Testimony of Michael DeGuglielmo in Misskelley trial Feb 1994

DIRECT EXAMINATION

BY FOGLEMAN:
Q: Would you state your name and spell your last name, please?

A: Sure. It's Michael Deguglielmo, D-E-G-U-G-L-I-E-L-M-O.

Q: And what is your occupation?

A: I'm employed as a director of forensic analysis for Genetic Design.

Q: Alright. And what is Genetic Design?

A: Genetic Design is a genetic testing company that specializes in human identification. We test in three particular areas. My forensic laboratory, which does basically criminal case work such as this. A paternity laboratory which handles cases of disputed parentage, both private and for governmental agencies, and a bone marrow tissue typing lab for bone marrow transplants.

Q: Alright. And what education, training, experience and background do you have to qualify you in this field?

A: Bachelor of Science degree in biology, post baccalaureate studies in biology and chemistry, Master of Science degree in microbiology and genetics, continuing education in forensic DNA analysis, radioisotope techniques, and statistical interpretations, as well as continuing education through numerous forensic agencies and organizations such as the American Academy of Forensic Sciences, the FBI laboratory in Quantico, and some of the regional forensic associations as well.

FOGLEMAN: Alright. Your Honor, we would submit the witness as an expert.

STIDHAM: No objection, your Honor.

THE COURT: Alright, you may proceed.

BY FOGLEMAN:
Q: In the course of your work with Genetic Design, did your lab receive certain items either -- from the Arkansas Crime Laboratory?

A: Yes, sir, we did.

Q: And were these in relation to the case involving the victims Michael Moore -- James Michael Moore, Steve Branch and Chris Byers?

A: Yes, sir.

Q: And specifically did you receive certain possible tissue recovered from ligatures?

A: Yes, sir.

Q: And how were those items labeled upon receipt?

A: There were two items listed as item Q4, "possible tissue recovered from ligature from Chris Byers," and Q39, "possible tissue recovered from ligature from James Michael Moore."

Q: Did you also receive some cuttings from some pants?

A: Yes, sir.

Q: Alright. And how were those items labeled?

A: They were labeled as Q6 and "parentheses 2S parentheses, cuttings from blue jeans questioned stained," and item Q10, "parentheses 1S parentheses cutting of blue jeans questioned stain."

Q: Alright. In regard to the possible tissue recovered from the ligatures, what tests were run on these items?

A: Well, our laboratory does DNA analysis in all the cases that we handle. And there are essentially two types of DNA testing, traditional DNA testing which has been done for quite some time is referred to as a restriction fragment length polymorphism, or RFLP. The second type of DNA testing is based upon a technique called polymerase chain reaction, or PCR. The initial type of testing requires a substantive quantity of DNA.

Q: Alright, what does that mean?

A: Um, well, I can tell you typically we're targeting approximately four hundred nanograms of DNA.

Q: What does that mean?

A: A nanogram is a metric measurement used in a lot of scientific discussion. The best way to explain it to you if you take a dime, a dime weighs approximately one gram and a nanogram is one billionth of a gram. So that's the amount of DNA that we would be looking for in the actual processing. While four hundred nanograms is not a lot, really, it is a substantive amount that from some items of evidence in -- well, in cases where there's evidence other than just specimens taken from parties for controls, it's difficult to obtain that much DNA. With PCR based testing, the sensitivity is sometimes -- many times -- below one nanogram and so we're able to do testing where we couldn't do it with the RFLP based testing. So for this particular case, the analysis that we did was PCR based testing because of the amount of material we had to work with.

Q: Alright. And is that because it's more sensitive?

A: Yes, sir.

Q: Alright. And what were the results on this Q4 and Q39, the possible tissue from ligatures?

A: In those two particular items we were not able to detect any DNA from the isolation. When we initially begin a test, the first thing that we do is to go through whatever the material is -- if it is tissue or blood -- and to remove the DNA from it so that we can work with it. Initially we go through and we quantitate that to determine, well, how much DNA is present if it's there. And we were not able to recover and detect any DNA from those two items, and subsequently the testing yielded no result as well.

Q: Okay. And what are the reasons for the inability to get DNA from these possible tissues?

A: Well, it can be one of several things. First of all, tissue specimens even more so than bloodstains or seminal stains tend to degrade, in other words, decompose and break down. The reason for that -- ah, fluids that make stains dry and when they dry, they are fairly well preserved and they can last for a longer period of time. But tissue or any biological material that's not preserved in some way will break down. Tissue specimens that you're going to analyze generally are best if they are frozen because that prevents them from decomposing. When that decomposition occurs, the DNA breaks apart and becomes in very small pieces so that it is very difficult if not impossible to test it. The other possibility is that they just were very small samples, and there may have been too little there to have recovered from for the testing anyway.

Q: Alright. So despite your best efforts you were unable to get any DNA from those items.

A: That's correct.

Q: Alright. In regard to the cuttings from the pants in Q6 and Q10, what type of analysis was made and what were the results in that?

A: Okay. All of the items that were submitted in this particular case were analyzed using the same particular test. It's a PCR based test called HLA DQ Alpha. The HLA stands for human leukocyte antigen. It's a gene that is present in our bodies in what is called a histocompatibility complex. It basically recognizes self and is what's responsible for tissue rejection in transplants and for tissue typing matches. The particular marker we are looking at is the D gene and a subset of that called DQ Alpha. In this particular case we did isolate a small amount of DNA from the two questioned cuttings from the blue jeans. In the initial information that we were given from the Crime Laboratory here, there was a possibility that these could be either mixed stains or potential seminal stains. And with any evidence involving a possible sexual assault, we use what's referred to as a differential extraction. And the purpose there is to separate sperm cells from any other material that might be there so that we could match them to the appropriate donors if there were two individuals comprising a mixed stain. We refer to those as the epithelial, or nonsperm portion, and the sperm, or male portion, of the sample that we have. The initial step, the quantitation in this case, showed a very small amount of DNA basically right at a marginal level of detection for the two sperm fractions, that being items Q6 and Q10, and we detected no DNA present from the nonsperm or epithelial portions. The physical HLA DQ Alpha analysis itself, though, there was not enough material for us to get a result or the result did not -- the testing did not appropriately amplify, possibly because of an inhibitor. Unfortunately, blue jeans many times do not provide the best substrate. There are numerous references to this in the literature. And it's most likely because of some of the sizings or dyes that are used in actually producing them. There's no hard and fast rule, but just some particular pairs of blue jeans will not allow us to get an amplification so that we can obtain results from it.

Q: Alright, and -- alright, from all of that, what can we conclude about the source of the DNA or probable source of the DNA in the two [or Q] cuttings from these pants?

A: Well, what I know from those two particular items, is that we did obtain a small amount of DNA, basically a threshold amount for our testing. The testing that we use is specific for human or higher primate. And by that I mean there is some cross reactivity between higher primates as far as the DNA sequences. Human beings, gorillas, chimpanzees and great apes will have some similarity in the actual DNA sequence. And because of that, they are not just human specific, but we know that the DNA that we detected is from the source of a higher primate. The other thing is that the small amount of DNA we detected were present in the male or sperm portions of the extraction which would be indicative of the DNA having come from a sperm origin.

FOGLEMAN: Okay. I don't have any further questions.

CROSS EXAMINATION

BY STIDHAM:
Q: Those are a lot of big words, but what I gathered when I wrote down in my notes was that you're talking about possibilities. You can't say for certain that there were sperm stains on these clothes, can you?

A: Well, no, sir. As we discussed earlier, in forensic science the only way that people will definitively say, to my knowledge, that there are sperm there is if they visually observe them under a microscope. And with a very limited specimen, most of the crime laboratories and our laboratory as well generally will not consume material in order to do that. We know that the extractions will separate male and female components, and we also know that the material we're looking at has to be human specific or higher primate specific to obtain a result. Generally speaking, that's the, just the way the testing is handled.

Q: Did you see any sperm in, in --

A: No, sir. We did not do a microscopic. We did not want to consume any of the material.

STIDHAM: No futher questions.

FOGLEMAN: I don't have any further questions, your Honor.

THE COURT: Alright, you're free to go, sir. Thank you very much.

DEGUGLIELMO: Okay. Thank you.

THE COURT: Call your next witness.

(WITNESS EXCUSED)