NO. 90-09-8445-CR

THE STATE OF TEXAS	()	IN THE DISTRICT COURT
	()	
VS.	()	38TH JUDICIAL DISTRICT
	()	
GILBERT ALEJANDRO	()	UVALDE COUNTY, TEXAS

HON. MICKEY R. PENNINGTON JUDGE PRESIDING

STATEMENT OF FACTS

APPEARANCES:

DISTRICT ATTORNEY'S OFFICE
By: ROGELIO F. MUNOZ, Esquire
Uvalde County Courthouse
Uvalde, Texas 78801
Appearing for the State;

LAW OFFICES OF R. EMMETT HARRIS
By: R. EMMETT HARRIS, Esquire
114 East North Street
Uvalde, Texas 78801
Appearing for the Defendant; and

GENE L. STEELE,
Certified Shorthand Reporter and
Notary Public.

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BE IT REMEMBERED that on Tuesday, the 11th day of December, A.D., 1990, at approximately 9:00 o'clock a.m., came on to be heard the above-numbered and styled cause, before the Honorable Mickey R. Pennington, District Judge, 38th Judicial District, Uvalde County, Texas, and the State by its attorney announced ready for trial, as did the defendant in person and by his attorney, a jury having been selected, empaneled, and sworn, the following proceedings were had before the Court and jury; to-wit:

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(Recess from 12:10 o'clock p.m. to 1:15 o'clock p.m. on Tuesday, December 11, 1990.)

* * * * * * * * * * * * * * * * * *

FRED SALEM ZAIN,

the witness, being first duly cautioned and sworn to tell the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

QUESTIONS BY MR. MUNOZ:

Q Would you tell us your name and how you are employed?

A Yes, sir. My name is Fred Salem Zain, spelled Z-a-i-n. I'm employed with the Bexar County Medical Examiner's Office and Crime Laboratory in San Antonio, Texas, where I am in charge of particular lab functions of what is called serology or the examination of blood and body fluids, trace evidence and documents and firearms and other specific duties concerning the crime laboratory. Specifically I test and analyze physical evidence for biochemical identification of blood and other body fluids. That's what I do myself.

Q What training, education or experience have you obtained to qualify you to conduct these examinations?

A My formal education consists of a Bachelor of Science degree in biology with a minor in chemistry and an

associate degree in applied sciences. I have a master's degree in biological sciences.

For the last eighteen years, sixteen of those spent in the field of forensics in law enforcement, I have dealt with the development of testing and methods that relate to the identification of body fluids and blood typing methodologies. I have published a variety of papers. I have done postgraduate work in this field also.

Also, I'm an associate professor at the University of Texas in criminalistics, which deals with forensic applications of evidence. Also, I'm an instructor at four police academies in the surrounding area. I've been instrumental in the development of some of the methods and techniques that we might talk about here today.

I'm a member of the Southern Association of Forensic Scientists, the Canadian Society of Forensic Sciences, the American Academy of Forensic Sciences, and I also belong to the International Society of Hemogenetics, the National Society of Electrophoresis, and the American Blood Bank Association.

I'm also associated on the faculty of the University of Texas Health Science Center, and

other colleges around Texas and outside of this state. I have given a variety of lectures and seminars in Texas and other states over the last year and a half that I've been here and also over the prior fifteen or sixteen years I moved here from West Virginia. There are other items, but basically this is my formal background.

Q Did you have occasion to conduct a series of analyses or examinations in the case involving the sexual assault of a lady name [redacted], which I think you referred to as your lab Number 371.

A Yes, sir. I did receive some items at the crime laboratory on May 29th, 1990, in reference to the particular Ms. [redacted], as well as a Mr. Alejandro.

Q And what was the item that you received or that you initially received for analysis?

A Well, if you will, I just will read the specific items that were submitted to me. The specifics were listed on a submission report form as one woman's slip, white, and one sexual assault kit with blood and semen. Also received was one woman's dress, pink with white flowers, and one peach woman's gown. Also received was one purple with white bows woman's robe, and two quilts, which were multicolored.

Most of these items are marked as

originating from Ms. [redacted], as well as the sexual assault kit, which was taken here at the Uvalde Memorial Hospital. That was turned over to me and all of these items were assigned the case number which you referred to, and which I have as SD-90-371.

They were assigned that number at that time, and they were all submitted for examination and testing to see if there was any seminal fluid or semen, as well as to see if there was any blood or hair present on the items, and if so, to then determine from whom the semen donor may have been.

Q Would you look at some of the items that are before you and then tell us whether or not these are some of the items that you examined, those that are here in front of you at this time, and that you examined.

A So that y'all will know specifically what we do, when evidence is received in any crime laboratory, no matter where it is, the standard procedure is to assign it a laboratory case number, and also for the person who may be doing the analysis to put their initials, for identification purposes, on the outside of this container.

When I received it, I placed the initials SD-90-371 on it and also my initials of SZ, and that's for identification. This particular item

here is State's Exhibit Number 8, and this is one of the bags that was received. This contains the purple robe that I was talking about earlier.

I'm not going to show you my name and the numbers, but they are all on the items in various places. They may be too small for you to see.

This is the housecoat and the peach colored gown and a pair of panties. You can see the markings on those fairly easy. I received these items.

State's Exhibit Number 8, there are cuttings there that you may see, and that's where I removed certain parts of the stained material for testing. State's Exhibit Number 7, the same way. It contains the white slip, which I examined and removed parts of the evidence that were there.

There again, on State's Exhibit Number 9, this contains the other housecoat or robe-type item. State's Exhibit Number 11 and State's Exhibit Number 10 are both marked with my case number and identification.

These all appear to be in a similar condition in which I returned them, except that I had them sealed when I returned them to the investigating officer. That's those items there.

Q You told us that you were able to identify human blood

and semen on these items, including the rape kit?

A Yes, sir, that's correct.

Q How were you able to do that?

A Well, there are two-fold things you do. What you do first of all is take the item and examine that item for any possible visual staining. I think everybody has seen what bloodstains look like. If there is any visual staining, the chemical will determine whether the stain there is in fact blood or not.

Secondly, you determine whether or not it is human. Thirdly, if it is human, then you proceed to identify as many specific components of the blood as you can so as to identify who the donor of that bloodstain is or where it originated from.

This is all done scientifically with accepted methods and techniques, not only in the specific field of forensics, but in the general field and scientific field of biology and chemistry.

To identify semen stains, you visually and microscopically look at the item and determine whether there is any stain visible. If so, then the stained material is checked chemically and the reaction of the chemical test is then used for semen identification, as well as microscopic identification. Then you can get a positive identification of whether

or not it is semen.

Seeing how semen only originates from the male individual, you can then also determine the blood typings from that semen itself, which will be the same blood typings as the semen donor may have in their blood. In other words, if a male individual is a blood type A, identified from his blood, the semen that he possesses will also be a blood type A. This is not only done with routine serological work, but it is also done with advanced serological testings and analyses.

It's a combination of all of these tests that you perform that you can then not only identify what the substance is but from whom the semen originated from. Likewise with bloodstaining, if the biological materials can be identified, then it can usually be determined from whom it originated.

Q Were you given a known sample of the blood of Gilbert Alejandro to make a comparison to the items that were submitted from the rape scene and the examination of Ms. [redacted]?

A Yes, sir. There was a known blood specimen that was submitted to me. Excuse me for a second here. Yes. I believe it was submitted July 6th, 1990, of which it was a known blood specimen. It also was tested and examined, just like all of the other samples were, and

the results were compared to the results of the evidence which I had previously tested and issued my results or conclusions on.

Q Other than a DNA analysis, what are the characteristics that you were able to tell were the characteristics of the semen that you found on each of these items?

A The semen stain that was identified on the items that we have talked about previously was a blood type A. It also was from a secretor individual, and I'll explain to you what that statement means. Also, it was of PGM type one plus. A PGM blood type is a system just like an ABO blood type is a system, and there are a variety of blood typings within that particular system which are identifiable as to each individual in here.

The blood typings that were identified from the semen were the same as the ones that were identified from the known blood specimen of Mr. Alejandro. The secretor status simply means this, that every individual secretes their ABO blood type in their blood fluids, and eighty percent of the population secrete the ABO type and body fluids that can be identified.

Twenty percent of the population secrete their ABO type body fluid in such low levels that they cannot be identified. From this you come up

with the terminology secretor or non-secretor. All that means is what I've already explained to you previously.

Q So that Mr. Alejandro's known blood was blood type A?

A That's correct, sir.

Q You determined him to be a secretor?

A Yes, sir.

Q And he had a PGM of one plus?

A That's correct.

Q Now the sample that you took or that you identified from the vaginal swabs of Ms. [redacted] indicated that the individual that had deposited semen inside of her had blood type A, and he was a secretor and had a PGM of one plus?

A Yes, sir. It was also the same, not only on the vaginal swabs, but also the same results were obtained from the bedspread and the two robes and the slip.

Q So not only did you type and analyze the substance that was inside of her body contained in the rape kit, but you also typed and analyzed the semen that was in the bedspread?

A That's correct, sir.

Q And you produced the same results in that regard?

A That's correct.

Q And you analyzed the semen stains on the two robes and

it produced the same results?

A Yes, sir.

Q You analyzed the semen stains on her slip and it produced the same results?

A That's correct.

Q Why is it that you did an analysis on each one of these items?

A Well, all items, when they are submitted for testing and examination, they are processed in the same way. We just don't check one item and if we do identify or do not identify something then just not examine the rest of the items.

All of the items that are submitted to the crime laboratory are examined, and in the same manner. Whatever is identified is tested in the same manner, and of course the results, whether positive or negative, are also reported in the same manner.

Q So it's just to make the test and the examination more certain that you test everything that you possibly can test, and everything that's provided for you to test and that is available to you?

A It's the policy of the crime lab to examine all items and to obtain as much information from each item that is possible and then to report the results. That's why it's done. The evidence is to help support in whatever

investigative purposes any agency may want to apply the information towards.

Q The typing of the blood, the determining of whether a person is a secretor, and the PGM determination, how long has that been in existence in forensic science and in forensic application?

A For a little over twenty something years. Some of the methodologies in ABO typing has been used even longer than that for forensic purposes. You have the protein and enzyme analysis and the secretor status, and that has been in existence in the realm of twenty years. It's been in crime laboratory use for that long.

Q These kind of analyses and examinations are used, and you have testified before in cases such as this one where an effort was being made to determine whether a certain individual had raped another person?

A Yes. Well, not only hundreds of times over my career and certainly not only in this state, but in other states I've testified to this, yes, sir.

Q In addition to the standard type of examinations and comparisons, including the blood type and the secretor status, and the PGM typing, you also perform what is known as a DNA analysis?

A Yes, sir. We have the capabilities to perform additional advanced testing on forensic evidence. We

have worked on approximately two hundred and fifty to three hundred forensic cases. We have worked about as many cases right now or we are second to the FBI Crime Lab in D.C. We have been fortunate to have the methodology and the technique advanced to where we can do additional testing. One reason being is that on a lot of cases you may have samples that are degraded or you cannot obtain the information, information that I talked about previously.

Well, with DNA profiling we are able to obtain information that ten years ago we were not able to utilize forensic means to obtain. Therefore, on cases where it is requested by the agency we do have the capabilities and we will do DNA typing or DNA profiling. DNA profiling is unique because it does give an identity to particular body fluids without any uncertainty as to the results obtained.

It is also means whereby sperm cells, if they are present, especially in sexual assault cases, we can then take those and give the identity of the semen donor, whereas prior to the specific type of testing, we could not go up to the 99.99 percent sure as to the possible semen donor.

Q Can you explain to the jury and to the Court what the basic theory is behind the DNA profiling? What is the

characteristic that you are looking for that allows you to make these comparisons with this certainty?

A Basically what we have talked about up to this point has been genetic markers, blood characteristics, blood typings. They are all one in the same. They are all genetically inherited. They are all passed on from one generation to the next.

DNA typing and profiles are the same thing. It is your genetic inheritance as to your particular makeup. Some DNA that you could readily relate to gives you physical characteristics such as brown hair, blue eyes, et cetera. There is additional DNA that makes up the composition of the body that is not used for your physical characteristics, but does make up your genetic characteristics. This will also help determine certain types of internal characteristics.

What we are basically talking about is a chemical makeup that is genetically inherited from one generation to the next. Forensically we identify this chemical makeup of the individual by testing. We simply take a portion of the chemical makeup from a cell and we separate it out. We go through several steps to where we can visibly see what this chemical makeup is.

The chemical makeup, the final makeup is then on an x-ray film, which shows then the banding patterns. These banding patterns either match up with what you are comparing them to, say, from a known blood sample, or they do not match what the banding patterns are from a known blood sample for example.

They are readily visible and readily apparent. Whether they match up or not, they can also be determined, not only mechanically and visually, but mathematically if need be, as to how close they may overlap each other as far as the identity.

On all of the cases that we have processed from our crime lab and other crime labs across the United States, the general consensus is that, except for identical twins, that DNA typing is a hundred percent identity as to whether a blood or body fluid may have originated from a particular donor or not.

Q Is the whole procedure based generally on accepted scientific principles?

A Yes. The methodology of DNA testing has been well used in the medical community and research and the metabolic disease control community for well over fifteen years.

The principles of DNA itself, the structure and the mechanism and the chemical basis, that has been utilized for much longer than that.

As far as the forensic community, the accepted methodology throughout the United States, Europe and other countries is by use of RFLP. That's an abbreviation for a specific type of testing used in forensic application. There are other types of DNA testing which are at this point in a research type of mode and are not generally accepted in the scientific community or in the scientific community such as the RFLP is.

Q How many tests have you performed of this type?

A As far as all types of testing, I've performed hundreds of types of tests in the crime laboratory, and in the entirety I've performed, well, approaching over ten thousand tests of this kind within this last year.

Q Have you testified in other courts as to your findings in these particular tests?

A Yes, sir. I've testified in a variety of courts within Texas, as well as out of Texas.

Q In fact, did you testify as to one of these procedures in another case in another court just this day?

A Yes. We were talking about some bloodstaining and test analyses that were used there. I think the last case

was not in Bexar County but in Karnes City, Texas, where I testified just recently, yes, in another case.

Q I imagine just as many times as you've determined that a certain individual was the same person that had donated or had left sperm in a person, you have also had many situations where you have excluded a person, is that right?

A Absolutely. The type of testing that is done in a crime laboratory is to find out any and all information that you can that will be beneficial and help in your decisions.

There are a large number of cases where the routine serological work does not give complete enough information to possibly exclude an individual as being a semen donor or depositing blood or another body fluid on another, but the beauty of DNA testing is that it can give you a hundred percent certainty, for example, that a semen stain or bloodstain did not originate from a particular individual.

This also helps in the investigations of a particular type of incident where maybe an agency can, you know, direct their investigation towards another avenue, other than where they may have been proceeding at that time. We've

always actually had more cases where it has excluded individuals rather than included individuals.

Q Mr. Zain, based on your analysis of the semen that was contained inside and that was taken in the rape kit from, according to the testimony in this case, from inside the vagina of Ms. [redacted], as far as your analysis of semen stains that were contained on the bedspread and the two robes that belonged to Julia Esparza, can you tell us whether or not those semen stains, that semen deposit came from an individual whose blood you examined and who you knew to be Gilbert Alejandro?

A I'll reiterate what I specifically pointed out in my report, which is that the banding patterns that were identified from these items that you mentioned were identical to the banding patterns of Mr. Alejandro. As I stated in the report, they could only have originated from him. There was no information whatsoever, beyond a scientific reasonable degree, that the particular semen stains that would show they originated other than from him.

Q In State's Exhibit Number 17, your report, it indicates your findings in this case, is that correct?

A Yes. This is a copy of my report, which I've signed, and the statement which I just gave is in there.

MR. MUNOZ: I would like to offer State's Exhibit Number 17.

MR. HARRIS: No objections, Your Honor. I have previously examined it.

THE COURT: State's Exhibit 17 will be admitted.

(State's Exhibit Number 17 accepted into evidence.)

MR. MUNOZ: I'll pass the witness.

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CROSS-EXAMINATION

QUESTIONS BY MR. HARRIS:

Q Mr. Zain, my name is Emmett Harris and I represent Mr. Gilbert Alejandro. We have not met before this moment, have we?

A That's correct, sir.

Q As I see it we have kind of two choices in this case, and I may not see it right, and I understand that, but we either have to just haul off and take your word for it or we have to try to better understand what you are saying so that we are really convinced that we are doing something other than just blindly relying on your opinion.

A Correct.

Q Assume that one or more of these ladies and gentlemen

are worried about doing it the second way. Just give me some more details about the analyses, and before we get to the DNA, let's start back with the more older and more longly accepted procedures that you have described.

A Okay.

Q Let's take the blood typing. Most of us have donated blood or for one reason or another we have had our blood typed before. If you are looking at two blood samples and they are of the same type, A or O positive, then that alone does not tell you, does it, that they came from the same human being?

A With the example that you have given, if a person is an A and another is an O, and there is a bloodstain, for example, that is blood type B, then one hundred percent both of those individuals would have been excluded as being able to deposit that particular bloodstain.

If the bloodstain was just the reverse of that, then you could exclude the A. You can exclude, by routine work, if it is different, if there is one difference in a blood type, then you can exclude it a hundred percent, if that answers your question.

Q Partly.

A Okay.

Q But of course your report, having included Gilbert, I'm

a lot more interested in inclusion there than exclusion, but from your report if you and I sat down and looked at a sample of your blood and maybe there was something readily discernible visually -- You talked about visually looking at blood types. I assume that mine would be red and yours likewise.

A Correct, hopefully.

Q At that point they are looking alike?

A Correct.

Q Unless maybe yours is blue. Let's say that both of us are relatively red, what then is the next step in the typing? What is the next step from a visual comparison?

A What I was referring to visually was in stains and not liquid blood. You can determine from clotting items where blood may have been deposited. If in fact there is a green stain, then visually you are going to determine that is not blood. But if there is a red or faint staining, then that draws your attention to the testing on those particular stains. That's what I meant by visual. Liquid blood, you know, most everybody's would look pretty much the same.

Q The types, I think I know that there are such things as type A and I know there is O positive, because somebody told me that, but what are the various types of blood?

Just review that for us.

A Well, for A, B, O typing, I think I went over this briefly before, but the four blood typings in that system is A, B, AB or O. Every one of us in this room will be one of those four.

Q Everyone in this whole territory from San Antonio on back would fall within one of those four?

A Yes.

Q And there would be countless, well, maybe not countless, but lots of us between here and San Antonio involved, correct?

A From the population base of which I work with in making my determinations, in Bexar County and the outer region communities, the population involved is approximately fifty-five percent Hispanic, which are blood type O, and then thirty-five percent are blood Type A and the remainder is about eight percent B and then two percent AB, you know, as far as an approximation. That's based on what is called gene frequencies, and not statistics. These are gene frequencies of the region as to what the inheritance of certain types of blood will be found in the individuals involved.

Q You gave us percentages applicable to the Hispanic population?

A Right.

Q What would be the percentages if you didn't limit it to the Hispanic population? Let's take the population of Texas, if that's a legitimate boundary to you.

A Let's just the United States because on papers that I have published in the past, you know, as far as regional groups, they have been fairly consistent across the United States.

Q That's fine.

A The normal range, for example, of a blood type across the United States, that would be about forty-five percent of the population, as a total mix, that would be AB and blood type O, and then approximately forty percent are type A and about ten percent are type B and the remainder would be type AB. That's just a national average.

So you can see there is a difference based primarily just on the Hispanic population, which is sort of surprising but then not too surprising with the generations of that particular ethnic group being in this area.

Q If all we had then was the ability to look at, and let's assume for the moment that you can take a semen sample but you are not fortunate enough to have one produced by a "secretor" type person, but there is enough content to where you can type blood from it, and

you've got a semen sample in a test tube vial and a blood sample in another one, and all you know for sure is that they are produced by someone having the same blood type, either A, B, AB or OAB or B, then at that point all we know is that someone or perhaps some two people from these large numbers that you have described produced those two liquids, isn't that right?

A Yes, sir. If a person, for example, was a secretor, which is what we are talking about right now, this situation right now, it would be approximately thirty-two percent of the population that would be A secretors.

If you take into consideration that we are talking about a semen stain, then we would be talking about approximately sixteen percent of the male population. Then with the addition of any other blood typings, based on gene frequencies, it would then reduce that, to save a little time, to that which was identified from the semen stains as well as the same blood typings that we have talked about. Mr. Alejandro occurred in 6.7 percent of the general population.

Q That includes a lot of folks, doesn't it?

A Which would exclude 93.3 or whatever it is, but not to play with numbers, 6.7 percent of the general population would be like six people in a hundred or

seven people in a hundred, you know, approximately.

Q Before we get off of that, maybe all twelve of these people know here and the only one that doesn't know this is me, but how do you determine what blood type is or what type a blood sample is?

A Well, we have been referring to ABO typing all along, so we will just use that. A very small portion is utilized. Say, for example, for liquid blood you place three small drops in a vial and then you add a commercial agent and it will react positively if it's an A, positively if it's B and positively if it's O, or positively if it's AB. Likewise, if there is no reaction then it is not that blood type. It takes about five minutes to determine it from a liquid blood sample.

To determine it from a dried bloodstain, it takes approximately two hours. The same procedure is used but you have to go through the method of absorption. This has to be done because you are obtaining information from a stain instead of from a liquid sample of blood or other body fluid.

Q How do you determine that the reaction has occurred or not occurred when you drop the commercial fluid in?

A Oh, it's visual and microscopic. If it's positive, it will clump together in a clumping process, which is

called agglutination. But if it is not, if there is no reaction, then it will be a negative result. These are also governed by standards and controls for quality, quality controls in testing.

Q Let's talk about secretors and non-secretors for a moment. What is it that a secretor, a person that you have classified as a secretor, what is it that he has present in his semen that a non-secretor does not?

A Nothing different, but just the amount of levels that the person secretes at is the only difference.

Q What is it that is secreted in varying levels, whether it's on a high level or a low level?

A The specific name is called blood group substance, which relates to the blood typing I mentioned earlier, to the ABO typing system. There is another specific blood typing, which is called a fluid blood type, which is derived from the blood. This determines the secretor status, and this is from the blood and not from the body fluid itself.

So then you have a countercheck of being able, one, to determine the status from the body fluid itself, as well as determine the status from the whole blood sample of the individual. There is a countercheck for a determination there.

Q How do we do that? How do we spot the little rascals

and know what they are or whether you have enough of them to make a conclusion?

A The chemical content in the body is what you are identifying. By secretor status, the ABO blood typing from the particular substance is determined in a similar manner as what I described to you earlier.

In the ABO typing the determination from a stain material is likened to the determination, which I also applied earlier, in determining the ABO type. All of these general reactions are grouped into the classification of what is called scientifically antigens, antibody type of reactions.

Where antigenic material is present on cells and in the body fluids, well, antibodies are also present, which will react opposite of what you are trying to possibly determine, but the chemical consonant we want is what the Lewis is based upon, which is a cellular reaction that is a positive visually or that is a negative visually. It can also be determined microscopically as far as sensitivity.

As to your original question on what is the difference, it's simply just the quantity of the material and not the material itself. Everyone will secrete their ABO blood typing substance and their body fluids. The secretor and non-secretor is just a

clearcut way of saying that eighty percent will secrete at levels that can be identified by what I've already explained, and twenty percent cannot.

Q What is it that is in the semen? Is it the blood itself or is it some chemical particle that you draw between the semen and the blood?

A Like I explained, in semen, vaginal fluids, saliva and your body fluids, in those you will see your blood group active substance, which is synonymous with the antigenic responses derived from the blood. It's not blood cells. It's the blood group active substance, which is also genetically determined and also is synonymous with the blood typing, the typing of the blood itself.

Q I think you said there was something called a PGM type one plus, is that right?

A Yes, sir.

Q What is PGM? What do those letters stand for?

A PGM is an abbreviation for phosphoglucomutase, and that last word, that particular word is called a protein enzyme. That is involved in or found in the blood and it's found in the muscle and other tissue in each individual. It is primarily what is called an enzyme, and that can be used as a characteristic blood type. It is determined from the blood. It is also identified

from semen, vaginal fluid and other body tissues.

The PGM blood type of an individual will be the same no matter what tissue it is derived from in that individual. There are ten types within the PGM typing system. Mr. Alejandro is a type one plus. There are individuals that are type one minus, one plus one minus, two plus, two plus and one minus, two plus and one minus; two minus, one plus; two minus, one minus; as well as two plus, two minus. The typing systems that are available for each one of us in this room will fall into one or the other of those particular types in the PGM system.

Q Without making you go through the pluses and minuses, if it's all right with you, just go through one to ten and tell us how many are in each one of those types. You can just use the broad approach and tell us how much of the United States population is in the first kind of the PGM.

A I do not know right off the top of my head on that because you get into, for example, on a two minus individual, it's like .5 percent. In other words, that's half of a percent of the population. All I can tell you is that in these blood types here is a combination. That's all I refreshed my memory on.

Q Without testing your memory, and without playing games

on all of the percentages as to all ten, just give us a range. If a category or a type has five percent of the population inclusive in that, then just give us that. Well, is that the low number?

A The lowest would be approximately .2 percent up to forty percent, in that range. But those ten will total up to a hundred percent.

Q I understand. All of us fall theoretically in one of those groups, in the larger and smaller groups, and they vary between .2 percent all the way up to forty percent, is that correct?

A Everyone in this room as well as everywhere else would fall into one of those groups.

Q How many of us would fall into the one plus? What percentage would be applicable there? By us, I'm talking about the United States.

A I do not recall specifically on the one plus. I wouldn't want to say one thing and be incorrect on it.

Q Do you think it's at the high end or the low end of the scale?

A It would be between twenty-five and forty percent, somewhere in that range.

Q As much as twenty-five to forty out of a hundred people would be type one plus?

A Twenty-five, yes.

Q Again, if I understand this, the next most complicated and newest kind of analysis that you have described here today is within the area of the DNA. Help me on the initials here. Perhaps some of the jurors know already, but for me, just tell me what DNA stands for.

A DNA is deoxyribonucleic acid. We just use the abbreviation DNA to conserve room and space. It's actually deoxyribonucleic acid, but that's what that particular abbreviation stands for.

Q You gave us a percentage awhile ago of 9.999. I guess you just arbitrarily ended up with that last nine. Could you go on beyond that or is that given number of nine a place where you could stop at?

A What I was referring to is that in blood typing analysis the number of blood typing systems that have been available up to, say, five years ago was such that you could say, "We have excluded up to 99.999 indefinitely of a given population as being the depositor of the semen or another body fluid based on the blood characteristics themselves." Analogous to that we could say that we excluded 93.7 percent of the population based on the blood typings that we have just went over, comparison-wise.

Q Let's shift from exclusion to inclusion. You've talked about things being generally accepted and consensus and

so forth. Is there what you would describe as a generally accepted consensus as to how, measured by a percentage, how positive you can be in the inclusion process of saying that semen and blood were produced by the same human being?

A Yes, sir, a hundred percent.

Q And what would you put that to?

A I would say, and this is not just myself, but it is a general and a specific consensus known verbally and in literature of geneticists around the world that DNA has even been stereotyped as fingerprinting. We call it profile, not to be prejudicial, but we call DNA profile because that's what it is. It actually profiles an individual as to a hundred percent identity, except for identical twins.

Q What is it that we are saying about identical twins? Are we saying that their genetic factors, their banding patterns, their markers are in fact identical or do they vary to some extent?

A To my knowledge the literature, and it is still being researched because of the standpoint of the multitude of information involved, but to my knowledge they do have identical banding patterns. That is, sir, we are talking about identical twins now and not just twins themselves. But, there again, the population whereby

identical twins fall into is very small. You know, worldwide there is not that many of them.

Q Are there in fact tests and data produced by those tests that prove somewhere there is one or perhaps more than one set of identical twins who literally have identical genetic markers and banding patterns as established by testing?

A I do not recall any literature that I could cite where that has been stated. But it's within the realm that it could be, you know, possible as to a specific identity, you know, to the best of my knowledge.

Q What is the general assumption concerning those of us who are not either twins or identical to each other? Is the assumption that your genetic markers and banding patterns would necessarily be different from mine?

A It is a proven fact, from the standpoint of, there again, fingerprinting, that fingerprinting is actually inherited by DNA cells. Your fingerprints of each individual is an individual identity in itself, and that is governed by the DNA itself.

Q Fingerprinting may be in effect the cause of DNA then?

A Well, DNA is the building block of every cell in the body, so there you can get the specific identity in the general scientific community. That's just like what I stated earlier with the medical community, you know, as

far as metabolic disease and genetic inheritance of certain diseases. That can be governed by DNA testing. The DNA profile of an individual in that regard is unique to each and every individual.

Q That is, after all, the underlying assumption that makes the rest of it make sense, isn't it, that each one of us has a unique genetic makeup which, if studied with enough detail and acuteness, sir, will sufficiently identify us and exclude us from the entire rest of the world. Isn't that the underlying assumption?

A I would have to agree with you as far as the assumption because from a non-scientific viewpoint, the assumption would be correct because simply not everyone in the world has had DNA testing profiling done on this.

Q Absolutely. That was going to be my next question.

A And neither has everybody in the world been fingerprinted, but it's still a reasonable scientific statement to say that the identity and the profile, when it does match up, is a hundred percent as far as that match-up.

Q Based on the idea that nobody is exactly the same, and if you have two samples that have the same markers, then they must have come from the same person, because only one human could have that particular genetic

makeup, is that correct?

A That's correct.

Q How do we know that that is true, not having tested a whole lot of folks here?

A Well, I won't say that --

Q Well, here is the reason that I think the answer is important here. We are not talking about paternity here, and perhaps the only obligation involved in that would be to pay child support to somebody for somebody who may be or may not be his child. Here we are talking about liberty, and we are talking about the penitentiary.

So how are we sure enough that that genetic makeup is totally unlike yours, so you can say to hang someone based on that assumption, when we haven't tested everybody?

A It's not a comparison that is made in a crime laboratory or any other laboratory, as far as comparing me to you or whatever. It's just simply the results of the testing and analysis that, one, it did match up according to the test results on all testing.

Secondly, all testing that is feasible and that can be done has been done, and nothing excluded the individual from that viewpoint. The uniqueness of the test is substantiated by

publication after publication.

Therefore, the validation of the testing, and excluding statistics--we do not report statistics, but we report a match or no-match simply so that there will not be, as you call it, a numbers game--the validation of the testing is in the banding patterns that we have found, and it is based on our experience and the experience of other laboratories that use the DNA testing.

From this we can say, when it's a match, that there is a hundred percent identity. Then when it is not a match it's a hundred percent exclusion as to that individual. That's the best I can state it.

Q Well, have we actually found, we being the scientific community, which I've already proven I'm not any part of by my questioning, but haven't we found so far no match or have we found two human beings in the world that have identical matches? Which is it?

A There again, from my personal knowledge, other than the possibility of identical twins being the exception to the rule, there has been no two individuals that have had the same DNA profile.

Q That's one of the reasons why the scientific community says everybody is different is because so far at least we haven't found anybody that is just alike?

A Well, it's also from the standpoint of genetic inheritance, which is based on a publication done by a gentleman, but then he gets into gene frequency of the population, and that's not really tangible. This is something that you can grab a hold of.

Q Is there any way of even roughly estimating what percentage of the current world population of human beings is that we have any genetic data on?

A As far as DNA profiles, DNA testing, there has been hundreds of thousands of people involved in this. I know that for a fact from just the crime laboratories in the United States, and that is not counting Europe and other countries around the world that have done DNA profiling. As far as specific numbers, I wouldn't want to offer a figure on that.

Q But conservatively speaking, you would say hundreds of thousands of people though?

A Minimally, yes.

Q Let's try to put that in perspective. I don't know this, but maybe you do. What's the current estimated world population right now?

A I really don't know. It's hard enough keeping track of the local population, let alone worldwide.

Q Genetic data availability, I take it that would be different just according to what spot on the globe you

went sculling around trying to find that data, is that right?

A As far as DNA, no.

Q The availability as to what we know about testing in this matter would certainly tell us that there would be more testing of people in the United States than we would have in Bolivia, isn't that correct?

A As far as what area may be facilitating that type of testing, yes.

Q That's what I'm talking about.

A As to the same type of testing or technique that would be utilized, it would depend on how many or where, so I would agree with you there, yes. It would depend on where it was, yes.

Q We have tested more people in the United States probably than have been tested in India or China?

A From our standpoint, yes. From the metropolitan department and Scotland Yard, you know, they may be doing independent studies. I haven't talked to anybody there in the last six months. What I will offer is that on blood typing data, gene frequency data, which is what you are relating to, as far as DNA testing, that has been done to some degree around the world.

In Europe in the 1950's they were using protein enzyme typing, such as PGM, for paternity

and so on. It wasn't until twenty years later that the United States did that. So if you say we have done more in the United States than Europe, it may be pretty much equal on that.

What I can say is that at the symposiums the techniques and the validation studies and the acceptance of this type of testing that has been utilized, that regard I would say there has not been -- Well, everybody will state, and I say everybody, and that means everybody that does this type of testing, they will state as to the exactness as to identity based on their local community, their state community or whatever.

What is now being structured across the United States is a national data bank such that the way it looks now, within the next five years, there will be a national profile of genetic DNA profiles available for comparison purposes, you know, for whatever reason.

Q By the way, perhaps this is an aside, but how will we know whether our own profile finds its way into this national data bank or whatever?

A It is being structured different by different states. As far as certain types of programs, we have either the incarcerated individuals or, say, cases from a

standpoint of where there is no suspect, and this is in any type of a criminal case. The information, for example, is still profiled and placed in this bank. I guess one way to find out is to have a DNA done of yourself and then have it submitted and see if you matched up anywhere.

Q Suppose that happened and suppose I trot out here to the Uvalde Memorial Hospital and I give them whatever fluids of mine they need to make that analysis, but lo and behold I match identical with another human being alive or formerly alive on this earth, and that was the only time that had ever happened, but just suppose that happened.

First of all, I understand that you would put the possibility way out on the tail end of all of those nines, but is that possible?

A You mean that you would match up with another individual?

Q Yes, sir, an individual that I had never laid eyes on.

A I would say not from an identity standpoint.

Q Suppose that it did, because we don't know that's not the case. We don't think it is, and I understand that, but suppose that happened. Suppose it only happened one time. Where does that leave us with our underlying assumption?

A Well, simply from the standpoint, if it did occur, it would stand some looking into of why it may have occurred.

Q And suppose it happened a dozen times and there are a dozen instances where, contrary to all of these other folks who were unique, there was matching of genetic markers?

A Well, one, I don't think that would occur. I do not believe that. We are assuming or making a lot of assumptions that that would be the case, but I don't believe it would.

Secondly, the foundation on why the comparisons would even have been made would prove invalid. But the DNA profile of yours, the only way it would even closely resemble anybody else's would be in your own hereditary background of your family. Even then it would not be an identical match. It would just have certain characteristics that might be similar.

Q Which would be true if what we assume is in fact correct, but we might be wrong. At one point in our history let's say we could have gotten someone with credentials such as yours to testify, and we wouldn't have looked in this room but we could have gotten a scientifical, astute and trained human being to testify that without a doubt he was 99.99 percent sure that the

earth was flat, and folks that knew such things as that said that at one time it was, which we now know that to be wrong, so couldn't we possibly we wrong about this?

A From a scientific standpoint, and based on that and not statistics, and that's why I think we are sort of drifting off here, because when we get into statistical data, then possibilities and probabilities enter in. When we get into the biological data, based on gene frequencies and genetics of heredity, which are established laws of heredity that make up each individual, then there is quite a difference involved. I would not profess to be a statistician, but I do try to pose the scientific facts as I think they exist.

Q I think I'm fixing to age myself, and probably not you, but tell me if I'm right on this. Wasn't it taught, until fairly recently, say through the '50's, that the smallest building block in nature or blocks were the nucleus, the protein and the neutron that spun around and created an atom? Wasn't there a time within our lifetime when we taught that was as far as you could get in breaking things down in their smallest part?

A From a molecular standpoint, yes.

Q A lot of folks that were smarter than I thought that to be the case, but recently hasn't it been determined that there is something smaller than that, which is

called the quark?

A I believe so.

Q These are really small as compared to these other things which we thought were the littlest things; is that correct?

A And the question from the standpoint of DNA, is it the building block from the chemical breakdown of each individual?

Q Exactly.

A The other standpoint, which I did mention earlier that there is testing, some types of DNA testing, that I said were not accepted because it actually is manufactured evidence or reproduced cellular material. That's why we are talking about really a routine DNA type of testing here today. That is counteracted by another type, which I wouldn't be here trying to explain at this moment if it would have been that type of testing that was used. But to answer your question, that's correct.

Q If I talk to those folks later on about quarks -- and I didn't just dream that up. There is in fact something that we call now a quark and that is a lot littler than the atom or the proton or neutron, isn't it?

A I do not recall the specific unit name.

Q Have you read Stephen Hawkins book "The Brief History

of Time"?

A No, sir, I haven't.

Q He talks about quarks in there.

A That sounds good to me.

Q One other set of initials and then I'll leave the initials alone. I think you said RFLP.

A Restriction fragment length polymorphism, that is the type of DNA testing which we use and which is the type of DNA that is utilized for identification, which is a better way to say that. That's an abbreviated study that shows the segment of DNA that is tested and the identities made from it.

Q Do I understand you to be saying that is the realm of study that we are not as sure about yet or that is the one that we are sure about?

A That's the one we are sure about.

Q The area that we are pioneering below that are more minute than that and that has not yet been accepted?

A No, it's not more minute and it's not different. It's the same DNA. It's just an abbreviated PCR. It's a type of DNA technology where if you have one cell you replica the material of that cell. That is called more or less manufacturing DNA, which is probably about five years down the road.

But it doesn't have anything to do

with or it is not different than DNA. It's not any different than what we are talking about. It's just a different type of testing technique that is utilized when you have a very small amount of DNA material that you cannot get a profile from. That's the only difference.

Q One other area and I promise I'll quit; mutation. Is it possible for someone's genetic composition to mutate? If so, how or what would cause that?

A First of all, yes, it is. And, secondly, it's --

Q Excuse me. Let me interrupt you if I may, and not to be rude. Let me be sure that I have got this going in my own mind, if that's possible. Does that mean, without going further, that it would be possible at one point on the calendar, from any genetic makeup, to be one kind, and on the other side of the mutation process--forgetting what caused it or may happen--be different?

A What I was taking your question specifically to be was can you have a mutation in gene structure which would, and let's just get down to the bottom line, which would cause a different profile from one end to the other. That's what you are looking at. That can occur.

But what happens when you do a variety, and this is the key, when you do a variety of

DNA tests, say, like we have done on these semen specimens for instance, it's not just one test to get one profile, it's not one test and you get a match and then you stop there because it's a match, but you do a variety of separate and individual DNA tests.

These separate and individual DNA tests will utilize different sequences of DNA and then you get matches on each one of these tests, which then readily assures you beyond a reasonable scientific doubt that there is a hundred percent identity.

If I were to, say, run one test on the sperm cells that were removed from the semen stains, and we got a match and we said, "Here it is. It couldn't have come from anybody else," well, that would not be scientifically sound.

We use different sequences so that after each test that we do it becomes more readily assured that it is in fact from an individual and that it comes from the least population that the identity could come from. If nothing else, it would be identified as being right on a million people. If you do four tests, then you get it into the hundreds of millions of people.

Like I explained earlier, we do not report and you do not see in that report any type of

population statistics or bases whatever concerning that. We just said that I had banding patterns that virtually assured the identity of the semen depositor that we compared the banding profiles to.

Q I may have got lost there. Was there more than one test of banding patterns done or are you talking about a series of, say, four tests? Did you mean by that blood type tests or other tests and then the DNA testing or are you saying you did multiple tests within the DNA area?

A Multiple tests. The routine serological work was done and then the individual DNA testing was done using different sequencing from the DNA present. That was performed also. The identity was based on the individual DNA test from the same material that was identified.

Q If you are right about that underlying assumption, and that a match means a match period, 99.99 across the board accuracy or inclusion or exclusion, if you are right about that, then why do you as the scientist feel it necessary to test two, three and four times if you are that certain? You've got a banding match up on that test so, bingo, school is out; that's it.

A Well, like on all tests, you can simply do the DNA testing and not do the preliminary testing. My answer

to both, the one that you posed and the one I posed, is that we do, like I explained earlier, any and all tests so as to gather in and have all the information that may be obtainable for whoever's benefit. If we can do the routine serological testing and say, for example, Mr. Alejandro was a B secretor and an A secretion was identified from this semen, then he's a hundred percent excluded.

The same thing would be true on all of the testing. You have to take all of the information and put it together and present it. Therefore, when you do DNA testing you do the variety and not for reassurement or not because it needs to be done, but we do it because they are separate and individual tests that just add to the cumulative information that we present.

Q It's not done just to be sure then?

A No, sir, it is not done just to be sure. It is not for duplication or replication or for identification. They are separate and individual tests that will just add information and if in fact, like I say, there is a difference in the banding patterns, then it's a hundred percent exclusion.

Q If these folks buy this science, as many obviously have, and if based on that they decide Gilbert

Alejandro is guilty and then five years from now--and lots can happen in research, in science--you discover that maybe we weren't really that sure, then how do you think you are going to feel?

A Well, sir, I --

Q I mean if it's on the other side of a guilty verdict.

A Well, sir, the only way, and we are getting personal here, but the only way I can really answer that is to say that if that was said eighteen years ago or let's say, fifteen years ago, when I testified as an expert witness, and when all of this ABO typing and secretor status was beginning, I can just answer and say that I can truthfully say that I have never yielded any information to the jury that hasn't been a hundred percent accurate and correct.

If different tests and methodology and knowledge comes about in the future and it becomes a question that that needs to be done or applied, then I would highly recommend that it needs to be done. I'm not saying it needs to be done because of any uncertainty that I would have at this time and place in life, because I'm a hundred percent sure, based on all of the tests and the results, as to what I've reported to you now, just like I have been in the past.

Q I don't question that. I'm saying that science looks

up and discovers that it was wrong. Then how are we going to fix that with Gilbert, if the world isn't flat?

A Well, those are based on assumptions of curiosity. There is really no assumptions that have been delivered to the jury today that haven't been scientifically based.

MR. HARRIS: That's all I have, Judge. Thank you.

MR. MUNOZ: No other questions, and the State is going to rest.

THE COURT: May this witness be excused from further testimony?

MR. MUNOZ: Yes, please.

MR. HARRIS: No objections.

THE COURT: You may be excused, Mr. Zain. Thank you very much for coming.

MR. MUNOZ: And the State does rest.

THE COURT: Let's take about a ten minute recess here. If everyone in the courtroom will just keep their places until the jury is out of the courtroom. After they leave we will be in recess for about ten minutes.

(Recess from 2:35 o'clock

STATE OF TEXAS ()

COUNTY OF UVALDE ()

I, GENE L. STEELE, Official Court Reporter in and for the 38th Judicial District Court of Uvalde County, State of Texas, do hereby certify that the above and foregoing contains a true and correct transcription of all proceedings in the above-styled and numbered cause, all of which occurred in open court or in chambers and were reported by me.

I FURTHER CERTIFY that this transcription of the record of the proceedings truly and correctly reflects the exhibits, if any, offered by the respective parties.

WITNESS my hand this the _____ day of _____, A.D., 1995.

/s/ _____

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We, the undersigned attorneys of record for the respective parties, do hereby agree that the foregoing pages constitute a true and correct transcription of the statement of facts, and other proceedings in the above-styled and numbered cause, all of which occurred in open court or in chambers and were reported by the official court reporter.

SIGNED this the _____ day of _____, A.D., 1995.

_____
ROGELIO F. MUNOZ
Attorney for the State

SIGNED this the _____ day of _____, A.D., 1995.

_____
R. EMMETT HARRIS
Attorney for the Defendant

COURT'S APPROVAL

The within and foregoing pages, including this page, having been examined by the court, are found to be a true and correct transcription of the statement of facts and other proceedings, all of which occurred in open court or in chambers and were reported by the official court reporter.

SIGNED this the _____ day of _____, A.D., 1995.

MICKEY R. PENNINGTON
District Judge
38th Judicial District
Uvalde County, Texas
JUDGE PRESIDING