

SUPERIOR COURT OF ARIZONA  
MARICOPA COUNTY

CLERK OF THE COURT  
FORM R000A

August 17, 1999

HON. RONALD S. REINSTEIN

K. Branding  
Deputy

N<sup>o</sup> CR 98-11390

FILED: AUG 20 1999

STATE OF ARIZONA

County Attorney  
By: Jeremy D. Freeman

v.

RONNIE HOWELL LYNCH

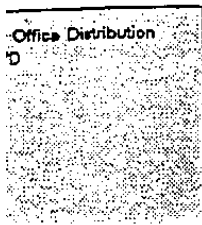
Stephen J. Whelihan, P.D.

DNA - STR RULING

The court has considered the defendant's Motion for Hearing on Admissibility of DNA Evidence, the state's Motion in Support of DNA Evidence, the defendant's reply, the Affidavit of defense expert, Dr. Donald E. Riley, and the testimony of Dr. Lisa Forman. The state did not file an affidavit from its expert, Dr. Sensibaugh, prior to the Frye hearing, due to his illness. However, the state filed an affidavit from Kathleen Sartor, a criminalist with the Arizona Department of Public Safety Crime Laboratory's DNA Unit. Both parties were given the opportunity to file post-hearing memoranda, however, neither side chose to file such.

This case was referred to this court by Honorable Thomas W. O'Toole solely on the issue of the admissibility of DNA evidence using STR analysis. It should be noted that this is the third DNA Frye hearing conducted by this court at the request of other judges and/or counsel. On October 16, 1995, this court issued a "Consolidated DNA Ruling" as to the admissibility of DNA evidence using the RFLP (Restriction Fragment Length Polymorphism) typing system. On July 11, 1997, this court issued a "Consolidated DNA - PCR Ruling" as to the admissibility of DNA evidence using the PCR (Polymerase Chain Reaction) typing system. Both are attached to this minute entry. The court previously found the DNA evidence admissible before trial, and informed both counsel and Judge O'Toole, noting a detailed minute entry would follow.

The DNA testing process utilized in this case is PCR based and involves STR (Short Tandem Repeats) analysis. Pursuant to a recommendation in the November, 1996 NRC II Report, The Evaluation of Forensic DNA Evidence, published by the National Research Council of the National Academy of Sciences, this court offered to provide a



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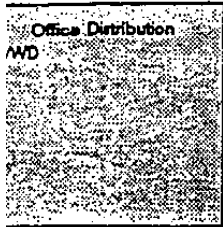
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neutral "court expert" to assist the court in its determination of the issue. The parties are to be commended for doing so in that it saved both substantial funds. The court was able to provide as its expert Dr. Lisa Forman, a noted molecular biologist and population geneticist with the Office of Science and Technology of the National Institute of Justice at no expense to the court or the parties. Dr. Forman is not permitted to testify for either the defense or prosecution, but may testify as the court's expert.

Subsequent to this court's July 11, 1997 DNA-PCR ruling, the Arizona Supreme Court decided State v. Tankersley, 191 Ariz. 359, 956 P.2d 486 (1998), which approved the admissibility of DNA evidence using PCR analysis, and noted that any challenges to the application of PCR methodologies in a particular case go to the weight, not the admissibility of that evidence.

- There exists a real issue as to whether there was even a need for a Frye hearing in this case, since STR analysis is PCR-based. In fact, Judge O'Toole referred the case to this court to initially determine whether it needed "any other evidence provided." However, because of the agreement between the parties as to the use of a court expert, the court found it worthwhile to conduct such a hearing.

An excellent explanation of the polymerase chain reaction (PCR) was given in Tankersley, id. so it is unnecessary to repeat that. Forensic DNA typing methods detect either "length differences" or "sequence differences." Length differences usually are detected by electrophoretic analysis of the DNA visualized by silver staining methods or fluorescence detection, or by probe hybridization detected by chemiluminescence or radioactive labeling. While RFLP was the first forensic DNA method to examine length differences in biological evidence, PCR based methods like D1S80 and the presently favored STRs also rely on the above described methods to reveal the length of the alleles contained in the evidence. Sequence differences are visualized using the "dot blot" method as practiced by hundreds of forensic laboratories here and abroad since the early 1990s when DQ-Alpha and Polymarker (PM) kits became commercially available. This court found the D1S80, DQ-alpha, and PM typing systems all to be admissible in its July 11, 1997 consolidated DNA-PCR hearing. That finding was affirmed by the Arizona Supreme Court in State v. Van Adams, 1999 WL



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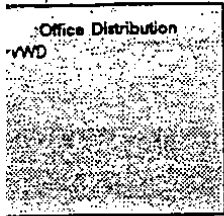
All PCR-based typing systems are standardized, and come in a "kit" form, accompanied with a "User's Guide." In the consolidated DNA-PCR hearing previously referenced, the same defense expert as used in this case, Dr. Donald Riley, criticized the DNA typing kit being used in virtually all forensic laboratories. In that case it was the Amplitype PM-PCR Amplification and Typing Kit. In this case, it is the Profiler and Cofiler kits manufactured and distributed by the Perkin-Elmer Corporation. And just as in the previous cases, the Profile/Cofiler kits are used in virtually every forensic laboratory in the United States, Canada and Great Britain, including the FBI lab.

A good description of STR testing is found in Commonwealth v. Rosier, 425 Mass. 807, 811, 685 NE.2d 739, 742 (1997), which took its information from the 1996 NRC II Report:

A tandem repeat involves multiple copies of identical DNA sequence arranged in direct succession in a particular region of a chromosome. A short tandem repeat is a tandem repeat in which the repeat units are three, four or five base pairs. Loci containing STRs are scattered throughout the chromosomes in enormous numbers. Such loci have a fairly large number of alleles and are usually capable of unique identification.

One of the advantages of STRs is that they are very common and are distributed widely throughout the genome. STR testing has come into such wide use today because of the large number of loci that are usable, allowing significant increases in the speed of test processing. NRC II Report at 70-71. In fact, from the affidavit of DPS Criminalist, Kathleen Sartor, it is clear that the DPS lab has progressed from the seven loci used at the time of this court's July 11, 1997 ruling to the total of twenty or twenty-one used by the lab currently.

As the Supreme Judicial Court of Massachusetts noted in Rosier, supra at 812,



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quoting from the NRC II Report, "STR testing is coming into wide use; . . . STR loci appear to be particularly appropriate for forensic use; and STRs can take their place along with VNTRs as forensic tools." The Rosier court held that the methodology underlying the PCR-based tests, including STR testing, was scientifically valid. While Massachusetts may not be a Frye state, the Supreme Judicial Court clearly found that STR testing was generally accepted in the scientific community. See also State v. Jackson, 255 Neb. 68, 582 NW.2d 317 (1998), where the court determined STR testing meets the Frye standard.

Dr. Riley seems to infer that STR testing is "novel" (Riley Affidavit at p. 2, n. 10). However, Dr. Forman testified that STR testing became available to laboratories as early as 1993. Also the Cellmark Laboratory in Maryland was doing STR testing in 1991 under contract with the United States Department of the Army to identify remains of soldiers killed in Operation Desert Storm. "STR Data Goes to Court: A Laboratory Perspective," Dr. Charlotte J. Word, Profiles in DNA, Geneprint (1998). Dr. Forman testified over 1,000 laboratories world wide use STR analysis today. Because of that, Dr. Riley's conclusion that the "actual scientific community" has been circumvented and thus that acceptance of DNA analysis using STRs with the Profiler/Cofiler testing kits is precluded by the "relevant scientific community of molecular biologists" is highly suspect. Also it is reflective of the evident ongoing differences between some members of the research laboratory community and the forensic laboratory community. This court noted the same dispute in its July 11, 1997 ruling (attached).

The defense focus seems to be on the fact that the Perkin Elmer Corporation considers its primer sequences to be proprietary and will not share the data about those primers. The conclusion is that therefore the entire process is unscientific and inadmissible. Dr. Riley does not negate the value of the STR markers themselves. Dr. Forman's opinion was that the withholding of the primer sequences does not affect the scientific validity of the kits.

In a perfect world, one would suppose that every step, ingredient and method of manufacturing of devices, products, medicines and the like would be in the public domain. But, of course, if that were true, as Dr. Forman pointed out, anyone could make the product

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themselves and market it. Thus, it is the position of the Perkin Elmer Corporation to preserve their proprietary interest in the Profiler/Cofiler testing kits.

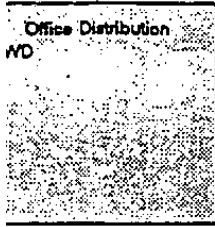
Rather than focus on the primer sequences, it seems that the focus should be on whether the results obtained from use of the kits are reproducible. The purpose of the kits is to minimize unexpected results, such as the artifacts Dr. Riley mentions at notes 25-26 of his affidavit. Dr. Forman noted that artifacts only make the "read" more difficult, but they don't affect the science.

As to the concerns raised about validation, the defense did not mention the fact that the DPS Quality Control and Assurance Manual was modeled after the National DNA Advisory Board guidelines, and in Dr. Forman's opinion, the DPS guidelines are even more thorough than the FBI's. The DPS manual outlines the steps that are needed to be taken for validation, and Kathleen Sartor's affidavit indicates that both developmental and internal validation studies were performed by the DPS lab as to all the loci used in the PCR-DNA analysis.

In addition, Dr. Forman noted that validation studies have been done by Dr. Sean Walsh of Perkin-Elmer, Dr. Jennifer Smith of the FBI DNA lab, Dr. Paul Ferrara, chief of the Virginia Crime Laboratory, and David Coffman of the Florida Department of Law Enforcement laboratory, all in accordance with the DNA Advisory Board Quality Assurance Standards, mandated as a national standard by federal law. (Crime Act of 1994)

As the Arizona Supreme Court noted in Tankersley, supra, in response to the defense argument in that case that the Forensic Science Associates (FSA) laboratory did not strictly comply with the Technical Working Group on DNA Analysis and Methods (TWGDAM) guidelines, those guidelines were not mandatory. In fact, as Dr. Forman testified, they have been superseded by the DNA Advisory Board standards.

What is apparent to this court is that the primer sequences in the Profiler/Cofiler kits are not really important to forensic scientists. The kits themselves are a means of visualizing, but have no impact on the validity of the scientific analysis. While



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the primer sequences may not be in the public domain, the kits themselves are. In Dr. Forman's words, the scientist "wants the cake, not the box it comes in."

The primer sequences are not necessary to see if the kits are working appropriately because the laboratory can validate the results on their own, as the DPS, FBI and other labs have. As stated previously, what is important is whether the results are reproducible. The validity of the STR testing can be compared with the already validated results obtained by RFLP and other types of PCR-based analysis.

As to the issue of independence regarding the use of the product rule, this court dealt with the issue in its July 11, 1997 ruling, and the Arizona Supreme Court dealt with it in State v. Hummert, 933 P.2d 1187 (1997). The DPS lab follows the NRC II recommendation that the product rule with a more conservative value of .03 for theta is to be used in PCR-based systems for the purpose of statistical analysis in determining population profile frequencies.

Finally, as noted in Tankersley, supra, and by this court in its July 11, 1997 ruling, any issue as to contamination is case specific and goes to the weight, not the admissibility of the evidence. Dr. Forman noted that contamination is the biggest issue in PCR labs and is a common concern in both research and forensic labs. But so long as there are appropriate controls, the laboratory can identify when there is contamination.

Based on all the above, the court finds that DNA analysis using STR testing is generally (actually universally) accepted in the forensic science community, and the results of such testing are admissible as evidence. The court further finds, as it has previously, that the protocol used by the DPS-DNA lab is generally accepted within the forensic science community.

cc: Judge O'Toole