them at approximately 2:42 after identifying him, and then they were submitted to the M.E.'s office at 4:00 p.m. on August 13th, 2012.

Q. And what did you do to make sure that those swabs were sealed up and presentable for testing at the medical examiner's office?

A. They remained in my care, custody, and control for the entire time. Then they are placed into evidence envelope and sealed and then taken to the M.E.'s office.

Q. And did you do that in this case?

A. Yes, ma'am.

Q. Have you had any contact with those swabs or with this investigation since then?

A. No, ma'am.

MS. COLLINS: Pass the witness, Your Honor.

MR. OLIVER: No questions, Judge.

THE COURT: All right. You may step down. Thank you.

MS. COLLINS: Your Honor, at this time, State would call Michal Pierce to the stand.

(Witness sworn)

MICHAL PIERCE,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MS. COLLINS:

Q. Please state your name for the Court spelling your first and last?
A. Michal Pierce. M-i-c-h-a-l. P-i-e-r-c-e.
Q. Ms. Pierce, what do you do for a living?
A. I'm a DNA analyst.
Q. Who do you work for?
A. I work for the Harris County Institute of Forensic Sciences, Forensic Genetics Laboratory.
Q. Is there a shorter name that we call where you work?
A. The Harris County lab.
Q. Okay. Is it sometimes also referred to as the M.E.'s office?
A. Yes.
Q. How long have you worked there at the lab?
A. About almost six years.
Q. Can you tell me what exactly it means to be a DNA analyst there?
A. We receive items of evidence that possibly have biological material and we screen those items of evidence. And after we screen them, we will test them for the presence of DNA material. After this testing, I interpret the data and write a report. I also review the work of my peers and testify in court, if need be.
Q. Ms. Pierce, can you tell me about the education

and training you've had to be able to hold the position you currently do?

A. Sure. I have a bachelor of science in microbiology from the University of Illinois. I have a master's of science in forensic science from Sam Houston State University. And I'm also certified by the American Board of Criminalists as a fellow in molecular biology.

Q. How many cases would you say -- or pieces of evidence would you say you have examined or analyzed in your time there at the lab?

A. I can't give a number. It's a lot. We get hundreds of cases a year.

Q. Is the lab an accredited facility?

A. It is.

Q. What does that mean, to be accredited?

A. For forensic labs specifically today, in Texas a lab needs to be accredited by a recognized agency. And if they are not, then they cannot present evidence in court. So, it's important in that respect, but, really, accreditation is ensuring that your lab performs work of a good quality. And so, you're ensuring -- it's a quality assurance measure to show that you're following certain standards.

Q. What's done by the accrediting agency to make

sure that you are living by those standards?

A. Yes. Usually a group comes in and they just look at everything in your facility. They look at the actual building, make sure it's secure. They look at your personnel extensively, the training of the personnel, the education. They look at all of your analysis methods that are SOPs, which is standard operating procedures. And they even interview staff members and make sure that we're following these standards.

Q. How often does that review take place?

A. The cycle is five years. So, every five years we will apply for re-accreditation, but during those five years, you also need to maintain this accreditation. You have to show that you're following these rules.

Q. And how do you do that?

A. We update the agency yearly and our own quality assurance program, which is quite extensive, the institute ensures that we follow these guidelines.

Q. Along with the facility being accredited -- and how long has the lab been an accredited facility?

A. I would say probably since the late '90s.

Q. Along with the lab being accredited, are you certified?

A. I am.

Q. And what does certification really mean?

A. Well, so accreditation is really for the agency. You accredit a place or an institute. And then you have personal certification, which is for an individual. And so, they're different because I can work at an accredited agency, but I don't have to be certified in anything. So, for our field there's really, that I know of, one agency that accredits in terms of forensics for what I do and that's called the American Board of Criminalists. And they will accredit individuals if they show that they can be in all the sections of forensic science. And for my section, that would be molecular biology for DNA.

Q. What do you have to do to prove that you should and can be accredited by the American Board of Criminalists?

A. For certification, you need to be working in the field for a certain amount of time. You need letters of people that can account for the fact that you're an ethical analyst. And then you take a test to demonstrate your knowledge in the subject.

Q. And how long have you been certified in the field?

A. I would say for about four years, possibly.

Four years.

Q. Okay. And if you don't have to be certified, why did you go ahead and do that?

A. Well, it's good to have. I see it as -- like I said, the difference between certification and accreditation is if you, for example, worked at a swimming pool, at the YMCA, the pool building can be accredited and they could say it's a safe place to swim, but you want your lifeguards to have CPR certification. You don't want them to show up and get hired and be trained minimally. So, it's really for the person, to show that they are keeping up certain standards themselves and they're going that extra mile to be a good analyst.

Q. Since you originally received your certification, have you had to do any kind of ongoing training or testing to maintain that?

A. Yes. As an analyst, I need to have at least eight hours of continuing education a year. That's also a rule in general for our agency, but for my certification, I do have to -- they have a point system. You need a certain amount of points to be re-certified every year. So, I do have to maintain a lot of activity in the field. I have to go to professional meetings and be current in methods and go to trainings.

Q. Okay. You mentioned that you now have some supervisory responsibilities at the lab. How long have you been in a position to be supervising other people?

A. I would say for almost two years I've been the quality assurance compliance manager of my section. And that's basically having a really big role in the quality assurance program of our lab.

Q. And what does that mean on a day-to-day basis for what you're doing?

A. Well, it means I do less case work and more of monitoring others. I am responsible for making sure our training program is going well for the analysts. I will run their proficiency test program, which is really important for accreditation. Every analyst needs to be proficiency-tested twice a year. And I basically also am in charge of the equipment, make sure it's maintained properly. And I also need to keep track of problems in the lab. Any variances or deviations from protocol, that would be a really significant thing to happen. So, I have to monitor things like that. I'm a troubleshooter and also probably considered somebody who you have talk to if you're in trouble.

Q. Okay. Because you are in charge of quality control there, is it important that you be on the up-and-up with the rules that have to be followed to

analyze and the general day-to-day findings and up-to-date research in your field?

A. Yes, absolutely. I need to be current on what's going on in the field to make sure we are current.

Q. Okay. Now, you mentioned that you do less of the actual analyzing these days, but are you still an analyst working with your hands on criminal evidence?

A. Yes, I am.

Q. Can you tell us, when you first began to work there at the lab with evidence like you do, is there a training or some way that you know how to properly handle the evidence?

A. Yes. There is an extensive training program for analysts that usually -- I know I trained for about six months to become a DNA analyst.

Q. Can you take us through that training and what you have to go through to make sure you're doing it right?

A. Sure. When you're training to be an analyst, you first have to just observe what's going on. You shadow the analyst. And then you have to read a certain amount of literature. You take practice tests and quizzes and practice test on samples that you practice with. Basically, you're not allowed to touch any

evidence or anything with DNA until you are passing your practice samples. You take tests and quizzes. And then finally you take what's called a competency test or a qualifying test to show that you can do the work. And even after that, you are supervised by an analyst. You can't work on your own until our technical leader allows you to. They issue you a memo saying that you've completed the training program and you're ready to work with evidence.

Q. After you pass those tests and are allowed to handle the evidence and do analysis on your own, do you continue to have something -- a check on each other there at the lab to make sure that everybody is doing things right?

A. Well, day-to-day everybody is pretty aware. It's hard to get away with anything because everybody is very -- they do take it seriously, the quality assurance program. So, if anything ever looks out of the ordinary, somebody is going to let somebody else know; but if you are alluding to maybe proficiency testing, everybody needs to take a proficiency test -- for DNA analysts, it's twice a year at least. And we definitely follow those rules. So, if you're having a problem with case work, it should come out in the proficiency test.

Q. Let me back up just a little bit and talk to

you about DNA generally. Have you brought or given me some resources to use to help aid you in talking about DNA?

A. I did.

MS. COLLINS: Your Honor, at this time, I would ask to be able to make use of the DOAR system and the computer system to display some images that Ms. Pierce has brought to help aid her in her testimony.

THE COURT: All right.

MS. COLLINS: I'll tender those to defense counsel for his review.

MR. OLIVER: Can we approach briefly?

THE COURT: You may.

(At the Bench, on the record)

MR. OLIVER: Your Honor, I've reviewed the State's slides and I want to make sure for purposes of the record that these slides are just for demonstrative purposes and don't relate to actual figures in the documents that this lab has provided.

MS. COLLINS: Of course. And, obviously, we'll go into the specifics of this case. This is just for purposes of talking --

THE COURT: These are for demonstrative purposes only; is that correct?

MR. OLIVER: I was trying to verify that.

THE COURT: All right. Admitted for demonstrative purposes only.

MR. OLIVER: Thank you, Your Honor.

(Open court, defendant and jury present)

Q. (By Ms. Collins) Okay. Ms. Pierce, I guess let's start with: What is DNA?

A. So, DNA is our genetic material. And it is -- am I supposed to be moving forward and backward on the slides myself? Or how do I move --

Q. Oh, yes, you can. Or she can.

A. Okay. It might be easier if I could. That's why I was just -- is that all right?

Q. Yes, of course.

A. So come down there?

THE COURT: It's your witness.

MS. COLLINS: If you don't mind, Judge.

THE COURT: I don't mind.

Q. (By Ms. Collins) Make sure you keep your voice up. And if you want to have a seat there, you can.

A. So, this presentation is really just to illustrate about DNA and testing because I find that it is sometimes hard to understand without a visual and it can be quite boring also, so...

THE COURT: Thank you.

A. I will just go over what we normally do in our

lab with items that have potential biological evidence.

First of all, sources of biological evidence are -- I'm talking about tissues or fluids in your body. And these are examples: Blood, semen, saliva, urine, hair, teeth, bone tissue, perspiration, vaginal secretions. Those are all examples of things that will contain cells that will contain DNA.

Q. (By Ms. Collins) Let me stop you for just a moment, Ms. Pierce. Are there other possible ways to gain DNA evidence? In other words, is this an exhaustive list?

A. This is not an entire list. They are the main examples of what we see in case work.

And the first thing that happens when we get evidence in our lab is it goes through what's called serology analysis, which is a screening. We are basically analyzing for the presence of bodily fluids. Examples are: Blood, semen, and saliva. Because all of those fluids could contain cells that have DNA.

Q. Let me stop you again. Before we even get to the point where any testing is being done, what do you do when you first get the evidence to make sure that it hasn't been tampered with or changed in any way when you received it?

A. Yes. When we receive packaging of evidence, we

examine it for what's called a proper seal. Maybe the officer or law enforcement personnel has taped the evidence closed and the initials are signing over and a date is possible, but, basically, we are inspecting to make sure that nothing has been broken or ripped.

Q. If something had been broken or ripped or unsealed when you received it, is that something you would document to make sure it was clear in your records?

A. Yes. We have to note that.

Q. Once you make sure it doesn't have anything like that, what's the next step when you're actually beginning the test to make sure that it doesn't get mixed in with other evidence or with your own hair or DNA?

A. Yes. We only examine one item of evidence at a time. And we always wear the proper -- it's called PPE, personal protective equipment. As you see in these pictures here, we have a lab coat, we have gloves, we have a mask, even a hair net, and even shoe covers so that we are minimizing any contact of our body with the evidence.

Q. Once you've gone through that process and you go into serology, how do you know what to look for or what to try to look for?

A. Well, we -- it depends on the type of crime. Usually, we will look for blood if it's a violent crime. We will look for semen if it's a sexual assault noted. We also -- it just depends on the case. We try not to get too many details of the case because we are always objective. So, sometimes we don't even know what the case details are. We are just really looking for bodily fluids.

Q. If you were to have details, where would you get that information from?

A. There is an offense report sometimes submitted. Not all the time. And sometimes in the case of -- if a sexual assault kit was collected, there is a hospital -- well, a medical report. There's hospital papers that we will read, but, again, this does not always happen. Sometimes we have nothing to help us.

Q. Once you start looking for this serology from blood, semen, saliva, what is the process to go through and do that?

A. Well, we do have different levels of testing. We have -- as I stated here, we have what's called presumptive and confirmatory testing. And, basically, a presumptive test is to -- it's a general test for a certain body fluid that we're looking for. It's very sensitive, but it's not specific. It doesn't mean

that's the only thing it could be. And then we have what's called a confirmatory test, which does confirm the substance we think it is. So, those are the two groups.

And usually the presumptive tests are chemical test. They're a color-change test. For examples of presumptive tests for semen, there is something called acid phosphatase. Testing for enzyme, phenolphthalein is a common presumptive test to indicate blood. And, again, these are just color-change tests. They are very fast, they are very sensitive, which is why they're presumptive.

Q. You mentioned presumptive tests for semen and blood. Are there presumptive tests for specific things like saliva or like skin cells, things of that nature?

A. Currently there is not a presumptive test for skin cells that I'm aware that labs are using. There are tests for saliva, especially presumptive tests. Our lab currently does not use those tests.

Q. Is there a reason that your lab doesn't use the presumptive test for saliva?

A. There is a reason. Actually, our lab used to use a presumptive test for saliva and we discontinued that practice because we found that the test was not -- besides not being as sensitive as a test should be in

our lab, it wasn't very specific. You have what's called false-positives, meaning if you're testing for saliva in the presumptive test you would hope that it would only give a positive test for saliva, but in the test that we had accessible to us it was reacting with things like blood and semen. And it is commonly known in the field right now that even certain confirmatory tests for saliva will react with fecal matter, urine, and breast milk.

So, you can imagine that in a sexual assault if you're trying to test for saliva, but something that had a urine stains on it was also present and it would be positive, it's misleading. So, for those reasons, we don't test for saliva currently.

Q. These presumptive and confirmatory tests -- I'm sorry I keep interrupting you, but these tests, when you use a portion of whatever evidence you have for this test, does that take away from the total amount of DNA you have in further testing?

A. Yes. We do have to consume a little bit of sample when we do each test. The more tests you do, the more sample you're using.

Q. So, as you do more presumptive or confirmatory tests, the less DNA you have left?

A. Possibly, yes.

Q. Okay. You mentioned the presumptive test. What are the confirmatory tests?

A. So, then the confirmatory tests that we use for blood, there is a test called hematrace. And for semen, we have a PSA test or a sperm search. I can show you an example.

Here is a picture. We're actually looking under the microscope for sperm cells. Sperm is only found in semen. The blue circle-ish, those are actually skin cells. They are very large. And then as you see the red, those are actually the heads of the sperm. And green -- you can't really see them in this slide, but the tails are usually seen green. We call it a Christmas tree stain. And that is what forensic analysts will visualize under the microscope. So, this is a positive slide for sperm.

And then another example of a test for semen is what's known as a PSA test. This is a picture of the device we use for PSA. PSA is a component found in semen, a protein. And you see this card is similar to maybe what you would imagine a pregnancy test would look like. If a woman wants -- puts her urine on the circle and then you see lines whether it's positive or negative. Although here we're not testing for pregnancy, but this card, you would put the sample from

the evidence on the circle and it would travel upward. And if there is a positive result, you would see the three lines. If there was a negative result, you would only see two lines. So, that's basically things we do in serology.

Q. Once you determine if a piece of evidence -- if you find blood or semen, are there any other things that you can really test for positively, presumptively or confirmatorily -- I don't know if that's a word -- other than blood and semen?

A. We don't test with chemicals or any -- we don't have any testing that we do for any bodily fluids other than blood and semen. However, when these items go through serology, the analysts are determining what possibly could have other fluids such as saliva or what I call touch DNA, which I can explain in a little bit; but if something is expected to still have those fluids, we don't test them, but we will cut a sample for DNA.

Q. Literally cut it out?

A. We will take a sampling, whether cutting or scraping or swabbing to test it for DNA.

Q. Once you get past these presumptive and confirmatory tests, what happens next?

A. So, then if there's something that is positive for one of these fluids or suspected to have another

fluid, we will cut the DNA and move onto DNA analysis.

Q. And what does a DNA analysis consist of?

A. It consists of several steps, which I have outlined here. There is several steps that -- so, it takes weeks, usually, for our lab to take what they call all the way through, due to sheer numbers we have. I can outline it here.

Q. What's the first thing that you're going to do in DNA testing? Better yet, what exactly is DNA?

A. I'll explain what DNA is. It stands for deoxyribonucleic acid, which is why we call it DNA. And what that is, is our genetic material. You have it in almost every cell of your body. And it's what we call instructions for life. Because it instructs your body how to grow, perform the daily functions. And it makes you human because human DNA is 99.9 percent the same. Only .1 percent is unique between individuals and that is what makes it useful.

So, unless you have an identical twin, nobody else will have your same DNA. So, that is the only caveat, identical twins are the exception. That's why it's important in forensics because it's something that individualizes you. Nobody else should have your DNA. And the idea in our analysis is if some DNA is deposited in a place or a person and a crime happened

and then we have persons of interest and we will take their DNA and identify it and then we will develop DNA from the evidence at the scene and then we will compare them and see if they're consistent. Because that can indicate that this person contributed the DNA. And it's because of this .1 percent that is different from person to person.

And it's also your heredity. So, it's passed down from your parents. You have one set of genes from your mother, one set from your father. Therefore, relatives, that's why they have similar DNA. Not the exact same, but they're similar because it's your heredity.

And this is just a pictorial representation. It's two strands wound around each other. We have something called basis, which we notate with the letters ATGC. Those are the different basis in the sequences. And the two strands are held together by the bonding between these basis, but that's all just a very brief pictorial representation.

Q. When we're talking about the two strands, is that again just talking about one set from mom, one set from dad?

A. Well, this is actually just the actual -- what the DNA looks like. This is the whole what they call

nucleic acid. This is the sample of DNA. This is one. So, this is -- the two strands are not necessarily meaning what I was talking about, but you do have two pairs of each chromosome to make a full set.

And as I said before, it's in your cells. I say almost every cell because not every cell has a nucleus, but if the cell has a nucleus, which is a smaller circular organelle -- that is pictured like this -- it will contain your DNA.

So, now I can get into how we analyze. The first step of DNA analysis is always called extraction. And it's where-- it's the transfer of my actual -- what we call substrain, meaning the item of evidence, whatever the cutting is. I need to now only find the DNA. So, I want to -- basically, I'll cut -- say, we cut a portion of, say, clothing or take a cutting of a swab. We put it in a little tube. I will then try to remove all the extraneous material and only have DNA.

Q. Let me go ahead and stop you right there. Okay? With regard to this case, did you have evidence in this case?

A. Yes.

Q. Okay. And are you the one who tested the evidence or is it kind of like a group project kind of thing?

A. In our labs, we have 90 people who are -- have a hand in the whole process. So, it is like an assembly line. So, somebody will do serology, somebody else will do extraction, somebody else will do the recording. So, I did not do everything lab-wise in this case, but I did the analysis of the DNA, which is the most important part.

Q. Okay. And when a -- what evidence, if at all, was submitted in this case?

A. I need to look at my folder for the complete list, but we did get items from a sexual assault case -- kit. And we also received clothing. And we also received saliva samples called reference samples from persons of interest.

Q. Okay. When you went through the evidence in this case, did you find -- during the serology section, did you find any presumptive or confirmatory testing on any of the items that you received for blood or semen?

A. We did do those tests. May I grab my folder?

Q. Yes, please.

A. I'm sorry. Can you repeat the question? I want to make sure I'm answering the question.

Q. Of course. To start off with, how many pieces of evidence were submitted to the lab in this case?

A. We received 14 -- well, initially we received

13 items. We received, like I said, sexual assault kit items, which consists of swabs. And then we also received a pair of panties, a purple shirt, black pants, in addition to a known saliva sample of the complainant.

Do you want me to go through the items in the kit?

Q. No.

Did you test for blood and semen on every item that was in the kit and every item that was turned into you; so all the clothing and everything in the kit?

A. We didn't test every single items. Sometimes there's slides that are submitted by a nurse and we don't test those, but the swabs from the kit and the clothing, we did do either a presumptive or both a presumptive and a confirmatory test for semen.

Q. Okay. Was there any blood or semen on any of the items that you found?

A. We did not detect any blood or semen.

Q. Okay. When -- you mentioned that when you don't find blood or semen, the next thing is just to kind of commonsensically look at the evidence and see where you think there might be something found. Is that right?

A. Yes. And this is where sometimes it would depend on if we have hospital paperwork to explain what

had possibly happened.

Q. In this case, did you have an idea of what kind of evidence you might be looking for?

A. Well, we did get what I call a medical report from the hospital. However, as it usually happens it was very hard to read. It wasn't a good copy. The only thing that jumped out was the fact that it was a child and we tend to treat child cases with -- basically, we -- even if the story was given, we take the story with a grain of salt and we will do certain things with children cases. We'll actually cut more items for DNA just to make sure that -- just to see if anything possibly could be deposited there.

Q. Okay. In this case, was there anything that when you looked at the medical reports you thought: Hey, this might be an area that we need to test?

A. Yes. So, we just wanted to test for DNA in any area that could be considered an intimate sample, meaning from the genital area.

Q. In this case -- I'm going to show you what's been entered in as State's Exhibit No. 12. Do you recognize this picture (indicating)?

A. Yes.

Q. Okay. What is this?

A. This is a photograph of a pair of underwear

that was tested and it has my initials on the page.

Q. Okay. I want to get a little off right now. Looking at State's Exhibit No. 12, was there a portion -- you said that you were looking for anything in the anogenital area?

A. The genital region.

Q. When you saw this pair of panties that had been submitted, was there a place on those panties that stood out to you as being a good place to test?

A. Yes.

Q. And what portion did you test in this case?

A. So, we always call attention to the crotch area of underwear or panties.

Q. Now, you mentioned before -- and I see some marking right here. Is that a marker or is that just the size of the panties (indicating)?

A. That is actually -- it is marking. It's a marker.

Q. Okay. Is this marking the area that you thought could be of interest?

A. Yes. You see the outline where we have the letters "AP" and then the circle with the line. That marking shows we tested presumptively for semen, which was negative. And then you see another outline of the crotch area, which is labeled "Area A," and that area is

where we scraped the material to put in a tube for DNA.

Q. Okay. Now, you mentioned earlier that sometimes you'll literally just cut sections out of evidence. Did you do that in that case?

A. We didn't cut from these panties. We scraped from the material.

Q. Okay. And when you scrape, is that literally like it sounds, you just scrape any material off of the crotch of the panties?

A. Yes. We take like a razor blade and scrape the cotton, or whatever the material is, and collect it onto some clean what is like butcher paper. It's white paper that is totally clean. And then we will collect these scrapings and put them all in a tube.

Q. Okay. So, for purposes of this case, is that what you're putting through this process we're talking about that begins with extraction?

A. With this item, yes.

Q. Okay. Were there any other items other than the panties in this case that were put through the DNA process?

A. Yes.

Q. Okay. What were the other items?

A. There was some swabbings from -- there are some swabbings, Item 2, which was labia majora swabs, and

then Item 3, labia minora swabs; and then Item 5, which were oral swabs, and then Item 7, which were anal swabs. All of those swabs we did cut for DNA. And then in addition to the panties that we just talked about, we also sent Item 13, the black pants, for DNA.

Q. And did you take the entire -- I'm assuming you didn't take the entire black pants and stuff them in a tube?

A. No.

Q. Okay. How did you go about determining what portion of those you were going to test?

A. So, for the black pants, we did not -- the test that we -- the confirmatory tests for semen were negative. However, there was one area of the -- that was the outside back of the pants that did have a little bit of reaction with our presumptive test, so we did decide to just cut that. Again, because of the child, just in case. And we took a small cutting of that for DNA.

Q. Once you have all of that, is that when you start the extraction process?

A. Yes.

Q. Okay. Kind of take us back to that. What starts off the extraction process with these items?

A. Okay. So, in extraction you're basically

adding chemicals and heat. We want to break open the cells and get the DNA out and then remove all of the extraneous materials so you're really only left with just pure DNA. That is your goal of extraction.

After extraction, you want to quantify how much DNA you have, if any. So, you -- it's -- you're counting on DNA that you have. And this is important because you need to know how much you have to do the next step, which is called DNA amplification. We call the technique we use PCR, polymerase chain reaction. Basically, what we're doing is we are selecting short areas of DNA and we are making a lot of copies of those areas. It's the area that we want -- because you don't want all 100 percent of your DNA. As we just said, everybody -- sorry. We're not just in the areas that are the same, that will not distinguish. We only want that .1 percent, something within there that will help distinguish. So, we are selecting the areas that we believe are variable from individual to individual.

And, like I said, we're making copies of them. Think about like taking one page of a book and making copies of only that one page and the rest of the book you don't care about. So, that is the next step. That's the most important step.

What we are amplifying is called short

tandem repeats, STRs for short. And those are what we call those areas that are variable from person to person. So, basically, STRs are what we are amplifying.

And to show you an example, you have a simple unit of -- if you look in the corner where I have AGTC, that is called a tetra nucleus type repeat. Basically means there's bases. AGTC, four different letters. So, you have that sequence in one area. And everybody has that sequence in the same location, but what is different is how many times that sequence is repeated. So, you will see we may have AGTC repeated anywhere maybe from 5 to 50 times, depending on what location we're looking at.

So, person one -- and here's where the mother-father factor comes in. Your mother might have given you a gene where that particular location is only three repeating units, but your father gave you that particular area with a repeating sequence of four. So, we will assign this gene type as 3, 4 for repeat. We're talking about the number of repeats. On here you see person two has a repeat of 2 and the other -- on the other gene, they will have 5 times repeating. So, it's really the repeat we're looking at, basically. It's not the sequence themselves.

And then the reason we want to amplify the

amount we have is because that will make it easier to see what it is. So, the last part is detection, which is -- here's a picture of our instrument that helps us. It's called a genetic analyzer. Once we amplify that DNA, it's tabbed fluorescently so it can be detected by the instrument. And it's run through the instrument, and, basically, the gene types are detected.

And what you have is the result. This is what's called an electropherogram. This is an electropherogram. It shows data. And what it is, is, basically, you see the flips, what we call peaks, those represent alleles DNA and it represents the types that we've detected. And I know you can't see, but, for example, if you see on the blue, the upper line -- okay. Thank you.

You probably can't see, but there's two peaks. One called 14, one called 15. And that's representing two different peaks, one from your mother and one from your father. Your gene type at that location is 14, 15. There's 14 repeats on one of the chains -- on one of the chromosomes, 15 on the other. So, we have all these locations we test. In our instance, there's 13 locations in this case. And, basically, we're taking the types at all 13 locations.

And so, once you have these

electropherograms, the analyst will look at the evidence profiles and they will look at the reference profiles from the people and see if the electropherograms show the same or consistent profiles. And this is where in forensics you will hear the words cannot be excluded or excluded. I basically look at data from an evidence profile and I will say: Person A is excluded, meaning they do not match this profile, it wasn't deposited by this person. Sometimes person B cannot be excluded or is included, meaning there is consistency, they could have contributed this DNA.

When that happens, I need to develop statistics to show the weight of that inclusion. And that's the last part of regular DNA analysis, you will develop a statistic for your inclusion. This is just an example. This is not data from the case we're talking about today, but I wanted to show an example of what a statistic would look on an STR -- autosomal STR profile, meaning that there was one DNA profile detected from one person. I calculate a statistic of how rare or common that profile is to be found in the population. In this case -- not in this case, but in this slide, if I said this profile would only appear 1 in 895 trillion Caucasians, that will give you an estimate of how rare it is, which is very rare because there's not 895

trillion people in the world. So, it just shows you that you shouldn't have the same DNA profile unless you have an identical twin. So, that is what we call autosomal STR. That is basic DNA testing.

And then my other two slides have to do with another type of testing. I don't know if you want me to go on with that.

Q. Okay. Well, let's stop there and take us back to the case we're here for.

A. Sure.

Q. The way you did -- and to be fair, how many times did you go back -- let me back up a little bit.

When you took the items that we talked about, the swabs, the scrapings from the panties, and the portions of the black pants, were you able to have a complete DNA profile for any of those items?

A. Yes.

Q. Okay. Of those items that you found -- well, to be fair, did all the swabs that were taken come back with Ryleigh Launer's DNA?

A. Our DNA testing showed that the swabs that I mentioned from the kit, those showed profiles consistent with Miss Launer's DNA.

Q. Okay. Is it surprising to find -- the swabs taken from Ryleigh Launer, to have her full DNA profile

on them?

A. No.

Q. Okay. When we're talking about DNA being left behind, you mentioned the sources. Things like blood, semen, saliva, hair, teeth, all these things that can be left behind that have DNA in them, a DNA profile. Is there any way to determine -- for instance, when we're talking about like skin cells, is there any way to determine how much DNA a person would leave behind by touching any given object?

A. Is there any way to determine in general or for our test?

Q. In general.

A. Yes. It will vary how much DNA is left behind by somebody. There's several factors that would affect that. There's no one set amount.

Q. Okay. Can you tell us about the factors that will determine how much DNA is left behind?

A. Well, it depends on what surface we're talking about. If you're talking about touch -- say, I touch this surface and I am depositing small amounts, trace amounts of DNA. It depends on the environment I'm in right now. If it starts to rain on this table, that will affect my ability to recover any DNA. Or if it's very hot, the DNA can start to degrade. DNA will break

down in extreme heat. Or if somebody throws a chemical on it, like an acid, that will always break it down. Then you also have mechanical factors. If somebody wipes the table, that will wipe the DNA off, or some of it. So, things like that, just the activity that happens on that item is affecting it.

And also me as a person, depending on what I am doing. If I'm somebody that sweats profusely, I'm probably going to leave more DNA behind than somebody who doesn't sweat a lot. Or, if I took a shower recently and am very clean, I might leave less DNA than somebody who is dirty or has hygiene issues.

So, things like that, those are examples of what can affect just recovery at all.

Q. In shows we see, CSI, NCIS, we have DNA that can be found decades later in almost any type of place. Is that real life?

A. Depending on the conditions it was stored in. We do have the ability to -- say, for example, a bloodstain was dried onto a cotton -- piece of cotton, that could be preserved for years. You could detect DNA years after if it was dried and kept in a nice, cool environment. But in the body, DNA will start breaking down. And on the outside of your body or the inside, DNA will not be around forever, unless you're deceased

and stored.

Q. What do you mean by DNA will start breaking down? Let me ask this. Ryleigh Launer, obviously, we had a full profile from her on her oral, anal, and vaginal swabs. Are you saying that her DNA is breaking down in her body?

A. No. And when I said it wasn't surprising that her profile matched, it was her DNA. We had swabbed areas of her body. So, of course, it makes sense that her own DNA is on her body. But when foreign things enter a body, substances, the body will start breaking that down because it doesn't belong there. And so, that's what I was referring to.

Q. Okay. You mentioned mechanical things, wiping away, things like that. Is it important, when determining whether you're going to find DNA, whether or not, for instance in this instance, Ryleigh had brushed her teeth?

A. Yes. And we're talking now about foreign DNA, not her own?

Q. Yes.

A. So, if there was foreign DNA in her oral cavity and she brushed her teeth, yes, that would remove some of the DNA, if not all.

Q. What about using the restroom, wiping?

A. If you used the restroom and there's DNA in the genital area, yeah, the act of urinating would remove some of that. And also wiping after could also remove some DNA.

Q. When we're talking about the type of DNA that's left behind, you mentioned the idea that things like blood, semen, saliva -- for lack of better term -- sticky substances that can dry. Would it be easier to preserve that kind of evidence as opposed to like touch DNA?

A. If we're talking on the body, I don't know if it's really a matter of stickiness. It's just there's more -- when you touch something, you're leaving less DNA behind than, say, if you bled heavily on it. There's just less cells left. And it also depends on the amount, but it does help that -- semen, for example, is very sticky and designed to stick to the area; but it's not -- I don't think it's really a matter of that.

Q. Fair enough.

You mentioned that the swabs all came back to Ryleigh Launer, her DNA profile. Was there the presence of anybody else's DNA profile in those swabbings?

A. No. With the autosomal testing that we did, the STR testing I was describing, that was all a single

person contributor, which was Ryleigh Launer.

Q. Were there any items that came back with a possibility that a foreign DNA substance was there?

A. Yes.

Q. Can you tell me about that?

A. With the panties, Item 11 -- and this goes back to one of the steps in DNA where I talked about quantification. When we're quantifying the DNA, our lab actually tests -- we have two numbers that come out for value of DNA. We have a number that shows a total of human DNA and a number shows male DNA. And this is important in sexual assaults because sometimes there's an overwhelming amount of female DNA if those things come from her body. And if there was male DNA, the female DNA can mask it. So, we have in the field this quantification system where we will show the two different numbers.

And in this instance with the panties, when I looked at the quantity value for male, there was a value. It wasn't undetected like the other items. Undetected meaning there is none. So, the items such as labia majora swab, there was no male DNA; but for Item 11, the panties, there was a value there. And that showed to me that there is male DNA present.

Q. Okay. And to be clear, despite the fact that

Ryleigh is getting half of her DNA from her dad, will she herself have any male DNA in her DNA profile?

A. No. She is a female, so she has no male DNA. We are looking -- we are talking about an X and a Y chromosome. She's female, so she has two X's. So, she does not have a value for male DNA.

Q. Okay. Once you find that there is the presence of male DNA on the scratches from the panties, is there anything that you can do with that to determine what male it is?

A. Yes. Once I saw that, I knew that I could do another type of test, which is called a Y-STR test.

Q. What's different about regular DNA testing versus Y-STR testing that would make it -- make you able to find out that male DNA presence?

A. So, Y-STR testing allows me to ignore the female DNA, which is overwhelming in this case, or any case of a sexual assault where they took swabbings of a female and there is possibly a little bit of male DNA. So, I can ignore the female DNA and pull up the very low level of male DNA. I'm only looking at areas of the Y chromosome of this foreign DNA. And as you said, Ryleigh does not have a Y chromosome. She has two X's. So, if there's a Y chromosome, it's from a foreign male. So, my Y-STR testing allows me to look at areas of the Y

chromosome only of this foreign male. And I can develop a different kind of profile for the Y-STR.

Q. When you are looking at just the Y male chromosome DNA that we're bringing up to help us for testing, are we going to have those two different numbers like we were seeing on the graph earlier?

A. No. We will see one peak or one representation because we are now no longer looking at a mother-father contribution. This is just a father. Every male's Y information -- and in what I'm testing, the Y is given down directly from that male's father. And so, therefore, there is only one allele present, what we call a haplotype. So, that is the -- there's only one representation for this location.

Q. Now, when you do this Y-STR testing, does it go through the same process that we just talked about before with extraction, amplification, and the other two parts?

A. Yes. What we're doing is we are just now amplifying the Y-STR instead of regular STR. We do a re-amplification and we do this detection that we talked about.

Q. Okay. In this case, were you able to successfully use that Y-STR testing to get that kind of half profile, if you will, of the male presence?

A. Yes. We detected a partial Y-STR profile for the scrapings from the panties.

Q. Now, you mentioned that in like a full DNA testing there are certain amount of points that -- or places that you are looking for where everybody is different. Are those the same kind of points or places that you look at in Y-STR testing?

A. Well, we are looking at repeating sequences like I showed you before, but this time only on the Y chromosome. And there is a difference though in terms of only individual -- Y-STRs are not individualized. It is passed down from your father, if you are a male, and which is passed down from his father. So, every male on his father's side will share the same Y-STR profile. So, that is the main difference between autosomal STRs and Y-STRs.

Q. So, this isn't like the regular DNA where I can say: It's that person. I can just say: It's somebody in that guy's family?

A. Right. On his father's side, that is correct.

Q. Okay. Once you developed that Y-STR profile in this case, were you able to use it to, like you talked about earlier, compare and contrast with other persons that you are given?

A. Yes.

Q. Okay. And I'm going to have you step back up there for a little bit.

A. (Witness complies).

Q. In this case how many male persons were you given -- back that up.

How many persons -- male persons' buccal swabs were you given in this case for purposes of comparison?

A. I was given two.

Q. And who were those two people?

A. I first received the buccal swab from Mr. Bobby Peyronel and then I received a buccal swab from the complainant's father, Mr. Christopher Launer.

Q. Okay. And did you take those swabs that you were given from each of those persons and put those through the same DNA process we talked about a few moments ago?

A. Yes.

Q. Okay. When you did that, were you able to, as you put it earlier, include or exclude those two people from what you found in Ryleigh Launer's panties?

A. Yes, I did my comparisons to those two individuals.

Q. Okay. Now, with regard to Christopher Launer, were you able to include or exclude him from the DNA

profile in Ryleigh's panties?

A. Mr. Launer was excluded from the Y-STR profile I obtained.

Q. Okay. Now, based on that and what you've told us, would that also exclude any biological male children that he had?

A. If he had biological sons, they should have the same Y-STR profile he does.

Q. You said they should. Has there been any instances out there where the biological sons have had different DNA profiles?

A. It would be very rare because there is always the possibility of a mutation, but, again, it's very rare. The rate is very low. So, again, I don't want to say for sure because I didn't get any son's saliva swabs to test, but in the absence of mutation, they will have the same Y-STR profile.

Q. Okay. With regard to Bobby Joe Peyronel, were you able to exclude or include his Y-STR profile from what was found in Ryleigh's panties?

A. Mr. Peyronel cannot be excluded from the profile found on the panties.

Q. Now, to be fair, same question here. Would that also mean that you would expect that any male sons or his father would also have that same DNA profile?

A. Yes. As I said before, if there was no mutations, which that would be really rare, they would have the same profile as he would, if they're biologically related.

Q. Okay. When you found his DNA profile, you said the next thing you do is to quantify or give a statistical analysis to that finding. Were you able to do that in this case?

A. Yes.

Q. And in this case, what was the statistical number that you reached?

A. I have a statistic of 1 in 79 Caucasians; 1 in 154 African-Americans; and 1 in 100 Hispanics.

Q. Okay. Now, when we saw the statistic a little awhile ago, it had like these really big numbers, 895 million in that number. What creates these lower numbers with regard to Y-STR testing?

A. Yes. Y-STR testing, you will not have these numbers in the trillions. The statistics are calculated differently. And these are -- as I said before, Y-STRs are different from autosomals STRs because it's not individualizing. There are other people in the world on your father's side that will have your same Y-STR profile for males only. So, that's a very different calculation. So, you will always get lower numbers if

you're comparing to a single source of autosomal statistics that is in the trillions or more possibly.

Q. Showing you what's been pre-marked as State's Exhibit No. 13. Can you tell me what we're looking at here (indicating)?

A. Yes. That is a page from my DNA report.

Q. Okay. And does it fairly and accurately show the results and the tables we've just been talking about, about the profiles of Christopher Launer, the profile from the panties, and the profile of Bobby Peyronel?

A. Yes.

MS. COLLINS: At this time, I would offer into evidence State's Exhibit No. 13 and tender to opposing counsel for objection.

(State's Exhibit No. 13 Offered)

MR. OLIVER: No objections, Your Honor.

THE COURT: Admitted without objection.

(State's Exhibit No. 13 Admitted)

MS. COLLINS: Permission to publish as we go along.

THE COURT: You may.

Q. (By Ms. Collins) Okay. Ms. Pierce, in looking at the DNA profile collected from what we have seen here in State's Exhibit No. 12, can you tell me, in each of

the points that had a profile in Ryleigh Launer's panties, did Bobby Peyronel have the same profile in each of these points? I don't know if that was a good question, but...

A. Yes. At the locations we tested -- and each box represents a location on the Y chromosome we tested. And the number, as I talked about, is the number of repeats, repeating units counted for that particular person's -- from that person's profile. You do have Mr. Peyronel consistent with each area we detected on the profile from the panties. And then Mr. Launer, there were areas that it was not consistent at all. So, from what's detected, Mr. Peyronel, as I said, his DNA was consistent with that profile.

Q. Were there any points along here with regards to the profile found in Ryleigh's panties that were not consistent with the profile of Bobby Peyronel?

A. No, from what we detected. There was one location that we did not get any DNA at all. And you can see that DYS19. That ND stands for not detected. And that's why I said it was a partial profile. Sometimes you don't get DNA at every loci or every location. So, that one we didn't get at all. I don't know what type that would have been, but every place we got DNA was consistent with Mr. Peyronel. It was not

different.

Q. Ms. Pierce, is there any way for you to tell us what kind of DNA that is? In other words, if the DNA profile we're seeing there is from semen, blood, saliva, finger, scrapings, things of that nature?

A. From my testing, I cannot say what kind of fluid or cells that came from.

Q. Okay. Are you here today to tell us that this means an aggravated sexual assault of a child took place?

A. I do not have an opinion on whether a crime took place or not. I'm only detecting DNA and interpreting that.

Q. Is there any way to tell strictly from what you see here, from the DNA that you gathered and tested, whether or not a rape has occurred?

A. No. When we detect DNA, we cannot tell how that DNA came to be deposited or in what manner, whether it was forced or consensual in cases of assault or sexual assault. We can only say: Was there DNA, how much, and who could have possibly contributed, and who could not have. I cannot talk about the manner it came about.

Q. Does the amount of DNA the you find -- let's say, for instance, we have a whole lot of DNA, that

would be consistent with an aggravated sexual assault of a child; versus if it's just a little DNA left behind, then it must have been consensual or some other form of contact?

A. If you're asking about the amount of DNA left behind, like a numerical value, that -- there's no rules or anything to say that that -- about how that came about. Again, the amount of DNA left behind, it could be a lot or a little and it is not about was it a crime or aggravated or not. That is not anywhere in our testing.

Q. Can you tell us whether or not the presence of male DNA was found in Ryleigh Launer's panties?

A. Yes. I can say that there was foreign DNA detected, foreign male DNA detected in the crotch area of her panties.

Q. Can you tell us whether or not that male DNA presence was consistent with the DNA profile of Bobby Peyronel?

A. That foreign male DNA profile was consistent with the Y-STR profile of Bobby Peyronel. Also, I do have to say that Y-STR profile will also be found in anybody in his paternal lineage.

Q. I'm showing you what has been pre-marked State's Exhibits 9, 19, 16, and 17. Can you tell me

what each of these items are (indicating)?

A. Yes. This is the sexual assault evidence collection kit that was submitted to us. And then --

Q. And that's with regard to State's Exhibit No. 9?

A. Yes. And then there was some clothing items submitted.

Q. You're referring to State's Exhibit No. 15?

A. And this was another clothing item submitted.

Q. And State's Exhibit No. 17?

A. And these were some reference samples submitted from the defendant.

Q. Okay. And according to your records, when you received each of these items did they have any markings, tears, anything showing that they had been tampered with or altered in any way?

A. We did not see any kind of indication of tampering.

Q. When these items came to you, were they sealed up?

A. Yes.

Q. Okay. When you received these items after going through the process we just talked about, what happens to them?

A. After we finish testing?

Q. Yes, ma'am.
A. When everything is finished testing, the report is done and ended, then we will put this in the -- our evidence vault for return to the agency that submitted it.
Q. Is that what you did in this case?
A. Yes.
Q. And do you seal everything up properly to make sure that it's again not tampered with when you do that?
A. Yes. We have our own seals and that shows we sealed the evidence and that is where we opened or closed the package.
Q. Okay. And from what you see, have any of these items been changed or altered since last handled by the lab?
A. No, it has not been. It does not look any different from when we seal it up.
MS. COLLINS: Your Honor, at this time, I offer into evidence State's Exhibits 9, 15, 16, and 17, tendering to opposing counsel.
(State's Exhibit No. 9 and 15 through 17 Offered)
MR. OLIVER: No objection.
THE COURT: Admitted without objection.
(State's Exhibit No. 9 and 15 through 17

Admitted)

MS. COLLINS: Pass the witness, Your Honor. May we approach, Your Honor?

THE COURT: You may.

(At the Bench, on the record)

MS. COLLINS: Judge, I don't mean to halt things, but I do anticipate this to be probably a lengthy cross-examination and I do know that Ms. Pierce has a child in childcare that she needs to pick up. Is there any way we might be able to rest for the day and pick up in the morning?

THE COURT: She's coming back tomorrow?

MS. COLLINS: Yes, sir.

THE COURT: Let's do it tomorrow then and we'll break for the day and we'll start at -- let's start at 9:30 tomorrow. I've got some things to do in the morning.

MS. COLLINS: Yes, sir. Thank you.

MR. OLIVER: Thank you, Your Honor.

(Open court, defendant and jury present)

THE COURT: How old is your child?

THE WITNESS: Seven.

THE COURT: Seven. Boy or girl?

THE WITNESS: Boy. He goes to daycare after school.