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Evidence—Criminal Law—Evidence of DNA Fingerprinting Admitted for Identification Purposes in Rape Trial. Andrews v. State

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EVIDENCE—CRIMINAL LAW—EVIDENCE OF DNA FINGERPRINTING ADMITTED FOR IDENTIFICATION PURPOSES IN RAPE TRIAL. *Andrews v. State*, 533 So. 2d 841 (Fla. Dist. Ct. App. 1988).

An Orlando, Florida woman awoke during the night of February 21, 1987, when a man jumped on top of her and held a sharp blade against her neck.[1] The intruder threw a sleeping bag over her head and threatened to kill her if she looked at him.[2] The victim struggled and received cuts on her face, neck, legs, and feet. The intruder raped the woman and fled with her purse. The victim could identify her attacker only as a strong, black male.[3]

The State of Florida convicted Tommie Lee Andrews of aggravated battery, sexual battery, and armed burglary of a dwelling.[4] The prosecution offered three types of evidence at trial,[5] including deoxyribonucleic acid (DNA) print identification evidence.[6] The DNA test, introduced over the defendant's objection, compared DNA from Andrews' blood and DNA obtained from the victim's blood with the DNA found in the victim's vagina. A molecular geneticist from Lifecodes, the commercial laboratory that performed the test, testified to a match between the DNA from Andrews' blood and the DNA obtained from the victim's vagina.[7]

Andrews appealed the conviction, challenging the trial court's admittance of DNA print identification evidence. The Fifth District Court of Appeal upheld the admissibility of the DNA "fingerprint"

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1. Andrews v. State, 533 So. 2d 841, 842 (Fla. Dist. Ct. App. 1988).

2. Moss, *DNA—The New Fingerprints*, 74 A.B.A. J. 66 (1988).

3. 533 So. 2d at 842.

4. *Id.*

5. *Id.* at 842-43. A physical examination made after the attack revealed the presence of semen in the victim's vagina. A state crime lab analyst testified that he found blood type O in the victim's vagina and that Andrews had blood type O. However, the victim also had blood type O, and the analyst conceded that the blood test result could have come from either the victim or Andrews. The analyst could only place Andrews within 65% of the male population that could be the source of the semen. The state also offered evidence that fingerprints on a window screen found outside of the victim's home matched Andrews' right and middle index fingers.

6. DNA fingerprinting is based on the unique character of each individual's genetic makeup contained in his DNA. DNA fingerprints are "pictures" of certain regions of DNA that vary from person to person. The pattern of the print is unique, and a person can be identified by comparing his DNA fingerprint with an unknown.

7. 533 So. 2d at 843. Dr. Baird of Lifecodes testified that the chance the DNA sequence found in Andrews could be duplicated in another person's cells was 1 in 839,914,540.

evidence and affirmed the conviction. *Andrews v. State*, 533 So. 2d 841 (Fla. Dist. Ct. App. 1988), *review denied*, 542 So. 2d 1332 (Fla. 1989).

Dr. Alec Jeffreys of Leicester University first developed the technique known as "DNA fingerprinting."[8] Although Dr. Jeffreys developed the technique for research purposes, the nature of the test makes it particularly suitable for identification issues in legal settings.[9] Two major judicial uses for DNA typing involve suspect identification in criminal trials and determination of parentage in paternity actions.[10]

In 1989 there were three commercial laboratories in the United States that analyzed DNA fingerprints.[11] Cellmark Diagnostics uses the DNA fingerprint technique and the probe developed by Dr. Jeffreys. This produces a fingerprint of about fifteen bands, the spacing of which indicates genetic differences among individuals.[12] Lifecodes Corporation uses a similar technique but different probes, thereby producing a print which has fewer bands.[13] Forensic Science Associates uses a unique technique known as polymerase chain reaction. This technique produces a set of dots that indicates the presence or absence of specific genetic characteristics.[14] Each method has its particular advantages and disadvantages.[15]

Because DNA testing involves techniques developed in the study of molecular genetics, a basic understanding of the science is essential

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8. White & Greenwood, *DNA Fingerprinting and the Law*, 51 Mod. L. Rev. 145 (1988). *See* Jeffreys, Wilson & Thein, *Hypervariable 'minisatellite' regions in human DNA*, 314 Nature 67 (1985).

9. Forensic application and use in testing for parentage were suggested by Dr. Jeffreys. Jeffreys, Wilson & Thein, *supra* note 8, at 69.

10. Comment, *DNA Identification Tests and the Courts*, 63 Wash. L. Rev. 903, 905 n.2 (1988). DNA testing can also be used to exculpate innocent suspects, to identify remains of victims, and to distinguish serial crimes from "copy-cat" crimes. *Id.*

11. Lifecodes Corporation in Valhalla, New York; Cellmark Diagnostics in Germantown, Maryland; and Forensic Science Associates in Richmond, California. Thompson & Ford, *DNA Typing: Promising Forensic Technique Needs Additional Validation*, 24 Trial 56 (Sept. 1988). The FBI has started to develop guidelines to standardize the technology of DNA fingerprinting. Smith, *Scientists Must Set DNA Fingerprinting Standards*, Clinical Chemistry News, at 4, Oct., 1989.

12. Comment, *supra* note 10, at 923.

13. *Id.* The probes employed by Lifecodes produce only one or two bands, making the use of more than one probe necessary to get the high probabilities of identification associated with DNA analysis. *Id.*

14. Thompson & Ford, *supra* note 11, at 57.

15. For example, the test using the polymerase chain reaction technique can be performed on samples that are too small to be analyzed under the other method. *Id.* Lifecodes claims that the presence of one or two bands makes for a more clear and unambiguous reading, while Cellmark claims their probe, producing some fifteen bands, is much more discriminating. Comment, *supra* note 10, at 923-24.

to analyzing the judicial validity of DNA fingerprinting. DNA is found in the chromosomes of every human cell nucleus.[16] DNA contains an individual's genetic code, the information needed to assemble and regulate life.[17] Only identical twins have identical DNA.[18] This uniqueness makes DNA fingerprinting quite promising for identification purposes.

DNA is composed of a series of nucleotide bases.[19] The bases, along with sugar and phosphate groups, make up the DNA molecule. DNA molecules take the shape of a double helix, which resembles a twisted ladder. The bases pair up or "hybridize" to form the rungs of the ladder.[20] The sequence of the bases determines the message the DNA will give.[21] The sequence of an individual's DNA is consistent throughout the body. Therefore, DNA fingerprinting can be run on a variety of organic materials, including blood, semen, and hair.[22]

All along the DNA molecule are repeated sequences of a small number of bases called "minisatellites."[23] Each minisatellite is present in only a portion of the population, but there are so many minisatellites that each individual will have a number of them present in his DNA.[24] Through the use of a DNA probe,[25] scientists can detect the presence of these minisatellites and produce a characteristic series of bands, which is called a DNA fingerprint.[26]

To make a DNA fingerprint one must first isolate the DNA from the sample of blood or other organic material. A protein called a "restriction enzyme" is added which cuts the long DNA molecules into smaller pieces. Restriction enzymes recognize specific base sequences and cut only at these points.[27] The resulting fragments are

16. Comment, *supra* note 10, at 909. All human cells contain nuclei except mature red blood cells. While DNA is also found in mitochondria, fingerprint analysis is limited to nuclear DNA.

17. *Id.* at 909 & n.25. "DNA: any of the various nucleic acids that are localized esp. in cell nuclei, are the molecular basis of heredity in many organisms, and are constructed of a double helix. . . ." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 370 (1986).

18. White & Greenwood, *supra* note 8, at 145-46.

19. *Id.* at 146.

20. Comment, *DNA Fingerprinting: Possibilities and Pitfalls of a New Technique*, 28 Jurimetrics J. 455, 457 (1988).

21. *Id.*

22. Comment, *supra* note 10, at 909.

23. White & Greenwood, *supra* note 8, at 146. *See also* Comment, *supra* note 21, at 461-63; Jeffreys, Wilson & Thein, *supra* note 8.

24. White & Greenwood, *supra* note 8, at 146.

25. *See infra* text accompanying notes 32-38 for discussion of DNA probes.

26. Comment, *supra* note 21, at 463.

27. *Id.* at 457.

loaded into an agarose gel[28] and an electric current is passed through the gel. Because of their negative charge, DNA fragments migrate through the gel towards the positive electrode. This process, known as electrophoresis, separates DNA fragments according to their size.[29] The smaller fragments move more quickly through the gel, and the larger ones more slowly, so that by the end of the process the DNA is spread out over the length of the gel.[30] The DNA is then denatured and transferred to a more durable medium, such as a nylon membrane.[31]

The DNA is then ready for forensic testing. A "probe," such as the one developed by Dr. Jeffreys, is radioactively labeled[32] and added to the membrane containing the DNA. A DNA probe is a single-stranded DNA molecule which binds to specific regions on the DNA molecule. In this instance, the probe binds to the minisatellite regions of the denatured sample DNA.[33] The minisatellite regions are thus radioactively marked. X-ray film is placed over the membrane, and development of the film reveals a series of bands which resembles a bar code from the grocery store.[34] The exposed piece of X-ray film is called an autoradiograph.[35] Each band on the autoradiograph represents a different minisatellite region, and the size of the band can be determined from its position on the film.

Analysts interpret the banding pattern to determine if there is a match between the sample DNA and the suspect's DNA. Because the number of minisatellites in the population is so great and because not every minisatellite is present in every individual, the chance that two individuals' minisatellite "profiles" will match is very small.[36] "The strength of the connection depends on the number of bands matched and the frequency of occurrence of each 'matched' band in the general population."[37] The greater the number of bands matched,

28. "The gel, which resembles a slab of Jell-O, is placed in a tray of an electrolyte solution." *Id.* at 459.

29. Kelly, Rankin & Wink, *Method and Applications of DNA Fingerprinting: A Guide for the Non-Scientist*, 1987 CRIM. L. REV. 105, 107.

30. White & Greenwood, *supra* note 8, at 146.

31. Comment, *supra* note 10, at 913. "Denatured" refers to the process of separating the two strands of DNA so that the sample DNA can hybridize with the DNA probe.

32. Radio-labeled phosphate (P^{32}) is incorporated into the probe. By using the radio-labeled probe, the analyst can "see" the DNA fragments.

33. White & Greenwood, *supra* note 8, at 146.

34. *Id.* at 147.

35. Comment, *supra* note 21, at 460.

36. White & Greenwood, *supra* note 8, at 147.

37. Comment, *supra* note 10 at 916 & n.63. Scientists determine the frequency of occurrence of the various bands through the use of population genetics.

the more likely that the two DNA samples came from the same individual. Various estimates are given for the likelihood of two individuals having matching prints.[38]

Scientists arrive at the probabilities of a match through the use of population genetics. The frequency of the occurrence of the entire pattern is calculated by multiplying the probability of each band's occurrence by the probabilities of the other matching bands.[39] This approach assumes that the probability of one band occurring does not affect the probability of any other band occurring.[40] This assumption is valid only if the entire population being studied mates at random and thus satisfies a condition known as Hardy-Weinberg equilibrium.[41] Some scientists have asserted that the assumption of random mating in a particular population may be unjustified.[42]

In addition to the recent questioning of the statistics involved, several other potential problems exist with the technique of DNA fingerprinting, some of which are due to the nature of the DNA molecule itself. DNA obtained from a crime scene often will have been exposed to environmental conditions that may have caused some degradation of the DNA molecule.[43] DNA testing can only be performed on intact DNA molecules. Tests that are performed on degraded DNA will produce results that cannot be read.[44] Molecular geneticists continue to conduct studies on the effects of environmental conditions such as age, exposure to heat, light, moisture, and other

38. Dr. Jeffreys gave 1 in 30 billion as an initial estimate of the probability of two samples matching by chance. *Id.* at 917. This is the figure also given by Cellmark. Lifecodes' estimates that two individuals will have identical prints ranging from less than 1% to over 30%. If several tests can be run on the same sample, this figure comes close to that of Cellmark. Thompson & Ford, *supra* note 11, at 56-57.

39. Comment, *supra* note 10, at 917.

40. *Id.*

41. Parloff, *How Barry Scheck and Peter Neufield Tripped Up the DNA Experts*, THE AM. LAW., Dec. 1989, at 50, 55.

42. *Id.* This article suggests that some of the problem with DNA fingerprinting lies in the calculation of the probabilities of a match—the population genetics portion of the analysis. Recently, a few courts have expressed concern over the statistics involved. *See* Motion in limine, State v. Pennell (Del. Super. Ct. Nov. 6, 1989) (WESTLAW, Allstates database) (DNA evidence generally admissible, but statistical probabilities not allowed because were not demonstrated to be sufficiently reliable); State v. Schwartz, 447 N.W.2d 422 (Minn. 1989) (DNA evidence admissible, but limited statistical data); People v. SHIFU Huang, 145 Misc. 2d 920, 546 N.Y.S.2d 920 (N.Y. Crim. Ct. 1989) (statistical data limited also). For an excellent discussion of population genetics in this context *see* Motion in limine, State v. Pennell (Del. Super. Ct. Nov. 6, 1989) (WESTLAW, Allstates database).

43. Comment, *supra* note 10, at 919-20.

44. *Id.* at 920-21. A degraded DNA molecule is one that is randomly broken up into smaller pieces. The restriction enzyme will not be able to cut the DNA at the proper places because the restriction sites on the molecule are no longer present.

chemical reagents to better understand their effect.[45] Contamination of the sample with bacterial and other nonhuman DNA can confound accurate analysis.[46] The presence of foreign DNA presents a potential false positive if the probe binds to the contaminant DNA. This problem can be eliminated through the use of a screening probe to detect the presence of bacterial DNA.[47] DNA from vaginal cells can contaminate semen samples taken from rape victims.[48] A screening probe that hybridizes only to DNA found on the male-specific Y chromosome reduces this pitfall.[49]

Another potential problem concerns erroneous autoradiograph interpretation, which can cause misidentification. Bands appearing at the same location on two autoradiographs may be from two different sequences of DNA that happen to be the same length. Alternatively, bands on one autoradiograph may consist of DNA from two entirely different regions of the DNA molecule which happen to be the same size.[50] Also, DNA fragments which are very similar in size can produce bands which appear so close to one another on the autoradiograph that they are indistinguishable.[51] Smearing of the bands is more common on the lower portion of the autoradiograph; therefore, bands on the top portion should be used for identification purposes.[52]

To ensure the reliability of DNA fingerprinting, the laboratory performing the test should follow certain safeguards. These safeguards include the use of written protocols for the entire DNA testing procedure,[53] independent review of the testing procedures,[54] continued analysis of information gathered concerning the frequency of oc-

45. *Id.* at 920.

46. *Id.* at 921. Other nonhuman DNA could include animal or viral DNA.

47. *Id.* at 922.

48. Comment, *supra* note 21, at 464.

49. Comment, *supra* note 10, at 922 n.95. *See also* Castro v. State, No. 1508/87 (N.Y. Sup. Ct., Aug. 14, 1989) (LEXIS, States Library, N.Y. Courts file). Humans have one pair of chromosomes, called sex chromosomes, which are involved in sex determination. The presence of the Y chromosome is determinative of sex. Males have one Y chromosome and one X chromosome; females have two X chromosomes. F. AYALA & J. KIGER, MODERN GENETICS 7 (2d ed. 1984).

50. Comment, *supra* note 21, at 465.

51. *Id.*

52. *Id.*

53. Comment, *supra* note 10, at 927. All labs currently performing DNA analysis have some type of protocol that includes detailed guidelines for the testing procedure and minimum qualifications for those carrying out the test. *Id.* at 928.

54. *Id.* at 928. Independent review should be performed in order to ensure that the laboratories are properly carrying out the procedures.

currence of each of the bands in the general population,[55] and adoption of a standardized system for DNA analysis.[56] The use of such quality control mechanisms will not only ensure the reliability of the results obtained, but should also make the introduction of this new form of evidence an easier task.

Because DNA fingerprinting is such a recent development, courts in the United States have just begun to rule on its admissibility as evidence.[57] Tommie Lee Andrews became the first person in the United States to be convicted of a crime using evidence of DNA fingerprinting when he was convicted of rape on November 6, 1987.[58] The Florida appellate courts were the first to review the admissibility of DNA fingerprinting when they affirmed Andrews' conviction.[59] A recent survey of the law in this area indicates that in over one hundred cases in twenty-seven states, courts have admitted evidence of DNA analysis.[60] Most of these decisions were at the trial level.

Appellate courts in only one state other than Florida have considered the admissibility of evidence of DNA fingerprinting.[61] The Maryland Court of Appeals in *Yorke v. State* held that the trial judge did not abuse his discretion in admitting DNA evidence, but did not rule on the propriety of the admission of such evidence.[62] In *Cobey v.*

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55. *Id.* at 926. As DNA testing continues, more information will automatically become available concerning the frequency of the various bands' occurrence in the population.

56. *Id.* at 929. Reasons for adopting a standardized system include easier regulation of testing facilities, generation of population statistics for determining population frequencies, and a compilation of a national databank of DNA samples of sex offenders. *Id.* at 929-30. For a call for standardization *see* Smith, *Scientists Must Set DNA Fingerprinting Standards*, Clinical Chemistry News, at 4, October, 1989.

57. The technique was first used in England, and in 1986, a British court admitted evidence of the results of DNA fingerprinting in the conviction of a rapist. White & Greenwood, *supra* note 8, at 148. Evidence of DNA fingerprinting has since been used in England in rape and murder cases, and the British government is currently considering whether to make DNA fingerprinting routine in immigration cases. *Id.* at 148-53.

58. *Admission of DNA Fingerprints Prompts Queries*, NAT'L L.J., Jan. 18, 1988, at 42, col. 1.

59. Taylor, *From One Speck, a Case is Made*, NAT'L L.J., Jan. 16, 1989, at 3, col. 1, cont. at 22, col. 1, referring to Andrews v. State, 533 So. 2d 841 (Fla. 5th Dist. Ct. App. 1988), *rev. denied*, 542 So. 2d 1322 (1989).

60. Anderson, *DNA Evidence Questioned*, 75 A.B.A. J. 18, 19 (Oct. 1989).

61. *See* Yorke v. State, 315 Md. 578, 556 A.2d 230 (1989); Cobey v. State, 80 Md. App. 31, 559 A.2d 391 (1989). Since the writing of this note, appellate courts in several other states have addressed the issue. State v. Schwartz, 447 N.W.2d 422 (Minn. 1989) (DNA evidence admissible, but statistical data limited); Spencer v. Commonwealth, 238 Va. 275, 384 S.E.2d 775 (1989) (DNA evidence admissible); State v. Woodall, 385 S.E.2d 253 (W. Va. 1989) (took judicial notice of tests' reliability); J.L.K. v. J.J., 151 Wis. 2d 566, 445 N.W.2d 673 (1989) (DNA evidence admissible under paternity statute).

62. 315 Md. 578, 584 n.3, 556 A.2d 230, 233 n.3 (1989).

State the Maryland Court of Special Appeals took a more extensive look at DNA fingerprinting and held that the trial judge did not err when he found DNA fingerprinting to be generally accepted in the scientific community and admitted it as evidence.[63] The Maryland courts' reluctance to decide whether evidence of DNA fingerprinting is admissible represents a deferral to the legislature. A new Maryland statute makes evidence of DNA fingerprinting admissible in criminal trials in order to prove or disprove identity.[64] This is the first such legislation in the country.

Several cases in the New York courts have involved evidence of DNA fingerprinting, but none of these cases has yet reached the appellate level.[65] In a recent case the judge conducted an extensive pretrial hearing on the subject of DNA fingerprinting.[66] After an indepth analysis of the science and technology behind DNA analysis and the particular method employed by the laboratory in this case, the court held evidence of DNA fingerprinting was generally admissible under the *Frye*[67] standard.[68] The court further held that the results of the DNA tests in that case could not be admitted to prove inclusion[69] because the company performing the test failed to follow proper procedures that are generally accepted within the scientific community.[70]

As of August 14, 1989, no court in the country had refused to

63. 80 Md. App. 31, 43, 559 A.2d 391, 398 (1989). "General acceptance" is the key phrase of the test for admissibility of novel scientific evidence set forth in Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). For a discussion of *Frye see infra* p. 8 and sources cited *infra* note 68.

64. 80 Md. App. at 34, n.5, 559 A.2d at 392, n.5. *See* Md. Cts. & Jud. Proc. Code Ann. § 10-915 (Supp. 1989).

65. Two civil cases have held evidence of DNA fingerprinting admissible in paternity actions. Matter of Baby Girl S, 140 Misc. 2d 299, 532 N.Y.S.2d 634 (Sur. Ct. N.Y. Co. 1988); King v. Tanner, 142 Misc. 2d 1004, 539 N.Y.S.2d 617 (Sup. Ct. 1989).

The New York courts have also allowed evidence of DNA fingerprinting in two criminal cases. People v. Wesley, 140 Misc. 2d 306, 533 N.Y.S.2d 643 (N.Y. Sup. Ct. 1988); People v. Lopez, N.Y.L. J., Jan. 6, 1989, at 29, col. 1. The court in *Wesley* determined that the evidence was admissible under the *Frye* standard.

66. Castro v. State, 144 Misc. 2d 956, 545 N.Y.S.2d 985 (Sup. Ct. 1989). The hearing lasted for twelve weeks and generated considerable publicity. *See* Anderson, *DNA Evidence Questioned*, 75 A.B.A. J. 18 (1989); N.Y. Times, Aug. 15, 1989, § B at 1.

67. Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). For a discussion of the *Frye* test, see *infra* notes 72-82 and accompanying text.

68. *Castro*, 545 N.Y.S.2d 985, 986-87 (Sup. Ct. 1989).

69. The court allowed DNA evidence to prove exclusion of the defendant because it thought that the techniques used by the laboratory produced sufficiently reliable results in respect to this determination. *Id.* at 998.

70. *Id.* at 996-97. Lifecodes performed the test in *Castro*. For possible ramifications of this decision, see notes 116-18 and accompanying text.

admit DNA fingerprint evidence.[71] There is no general agreement concerning the proper standard to apply in determining the admissibility of novel scientific evidence, such as DNA fingerprinting. A majority of courts continue to apply the *Frye*[72] test, although a growing number of state and federal courts are adopting the relevancy approach of the Federal Rules of Evidence.[73]

Under the *Frye* test, courts admit evidence obtained from a novel scientific technique only when that technique has gained general acceptance within the relevant scientific community,[74] thus attempting to ensure the reliability of such evidence.[75] The theory recognizes that scientists, not a jury, are the best judges of a technique's reliability and that general acceptance within the scientific community reflects the technique's reliability. *Frye* supporters voice the concern that a jury may be awestruck by scientific evidence and afford it too much weight.[76]

The relevancy approach embodied in the Federal Rules of Evidence is the primary alternative approach to the *Frye* test.[77] This approach treats novel scientific evidence like any other evidence.[78] The evidence is admissible if it is relevant[79] and helpful to the trier of fact.[80] Courts following this approach may thus admit evidence even though the "source or mechanism that provides the data is not gener-

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71. *Id.* at 987.

72. Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). Gianelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197, 1200 (1980); Note, *The Frye Doctrine and Relevancy Approach Controversy: An Empirical Evaluation*, 74 GEO. L.J. 1769 (1986).

73. *See* FED. R. EVID. 401, 402, 403, and 702. Rule 403 allows the trial judge to exclude relevant evidence on the grounds of prejudice, confusion, or waste of time. See *infra* notes 75-76 for text of rules 401, 402, and 702.

74. 293 F. at 1014.

75. Gianelli, *supra* note 72, at 1207.

76. *Id.* at 1240 n.318.

77. *See supra* notes 72-73 and accompanying text.

78. Note, *supra* note 72, at 1770.

79. FED. R. EVID. 401 states: " 'Relevant evidence' means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable than it would be without the evidence."

FED. R. EVID. 402 states: "All relevant evidence is admissible, except as otherwise provided by the Constitution of the United States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority. Evidence which is not relevant is not admissible."

80. FED. R. EVID. 702 states: "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."

ally accepted."[81] Those who adhere to the relevancy approach rely on the safeguards of the judicial process to mitigate any possible danger. This approach allows the jury to assess the reliability of novel scientific evidence.[82]

The court in *Andrews* first considered which standard the Florida courts had adopted for determining the admissibility of novel scientific evidence.[83] Expressing some uncertainty as to which standard Florida had actually adopted, the court looked to recent Florida decisions to resolve the issue.[84] In *Brown v. State*,[85] after reviewing Florida law concerning the standard for admissibility of novel scientific evidence,[86] the court concluded that the Florida Supreme Court had not adopted the *Frye* test.[87]

However, the *Andrews* court found indications that the Florida Supreme Court had accepted the *Frye* doctrine in *Bundy v. State*.[88] In *Bundy* the court never explicitly stated that it was adopting the *Frye* standard, but it used language from jurisdictions applying the *Frye* standard in deciding to exclude hypnotically-aided testimony.[89]

The court in *Andrews* traced the development of the standard for determining the admissibility of novel scientific evidence in Florida to the case of *Kruse v. State*.[90] *Kruse* adopted the relevancy approach concerning the admissibility of testimony that a child was suffering from Post Traumatic Stress Syndrome.[91] Looking to the Florida Rules of Evidence[92] for the proper standard for determining the admissibility of novel evidence, the court acknowledged that while general acceptance by the scientific community was not necessary,

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81. Note, *supra* note 72, at 1771.

82. *See* Gianelli, *supra* note 72, at 1239-45.

83. Andrews v. State, 533 So. 2d 841, 843 (Fla. Dist. Ct. App. 1988).

84. *Id.*

85. 426 So. 2d 76 (Fla. Dist. Ct. App. 1983).

86. *See* Kaminski v. State, 63 So. 2d 339 (Fla. 1952) (in dicta alluded to the fact that results of lie detector tests would have to pass the *Frye* test); Coppolino v. State, 223 So. 2d 68 (Fla. Dist. Ct. App. 1968), *cert. denied*, 399 U.S. 927 (1970) (courts should admit scientific evidence upon proof that its reliability is widely recognized by scientists, but trial judge has wide discretion concerning the admission of evidence); Jent v. State, 408 So. 2d 1024, 1029 (Fla. 1981) (cited to the trial judge's discretion concerning the admission of evidence and characterized the issue as whether the evidence was so "unreliable and scientifically unacceptable" that its admission was error).

87. 533 So. 2d at 844.

88. 471 So. 2d 9 (Fla. 1985) (the serial killer Ted Bundy was the defendant).

89. 533 So. 2d at 845 & n.2.

90. 483 So. 2d 1383 (Fla. Dist. Ct. App. 1986).

91. 533 So. 2d at 845-46 (citing *Kruse*, 483 So. 2d at 1385).

92. FLA. STAT. ANN. §§ 90.403, .702 (1979). The Florida Evidence Code is essentially identical to the Federal Rules of Evidence and the Arkansas Rules of Evidence.

however, some indication of reliability was required even under the relevancy approach.[93]

The *Andrews* court adopted the *Kruse* rule as the preferred standard for determining the admissibility of novel scientific evidence.[94] This rule followed the Third Circuit's decision in *United States v. Downing*.[95] The court in *Andrew* stated, "[t]his approach recognizes relevancy as the linchpin of admissibility, while at the same time ensuring that only reliable scientific evidence will be admitted. . . ."[96]

Applying this standard, the court first noted the qualifications of the expert witnesses and the soundness of the scientific principles underlying DNA fingerprinting.[97] The court briefly discussed the techniques involved[98] and found that the procedures employed by Lifecodes, the lab that performed the test, were scientifically acceptable.[99]

Turning next to the reliability component of the relevancy standard, the court followed the approach taken in *Downing* to determine the reliability of a scientific technique when the technique has no established track record in the courts. In such circumstances, a court should look to other factors which relate to the reliability of such evidence,[100] such as the novelty of the technique.

The court concluded that DNA testing had been established as a sufficiently reliable procedure.[101] The extensive nonjudicial use of the procedure[102] and the existence of specialized literature in the field were factors demonstrating the reliability of the procedure. The court also determined that the probability of erroneous results was very low.[103] Finally, the court considered the validity of calculating the frequency of occurrence of given DNA bands and determined that the result was "generally accepted in the scientific community as being accurate for this calculation."[104] The court found DNA fingerprint-

93. 533 So. 2d at 846.
94. *Id.*
95. 753 F.2d 1224 (3d Cir. 1985).
96. 533 So. 2d at 846.
97. *Id.* at 847-48.
98. *Id.* at 848. This was only a short summary of the general technique used in DNA analysis.
99. *Id.* at 849. The court observed the extensive testimony at trial concerning the methods used by Lifecodes and recognized the safeguards in Lifecodes' techniques, such as the use of control samples, in deciding that the technique was reliable. *Id.*
100. *Id.*
101. *Id.*
102. *Id.*
103. *Id.* at 850.
104. *Id.*

ing reliable and affirmed admitting it into evidence.[105]

Andrews is the first appellate court decision in the United States addressing the issue of DNA fingerprinting. It is binding only in Florida's Fifth District and its authority there is limited by the standard the court adopted for admissibility of DNA evidence. The result in *Andrews* could change if the Florida Supreme Court clearly adopts the *Frye* standard for the admissibility of novel scientific evidence.[106]

Andrews' authority elsewhere depends, in part, on the standard that the particular jurisdiction follows in admitting novel scientific evidence. Those jurisdictions that follow the "qualified" relevancy approach of *United States v. Downing*[107] will find *Andrews* persuasive, since *Andrews* utilized this standard in admitting DNA fingerprinting evidence. Jurisdictions which follow a "straight" relevancy approach will also be able to use *Andrews*.

Andrews probably will not have the same impact in those jurisdictions which follow *Frye*. The fact that the court considered outside factors relating to the reliability of the technique, however, will enhance *Andrews'* authority, as will the fact that the court acknowledged in dicta that DNA fingerprinting would pass the *Frye* test.[108] Courts adhering to *Frye* will probably have to subject the technique to additional scrutiny before accepting it under the *Frye* standard.

The standard in Arkansas for determining the admissibility of novel scientific evidence is unclear. Arkansas has adopted the Uniform Rules of Evidence which are very similar to the Federal Rules. A recent decision of the Arkansas Supreme Court, *Bowden v. State*,[109] relied on those rules for establishing the standard for admitting expert testimony. The *Bowden* court stated, "[t]he general test for admissibility of expert testimony is whether the testimony will aid the trier of fact in understanding the evidence or determining a fact [in] issue."[110] *Bowden* supports the relevancy approach of the Federal and Uniform Rules of Evidence.

However, in *Dumond v. State*,[111] the Arkansas Supreme Court

105. *Id.*

106. *See* Stokes v. State, No. 75313 (Fla. July 6, 1989) (WESTLAW, FL CS Database) for a recent indication of *Frye*'s viability in Florida. In *Stokes* the Florida Supreme Court held that the *Frye* standard applied to the admissibility of posthypnotic testimony. *Id.* at 18. The court also expressed disfavor with the relevancy approach. *Id.* at 17.

107. 753 F.2d 1224 (3d Cir. 1985). For discussion of this approach *see supra* notes 91-96 and accompanying text.

108. 533 So. 2d at 847 n.6.

109. 297 Ark. 160, 761 S.W.2d 148 (1988).

110. *Id.* at 177, 761 S.W.2d at 157.

111. 294 Ark. 379, 743 S.W.2d 779 (1988).

indicated that *novel* scientific evidence should be subjected to closer scrutiny than that required by the Arkansas Rules of Evidence. The court addressed an ineffective assistance of counsel claim for failure to secure allotyping[112] of the defendant's semen. In dicta, the court stated that an analytical tool of this nature must pass the *Frye* test.[113]

One Arkansas court recently addressed the issue of DNA fingerprinting evidence in a rape trial.[114] The judge allowed the results of DNA fingerprint analysis, which had been conducted by the FBI, to be used to convict the defendant.[115] This decision may provide the vehicle for the Arkansas Supreme Court to decide the standard for admissibility of novel scientific evidence and how DNA fingerprinting measures up to that standard. The persuasive authority of *Andrews* will depend upon what standard the Arkansas courts adopt.

The potential impact of DNA fingerprinting on the judicial system is tremendous, particularly in criminal cases. No other identification technique provides equivalent accuracy. One author predicts it will become the "routine identification buzzword for the 1990s."[116] Paternity assessment will also be significantly affected. In fact, results arrived at through DNA fingerprinting could soon be conclusive of parentage, possibly doing away with paternity actions altogether.[117] DNA fingerprinting will also be useful in several other areas of the law.[118]

DNA fingerprinting will provide prosecutors in criminal investigations a very powerful weapon by which to prove identification. Once a jurisdiction decides that DNA evidence is admissible, the only means by which a defendant could attack the evidence would be to question the procedures used by the laboratory that performed the test. Such an attack could call into question not only the results of the test in the instant case, but possibly all tests performed by that laboratory.[119] Such was the result of the defense in *Castro v. State.*[120]

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112. Allotyping is a blood test that characterizes certain genetically determined antigenic differences in humans. *See* STEDMAN'S MEDICAL DICTIONARY 44 (5th Unabridged Lawyer's ed. 1982).

113. 294 Ark. at 386, 743 S.W.2d at 783.

114. Arkansas Gazette, April 29, 1990, B6, col. 5.

115. *Id.* A previous judge had initially allowed the DNA evidence, but later declared a mistrial based on that decision. Arkansas Gazette, Oct. 27, 1989, B4, col. 1. Arkansas Gazette, Oct. 28, 1989, B8, col. 1.

116. Taylor, *supra* note 55.

117. Anderson, *supra* note 60, at 19. A recent Arkansas statute makes evidence of DNA fingerprinting admissible in paternity actions. ARK. CODE ANN. § 9-10-108 (Supp. 1989).

118. *See supra* note 10.

119. *See supra* note 110 and accompanying text.

Lifecodes performed the DNA fingerprinting analysis in *Castro*, and the judge threw out the results after finding DNA fingerprinting evidence to be generally admissible.[121] The finding of the judge that the procedures used by Lifecodes were flawed and not in accord with generally accepted techniques could prompt a review of cases, including *Andrews*, in which the DNA testing was performed by Lifecodes.[122]

The *Castro* decision demonstrates the need for standardized procedures for performing DNA fingerprint analysis. Once a standardized system is in place, DNA fingerprinting evidence should enjoy widespread judicial acceptance. *Andrews* could lead the way in this movement.

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120. 144 Misc. 2d 956, 545 N.Y.S.2d 985 (Sup. Ct. 1989). *See supra* notes 67-70 and accompanying text.

121. *Id.*

122. *See* Anderson, *supra* note 56, at 18.