that information they take for granted is not information which is known to prosecutors let alone judges. Scientists must continually remind themselves that it is impossible to be too simplistic in explaining DNA typing to lawyers and judges. The best policy is to assume that lawyers and judges have a zero DNA IQ. Scientists should be prepared to assist in the presentation of a persuasive court case by doing the following;

- ◆ Present a list of published scientific articles and papers concerning STR typing. At the latest count, the Short Tandem Repeat DNA Internet Database web site maintained by the National Institute of Standards and Technology contained over 1300 published articles referencing STR typing. The existence of such an extensive body of information is impressive in and of itself to a court of law. The web site is found at www.cstl.nist.gov/biotech/strbase.
- ◆ Detailed affidavits delineating laboratory compliance with the DAB standards section by section, as well as ASCLD compliance, if accredited. The affidavits should also detail the validation conducted by the testing lab, as well as studies and validation conducted by other labs, which studies are routinely relied on by scientists (see above)
- ◆ Educate the court on how new scientific methods become accepted in the scientific community. Many judges fundamentally misunderstand the process by which new scientific methods become accepted. It should be stressed that the editors of scientific journals are not interested in publishing research by one lab which duplicates research already done by other labs.

- ◆ In addition, labs have access to data which can be very important in persuading a court that the testing methods are accurate and reliable. As all scientists know, every time these kits are used, controls and standards are used. This provides data showing the ability of these kits to replicate testing results from the positive and blind control results. Above and beyond the proficiency test results for the scientists for this lab, the scientists should obtain data from the supplier of these proficiency tests taken by other labs. This demonstrates that this lab and many others, using different technologies, obtain the same results.
- ◆ Finally, scientists should also not overlook what may well be the most important persuasive data produced by the lab in the testing process; the comparison of the female fraction typing results from vaginal/perineal/anal, etc. swabs to the typing results from the known from the female victim. Statistics have repeatedly shown that about 70% of the cases submitted for DNA typing are sexual assault cases. The great majority of those cases involve testing a mixed biological sample such as a vaginal swab. Data showing that the DNA profile from the female fraction of the mixed stain matches the known of the female victim is very impressive data. It indicates the capability of accurately and reliably comparing a forensic sample to a more pristine sample. This method of demonstrating lab performance has long been advocated by Dr. Budowle.

RECENT CASE DEVELOPMENT IN STR TYPING

Since the Minnesota Dishmon hearing from early 2000, Judge Anderson has heard testimony from additional defense witnesses. In a September 19, 2000 order supplementing his original ruling in Dishmon, Judge Anderson reaffirmed his original ruling, stating that nothing had been presented which would persuade him to change his earlier opinion. To this authors knowledge, no trial court other than the Vermont and Colorado decisions cited above has rejected STR typing as an accurate and reliable method of typing biological stains. Decisions in Florida, Arizona, California, and Michigan have followed the reasoning of earlier California decisions and the decision of Judge Anderson. Given the continued and growing body of evidence that these kits and instruments are performing remarkably well on a variety of samples, this author believes it likely that the corner has been turned and that the STR wars will result in a body of uniform decisions which favor admissibility.

However, even if the judge should rule that the kits and instruments must be shown to be generally accepted, this does not mean that the testing results should be excluded. As noted above, in Dishmon, Judge Anderson concluded that a showing had been made that the kits and instruments were generally accepted. Since the date of that ruling, much has occurred which supports a finding of general acceptance for the kits and instruments. If a court should rule there must be a showing of general acceptance of the kits and instruments, the following points should be made to the court:

- ◆ A number of new papers have been published supporting general acceptance of kits and instruments (1-4)
- ◆ Presentations at meetings and seminars
- ◆ FBI survey and other info indicating kit and instrument usage in US labs
- ◆ Use of kits world-wide

MINNESOTA'S ABROGATION OF THE STATUTE OF LIMITATIONS FOR CERTAIN SEXUAL ASSAULTS

The durability and stability of DNA has led to the ability to identify the contributor of a DNA sample years after that sample has been deposited at a crime scene. Thus, it is possible to obtain a DNA type from evidence samples collected years ago and even in situations where the evidence has been subjected to very harsh treatment such as skeletal remains from a fire. DNA typing has been shown to have a superior ability to accurately type aged samples as compared to the older methods of protein and enzyme typing.

This fact has led a number of states to create exceptions to their statute of limitations in sexual assault cases where biological samples have been preserved. The primary rationale for statutes which barred prosecution after a given number of years had passed is to protect an accused from "overly stale criminal charges." United States v Marion, 404 U.S. 307, 321 (1971). A number of legislatures have been persuaded that DNA testing can identify a perpetrator with such a high degree of probability that it is no longer justified to cut off prosecution of older crimes where biological evidence from DNA can identify the perpetrator.

In its 2000 legislative session, the Minnesota legislature amended and abolished the statute of limitations for certain sex crimes. The statute provides that an indictment or criminal complaint may be filed at any time charging sexual assault if physical evidence capable of being tested for its DNA characteristics is collected and preserved. This legislative change will enable prosecutors to file charges far into the future when, for example, a perpetrator charged and convicted of a crime has his DNA entered into a data base which is then searched against DNA profiles developed from unsolved crimes all over the United States.

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