

COMMONWEALTH OF MASSACHUSETTS

HAMPDEN, ss.

SUPERIOR COURT  
INDICTMENT NOS.  
NOS. 98-0965-0966 (JT)  
98-0967-0968 (RD)  
98-0969-0970 (JD)  
98-0729-0730 (LD)

COMMONWEALTH

vs.

ALFRED GAYNOR

HAMPDEN COUNTY  
SUPERIOR COURT  
FILED

APR 13 2000

  
CLERK-MAGISTRATE

**MEMORANDUM OF DECISION RE:  
ADMISSIBILITY OF STR TEST RESULTS**

The defendant is under indictment for the aggravated rape and murder of four different women. On September 24, 1999, I issued a Memorandum of Decision on Defendant's Motion for a Daubert-Lanigan Hearing Re: Admissibility of DNA Evidence, in which I ruled that certain DNA test results offered by the Commonwealth were admissible. Thereafter, the Commonwealth asked scientists at Cellmark Diagnostics ("Cellmark") to perform additional testing on items submitted to it. Accordingly, I have held further hearings regarding the admissibility of those new test results. Specifically, on February 15, 2000, I heard testimony from Dr. Robin Cotton, the director of the laboratory at Cellmark, and on March 16 I heard testimony from Dr. Donald Riley, a research professor at the University of Washington.

In my September 24 decision, I determined that the testing conducted by Cellmark under the

STR system of analysis was scientifically reliable. The original STR testing was done at three genetic locations, identified as CSF1PO, TPOX, and TH01. It is important to note that the most recent testing did not involve a new system of analysis. Instead, it applied the STR system to ten new genetic locations, so that a total of thirteen loci (rather than the original three) have now been subjected to STR testing. It is true that there are some differences in methodology between the original testing and the more recent testing. For example, in the previous testing visualization of the DNA was accomplished by use of a silver stain, and the end product was the impression of the DNA pattern on a piece of x-ray film. With the more recent testing, visualization of the DNA was accomplished with the use of a fluorescent tag, and the fluorescence was monitored as the DNA electrophoresis took place. The end result was a computer print-out of the locations where the fluorescence was detected. However, the same basic scientific principals were at work in both the original testing and the more recent testing, and the difference is really that, in the more recent testing, a machine (a 310 Genetic Analyzer, which has been in existence for more than five years) examined the results and printed out the information which, in the original testings, was obtained by a scientist's visual examination of an x-ray film. I accept Dr. Cotton's testimony that the new technology is at least as reliable, if not more so, than the original technology, and that many reputable laboratories around the country are now using it. Because the more recent testing consists essentially of a refinement in the STR system of analysis, which has been determined to be generally accepted in the scientific community, I find the recent test results to be reliable.

The defendant complains that PE Biosystems, Inc., which manufactured and sold the Cofiler and Profiler Plus kits which Cellmark used to do the more recent testing, does not publish the composition of its primers, and therefore that the scientific community has not had the opportunity

to validate the operation of those primers. Accordingly, the defendant is concerned that laboratories which use these kits must rely upon PE Biosystems' own validation of its primers, and that primer error may result in the masking of mixtures in the DNA and the false exclusion of other individuals who may have had physical contact with the victims. I do not share the defendant's concerns. I am persuaded by the reasoning of Judge Thor Anderson of the Fourth Judicial District of Minnesota in Minnesota v. Dishmon, et als (Docket nos. 99047345, 99069306, and 99079650), who wrote: "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." Cellmark has done validation studies of tests performed with the Cofiler and Profiler Plus kits, and those studies have been produced in writing and presented at scientific meetings. I accept Dr. Cotton's opinion that, based upon those studies as well as upon other information derived from scientific literature and other meetings of scientific researchers, the results of those tests are reliable.

The defendant also argues that eleven of the thirteen loci which are used as the basis for the Cofiler and Profiler Plus kits have not been mapped on the human genome, and that as a result the users of those kits cannot be certain that the genes which those kits detect are actually located on the designated chromosomes. He argues that any of the eleven unmapped genes could actually be other genes under a different name, which, if proved, would destroy the assumption of independence and invalidate the use of the product rule. However, I note that the Combined DNA Index System ("CODIS"), which was created by the DNA Identification Act of 1994, involves the same thirteen STR locations which were utilized by Cellmark in this case. Laboratories from the FBI, the Royal

Canadian Mounted Police, and a number of states from around the country did a study in order to decide which loci would be used in the national data base, and eventually decided upon these thirteen "core loci." Moreover, I specifically asked Dr. Cotton during her testimony to comment about this concern, and I am satisfied with her response and with her explanation as to why she "just can't envision that happening." Given the considerable reliance which the scientific community has placed on these thirteen loci, I consider Dr. Riley's opinions about the potential for error to be highly suspect.

Dr. Riley also identified a number of technical issues which the defendant claims are significant enough to warrant exclusion of the STR test results. Once again, I disagree. All of the potential problems identified by Dr. Riley are matters with which a trained analyst would be prepared to deal on a regular basis. Indeed, Dr. Cotton and her colleagues at Cellmark specifically reported and considered such matters as spikes, peak imbalances, "minus - A" peaks, locus dropout and differential amplification, and factored them into their report of the test results. All that Dr. Riley can really say is that there is a "potential" for this system of analysis to miss alleles and to distort results. I recognize that the potential for error exists in any scientific testing, but I am satisfied that Cellmark has done all that is reasonably possible to eliminate that potential. In addition, Dr. Riley pointed out certain observations that he made during the Cellmark testing. He claims that he observed flaws in Cellmark's technique (such as the passing of bare hands and arms over sterile solutions), and believes that Cellmark's technicians were having difficulty in bringing their testing within accepted tolerance levels. As I pointed out in my September 24 decision, "I am satisfied that Cellmark has appropriate procedures in place to guard against the possibility of contamination, and that in fact its record of accuracy over the years has been exemplary." I heard nothing during the

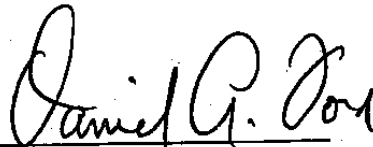
testimony of Dr. Riley, whose work has been primarily in the research field, to change my mind. In any event, I agree with the Commonwealth that those issues bear more heavily on the weight to be given the evidence rather than upon its admissibility.

Finally, the defendant argues that Cellmark ignored the manufacturers' recommendations with respect to the minimum quantity of template DNA and the minimum threshold peak height at which to declare the existence of an allele on the electropherogram. Even if I were to accept Dr. Riley's testimony that PE Biosystems set one nanogram as the lower limit of the quantity of DNA to be tested, that is only a recommendation. Dr. Cotton testified that Cellmark was able to obtain reliable results from as little as one-half nanogram of DNA, and I accept her testimony in that regard. In the same vein, if I accept that the peak limit at which an allele may be declared to exist at any one location is 150 RFU's (relative fluorescent units), that is again only a recommendation. I spent a considerable amount of time questioning Dr. Cotton about the peak heights shown on her computer print outs, and I am satisfied with her answers. The fact that Cellmark may have chosen not to stay within the manufacturers' conservative recommendations does not, in my judgment, invalidate the studies.

The technique used by Cellmark in this case is now being utilized by the FBI laboratory and approximately twenty other state laboratories around the country. Many other laboratories are now in the process of doing their own validation studies so that they may also begin doing this type of testing. Even Dr. Riley conceded that he knows of no laboratory which has switched to this new technique and then abandoned it because it was found to be unreliable. Dr. Riley also acknowledged that, in the case of several stains on pieces of evidence submitted to Cellmark, the conclusions reached by Cellmark are completely consistent with the data which Dr. Riley reviewed. Moreover,

Cellmark retested the three loci which were originally tested last summer, and reached precisely the same results in its most recent testing. That fact bolsters my belief that the tests were properly performed and that the results are reliable.

Accordingly, I find that the STR test results which the Commonwealth proposes to offer into evidence are scientifically valid and reliable, and that the testimony which I heard from Dr. Cotton complies with the standard enunciated by the Supreme Judicial Court in Lanigan. I also find that the Commonwealth has met its burden of showing that its experts properly performed scientifically valid methodologies in arriving at their opinions, and that the results of the tests are sufficiently reliable to be put before the jury. I therefore rule that the most recent STR test results are admissible.



Daniel A. Ford  
Justice of the Superior Court

DATE: April 7, 2000