IN THE COURT OF COMMON PLEAS
CUYAHOGA COUNTY, OHIO

MICHELLE KASCHAK, et al.,
Plaintiffs,
vs Case No. CV 3551360
UHHS BEDFORD MEDICAL CENTER, et al.,
Defendants.

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DEPOSITION OF ARTHUR B. ZINN, M.D., Ph.D.
THURSDAY, AUGUST 17, 2000

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The deposition of ARTHUR B. ZINN, M.D., Ph.D., the Witness herein, called by counsel on behalf of the Plaintiff for examination under the statute, taken before me, Vivian L. Gordon, a Registered Diplomate Reporter and Notary Public in and for the State of Ohio, pursuant to agreement of counsel, at the offices of Reminger & Reminger, The 113 St. Clair Building, Cleveland, Ohio, commencing at 1:30 o'clock p.m. on the day and date above set forth.

APPEARANCES:

On behalf of the Plaintiff
Becker & Mishkind
BY: HOWARD D. MISHKIND, ESQ.
Skylight Office Tower Suite 660
Cleveland, Ohio 44113

On behalf of the Defendant University Hospitals
Moscarino & Treu
BY: KEVIN M. NORCHI, ESQ.
630 Hanna Building
Cleveland, Ohio 44115

On behalf of the Witness:
Reminger & Reminger
BY: P.J. MALNAR, ESQ.
The 113 St. Clair Building
Cleveland, Ohio 44113

ALSO PRESENT:
Michelle Kaschak
Michael Kaschak

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ARTHUR B. ZINN, M.D., Ph.D., a witness herein, called for examination, as provided by the Ohio Rules of Civil Procedure, being by me first duly sworn, as hereinafter certified, was deposed and said as follows:

EXAMINATION OF ARTHUR B. ZINN, M.D., Ph.D.

BY MR. MISHKIND:

MR. MISHKIND: The record should reflect that we are here today on August 17th, 2000. The purpose of this deposition is to obtain the facts and information known to Dr. Arthur Zinn who was involved in certain aspects of Megan Kaschak's care at or around the time of her demise.

The deposition is being taken by agreement. Ms. Malnar has arranged to have Dr. Zinn here. Dr. Zinn has made himself available without the issuance of a subpoena to answer questions. The Kaschaks are also here.

Certainly no issues of waiver of privilege -- there are no privileges that are being withheld.

MS. MALNAR: Fair enough.

Q. Let's start out with an easy question for you. Tell us who you are.

A. My name is Arthur Zinn.
Q. And what is your occupation?
A. I'm a medical geneticist.
Q. Could you trace briefly for me your educational background.
A. I grew up in New York City, went to public schools, went to college and got a bachelor of arts in chemistry from Brandeis. I came to Case Western Reserve University where I got my M.D. and Ph.D. in biochemistry. I then went to the University of Minnesota where I trained in pediatrics. I then went to Yale University where I trained in human genetics.
Q. Where is your practice situated currently?
A. My main office is at University Hospitals of Cleveland.
Q. And just for housekeeping purposes, are you an employee of University Hospitals or are you employed by some other entity?
A. My paycheck comes from Case Western Reserve University.
Q. Are you affiliated with some practice group?
A. I think I am now. I think it's called

University Genetics, Inc. I'm not sure there was such an Inc. when I spoke with the Kaschaks.

Q. Your M.D. degree from Case was obtained in what year, approximately?

A. '76.

Q. Did you then immediately pursue your Ph.D.?

A. They were done concurrently.

Q. Dual degrees?

A. I was awarded the Ph.D. in January '77.

Q. Your training then at University of Minnesota was in what?

A. Pediatrics.

Q. Was it a straight residency in pediatrics?

A. It was a residency in pediatrics.

Q. How many years were you there?

A. About two and a half.

Q. And then at Yale, it was in human genetics?

A. Correct.

Q. How many years were you there, sir?

A. A little over two.

Q. At the beginning of the deposition,

you said that you are a medical geneticist.

A. Correct.

Q. Is there a board certification in that subspecialty?

A. Yes.

Q. Are you board certified?

A. I'm certified by the American Board of Medical Genetics in both clinical genetics and clinica' biochemical genetics.

Q. Do *you* have any other board certification outside of the area of genetics?

A. No.

MS. MALNAR: One thing I should have mentioned to you, if you let Mr. Mishkind finish his questions before you start your answers, that will make things easier.

Q. Do *you* have a relatively recent or current curriculum vitae?

A. Yes.

Q. Do you have it with you?

A. No.

Q. Would it be difficult for you to make it available to Ms. Malnar, assuming she doesn't already have it in her hands?

A. I can do that.

Q. If you would, please, I would appreciate it.

Your employer then today is Case Western Reserve University or is it University Genetics, Inc.?

A. Case Western Reserve.

Q. Your office is located where?

A. In University Hospitals of Cleveland.

Q. In what department or division is the office located at the hospital?

A. The Center for Human Genetics.

Q. After you finished your training at Yale, did you then come to University Hospitals?

A. I then came to Cleveland to my present position.

Q. You have been in this present position for how many years, sir?

A. Since 1982.

Q. The Center for Human Genetics consists of you and how many other geneticists are in that division?

A. It's not a division, it's a department. And it's a department, I think, of about 25 faculty, not all of whom have clinical responsibility.

Q. Can you tell me the names of those that do have clinical responsibility?

A. When?

Q. Good question. At or around the time of the events that concern Megan back in January, February, '97.

A. Suzanne Cassidy, Nathaniel Robin, Matt Warman, and Georgia Wiesner are the other physicians. There are other people who have clinical responsibility, but they are primarily laboratory based.

Q. In terms of the genetic issues that were involved in Megan's case, were you the only medical geneticist that was involved or were there others?

A. First of all, I was not involved. Second, the patient was seen by Nat Robin in consultation.

Q. Is Dr. Robin still in the department?

A. Yes.

Q. When did you become involved in one way or another in terms of disseminating or communicating any information?

A. After Megan's death.

Q. How is it that you were chosen to be

involved postmortem?

A. The question was whether or not Megan might have had a metabolic genetic disorder, and there is a series of people who had made various recommendations, and the thought was I could help expedite the postmortem studies so that those questions could be addressed appropriately.

Q. Do you have a recollection as to who those people were that thought you might be able to expedite some of the answers to those questions?

A. I believe it was the neonatologist who called me.

Q. Do you remember which neonatologist that was?

A. Michele Walsh-Sukys.

Q. Is Dr. Walsh-Sukys still at RB&C, to your knowledge?

A. Yes.

Q. Some time ago when we first attempted to schedule your deposition, there had been a request made that you bring with you a complete copy of your office chart or records regarding Megan that would include autopsy results and the results from any metabolic tests that had been

performed.

Have you brought any such documents with you today?

MS. MALNAR: The documents that he brought with him are copies of the documents that I faxed to you today.

MR. MISHKIND: I didn't get a fax from you today. When did you fax that?

MS. MALNAR: Did you get a fax from me today?

MR. NORCHI: It was around 11:30, 12:00.

MR. MISHKIND: I was out of the office.

MS. MALNAR: I can make another copy of it now for you, if you like.

(Thereupon, a recess was taken.)

Q. The fax that came over from Ms. Malnar at 11:30, 12:00 o'clock, I had already left my office, so I have not seen that, but we are in the process of photocopying it and I will have questions for you relative to that.

But are these results of certain metabolic tests that had been performed on Megan?

A. They are the results of either

enzymatic or DNA based molecular tests, yes.

Q. Are these results of tests that were done in-house or that were sent out elsewhere?

A. The tests were done either at a laboratory that physically is located in Rainbow, a laboratory that's part of a Rainbow Center center that's at the V.A. Hospital in Cleveland, a laboratory that's -- I can't remember where it was back then, but it is part of the genetics department -- and a laboratory that's in California.

Q. Where are these records maintained, the originals of what you have brought with you today?

A. They are put in an envelope and put somewhere on my bookshelf.

Q. And what you brought with you today, does that constitute all of the test results that you have obtained back relative to Megan?

A. Those are the test results that I had some knowledge or some involvement with. There are laboratory tests that were done prior to Megan's death that I did not keep records of and don't have, didn't seek to.

Q. In a moment, doctor, I'm going to have

these documents marked as an exhibit for purposes of the transcript, but before I do that, let me ask you, there is reference, in addition to yourself, there is reference to Dr. Kerr and there is also reference to Stuart Schwartz that was somehow involved in the interpretation of some of this information; is that correct?

A. I'm sorry, do that again, sir.

Q. Dr. Kerr was involved in apparently the interpretation of some of the test results?

A. Oh, I see. Yes, Dr. Kerr signed, I think, two of the reports. Dr. Schwartz signed, I think, two of the reports. I signed none of them since I didn't perform them. I didn't interpret any of the primary results.

Q. Were there any tests that you had recommended that were never done in this case?

A. Not to my knowledge.

Q. So that all of the tests that you believe were reasonably appropriate to do to rule out or to confirm some type of a metabolic or genetic disorder were, in fact, done; is that a fair statement?

A. The list that was provided to me from the assessment prior to Megan's death, I saw to

it that that list got executed appropriately.
Q. And as you look back at that list, would there have been any additional tests, metabolic or genetic tests, that in your professional opinion should have been performed in order to rule out any loose ends, if you will?
A. At the time I thought what was done was what should have been done.
Q. And as you sit here now, do *you* still hold that same opinion?
A. Actually I haven't thought about that.
Q. Is there anything that comes to mind as you are reflecting on it now that it would have been nice to have done to have ruled out or to confirm things?
A. I have to remember. You are asking me if there is something nice to have done. The answer to that is always yes. You always want more information, but the answer to the question you want, I think, is should more studies have been done, given the evidence at that time, and I think the answer is no.
Q. In a moment I'm going to hand these documents to Vivian. Let me ask you one question.

Given the fact that I have not had a chance to read through these documents and without taking probably more time than any of us have today to study them, can you tell me whether these test results, which I have not seen before, whether or not they permit you to opine that there was any type of a metabolic or genetic disorder that caused Megan to experience her cardiopulmonary arrest?

A. My assessment of reviewing these results when they became available was that I could not make a diagnosis based on these results.

Q. Do you use, from a professional standpoint, the term that the results are inconclusive as a descriptive term?

A. I sometimes use that term.

Q. And might that have been a term that you used on one or more occasions when you talked with Mrs. Kaschak?

A. Again, we had multiple conversations. I cannot remember all the conversations in detail. My feeling at the time was that rather than saying inconclusive, what I would say, they are not consistent within themselves and do not

allow me to make a specific diagnosis.

Q. And again, the diagnosis that you were looking to make was to determine whether or not there was some type of a metabolic or genetic abnormality, if you will, or error, inborn error that caused Megan on her first day of life to experience this cardiopulmonary arrest; correct?

A. Yes.

Q. And then, carrying that further, whether there was any metabolic or genetic disorder that prevented Megan from surviving the results of this cardiopulmonary arrest?

A. I probably wasn't trying to address that question.

Q. So you were focusing --

A. I was trying to see with the results of completing the studies of the people who evaluated her, and I considered on their list whether those things were explanations of what was going on and if any of the results, if they came back one way or another, would suggest further testing that I should do to either prove or disprove those initial hypotheses.

Q. The focus then -- and I don't mean to repeat --

A. I'm trying to make sure I answer the question in a way that I am comfortable with.

Q. Sure. And I am trying to understand it in a way that I am comfortable.

A. I understand.

Q. So I am not trying to be difficult.

The evaluation was to determine whether or not there was some metabolic or genetic disorder that Megan had that is the more probable or likely explanation for why she experienced a cardiopulmonary arrest; true?

A. Yes.

Q. And based upon all of the tests, there is insufficient evidence for you to provide an opinion that her cardiopulmonary arrest was caused by a metabolic or genetic error or genetic abnormality?

A. That's correct.

MR. MISHKIND: Let's go ahead and mark this as an exhibit. I'm not going to go through it; perhaps Mr. Norchi might, since he has the benefit of hours of reading it over better than I have. And what I may do is defer to Mr. Norchi and then read it while he is asking you questions and then maybe come back afterwards to try to

save some time.

MR. MISHKIND: Let's mark this as Plaintiff's Exhibit 1.

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(Thereupon, Plaintiff's Deposition Exhibit 1 was marked for purposes of identification.)

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Q. Just for purposes of bookkeeping, Plaintiff's Exhibit 1 is a copy of the various interpretations and test results that you have provided today and that were within your possession from the Center for Human Genetics relative to Megan; is that correct?

A. They were in my possession because they were mailed to me.

Q. Are there other tests -- strike that. Are these all postmortem tests?

A. Yes.

Q. As I understand it, the autopsy was done within 40 minutes of Megan's death?

A. I don't know the details. I know it was done rapidly because of the requirements to try to preserve tissue.

Q. What we have here are interpretations

and reports relative to what was done on a postmortem basis on these various tests; true?

A. Right. They were done not within that 40 minute period. The tissue was collected, frozen, and then --

THE WITNESS: I'm sorry to be so graphic.

MR. MISHKIND: They realize.

THE WITNESS: I feel bad.

MR. MISHKIND: I appreciate that, doctor.

A. I will finish my answer. Yes, the tissues were collected and frozen, and as the tests proceeded, samples were analyzed.

Q. As you look at what we have here in Plaintiff's Exhibit 1, which now has an exhibit sticker and a staple preserving all the documents, are there other reports or interpretations that, for whatever reason, aren't contained in Exhibit 1 that relate to tests that were ordered postmortem?

A. Not to my knowledge.

Q. I want to ask you about certain communications that you may or may not have had with Michelle during this order.

A. Mrs. Kaschak?
Q. Yes.
According to information that I have from Michelle, you spoke to her in August of '97 indicating that you expected results from biochemical tests to be available in about a month or sometime in September of 1997.
I don't expect that you can remember the exact date, but during the summer of 1997, were there some biochemical tests that you were waiting the results on?
A. I believe so. I don't know the interval.
What was the date of Megan's death?
Q. February of 1997.
A. That sounds correct.
Q. And the biochemical tests, are they contained within the packet that is Exhibit 1?
A. Yes.
Q. Can you refer to what the document is that show the test results?
A. Do you want specifically which test I was waiting for on that particular phone call?
Q. At that particular time that would refer to biochemical tests that you were waiting

for in August of '97.

A. Then I would say the packet refers to, in some broad way, what I was waiting for.

Q. All of those are biochemical tests?

A. Maybe I should define the terms.

Q. All right.

A. Many of these reports are enzyme analyses, which is a form of biochemical measurement. Other tests are DNA based molecular testing, which some consider biochemical and others don't. But they are all metabolic studies designed to elaborate the cause of a metabolic disease. These are all metabolic tests.

Q. Do you recall ever indicating to Michelle the results on the phone as to the results of the biochemical tests, whether enzyme or otherwise?

A. Yes.

Q. And what is your recollection of what you told her?

A. I told her what I had received and what we had found.

Q. And the bottom line in terms of what you found and what you would have told her would be what?

A. No doubt, it changed somewhat as we went through the conversations, but initially I said I don't have an answer, and I probably said I don't have an answer in each of our phone calls.

I would also say that we have a result; I'm not sure what it means, or it shows this, but we need to wait for something else to see if that's been confirmed by the other studies.

I would say that was the content of most of the conversations.

Q. Do you recall ever having a conversation with Michelle where you gave her the final report on all of the tests, after having all of the information back over the many months that this process took place?

A. To the extent that I was uncomfortable doing everything on the phone, I would say I gave a final report. And I said that we don't have an answer for what happened to your baby.

Q. Do you recall indicating to Mrs. Kaschak at one time or another that the neurological changes that occurred to Megan appeared to be most likely secondary to the

hypoxic episode that she experienced on her first day of life?

A. I don't think I would have commented on that.

Q. Tell me why is that.

A. One, I wasn't a witness to those events, and two, that's a neuropathology interpretation, and I don't think I could say more or less likely to that.

Q. Have you had a chance to review the autopsy?

A. Yes.

Q. Do you have a copy of the autopsy with you today?

A. No.

Q. To the extent that you need it in responding then to any of my questions, I'm going to go ahead and mark a copy of the autopsy as Plaintiff's Exhibit 2, and feel free to reference it as necessary.

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(Thereupon, Plaintiff's Deposition Exhibit 2 was marked for purposes of identification.)

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MS. MALNAR: May I?

MR. MISHKIND: Sure.

A. Can you repeat your last question, the one about the hypoxic changes?

Q. Sure.

What I asked you was whether you recalled indicating to Mrs. Kaschak that the neurological changes that occurred to Megan appeared to be most likely secondary to the hypoxic episode that she experienced on her first day of life.

A. Okay. Let me amplify my answer. Is that permissible?

Q. Go right ahead.

A. I hope what I said -- I don't think I would've said more likely, because I don't think that would be my position to do that, and I think it would have been presumptuous.

I think at one time I might have said could be consistent with, but I don't think I would have said more likely.

Q. Were you able to provide her with any explanation that was equally likely as being the cause of the neurological changes, other than the hypoxic episode she experienced?

A. To answer that, then, I think I would have focused on the metabolic potential cause, and at no time did I have an explanation sufficient to provide her with that explanation.

Q. So that you considered the hypoxic episode as being one of a number of potential explanations for the neurological changes and you also considered metabolic abnormalities as a potential explanation for the neurological changes?

MR. NORCHI: Objection.

A. The neuropathologic?

Q. Yes.

A. I would leave that to the neuropathologist.

See, the answer -- I'm not sure what your objection is.

Q. Don't worry about the objection.

A. Sorry.

Q. Sometimes lawyers object because they know why they are and sometimes they object because they feel they have to.

MR. NORCHI: I know why I am objecting, Howard.

THE WITNESS: I'm sorry, I am trying

to answer people's questions.

MR. NORCHI: Go ahead, doctor.

A. The question I would have, if I was trying to discuss that with Mrs. Kaschak, would be, do I know the cause or the effect. I mean, if there was a metabolic disorder that caused the child to have a cardiorespiratory arrest, then you can have problems with the arrest itself.

It's a question of what caused the arrest. And so that's why I couldn't tell cause and effect and why I wouldn't comment further.

Q. As you sit here now, do you have a basis to say to a reasonable degree of medical probability that you know what the cause of the cardiopulmonary arrest was?

A. I do not know the cause of that.

Q. Do you have a basis to a reasonable degree of medical probability to say that you know what the cause of the hypoxic ischemic encephalopathy was that the baby suffered?

A. I don't have a comment on that. I don't have a position on that.

Q. Is there a reason that you don't have a position on that?

A. Because I think the neuropathologists

have to comment on -- I mean, it's a neuropathology diagnosis of what they see and I didn't focus on that.

Q. In looking at the autopsy for a moment, if you could turn to page four. In the summary and comments section --

A. Yes.

Q. -- the second paragraph, just so that we are referencing it, it says abnormal significant autopsy results fell into two major categories.

A. Yes.

Q. One being severe hypotensive/ischemic encephalopathy, which is attributable to cardiac arrest on the first day of life, and two, excessive glycogen deposition in liver, skeletal muscle and cardiac muscle.

Did I read that correctly?

A. Correct.

Q. Do you have an opinion as to the significance of the excessive glycogen depositions that were found in the liver, the skeletal muscle and the cardiac muscle?

A. I don't have an explanation for it.

Q. Are there factors that you considered

as possible explanations for that?

A. I thought it was either related to the events experienced prior to Megan's death or it could have been secondary to a metabolic disorder.

Q. Were you ever able to attribute the glycogen deposition in the liver, skeletal muscle and cardiac muscle to a metabolic disorder?

A. No.

Q. You said the other possibility was to events that occurred prior to her death. What do you mean by that?

A. That as you experience the severe problems that Megan had, you can have tissue damage that effects mitochondrial function. You may not be able to use glucose, break down glycogen and use the glucose; especially when you place the child on large amounts of intravenous sugar, that sugar has no place to go and the cells tend to store it.

Q. Who prepared the autopsy report itself?

A. I presume the pediatric pathologist. I believe Dr. Beverly Dahms signed it and I don't know if a resident helped her or not. I don't

remember the names on it. Maybe it says.

Q. I believe Beverly Dahms is at least the major person involved.

A. She is the staff pathologist.

Q. Did you have any ongoing discussion or conversation with Dr. Dahms as the tests were being ordered and the results were coming back postmortem?

A. We spoke on a number of occasions.

a. Tell me to the best of your recollection, either specifically or in general, what was discussed and what information you likely imparted to her or she to you.

A. The initial conversation had to do with what she would like me to do to help her, and what I told her I would need from her.

So I asked her basically to do as best a job as she could and provide me with as much information as she could and then to let me know. And she had the results, and on the second visit, third, or whatever it was, I went over and discussed those results.

We spoke about the glycogen deposition at some length. We tried to see if that was a good clue or that might help me establish a

course for further study. We looked at all the related causes of glycogen deposition in inborns and we could not match those with the pattern we could see.

I could not do that alone. Dr. Dahms had to look at the cells. She had to tell me where they were in the cell, if they had membranes around it.

I don't mean to go through the particulars, but that's what she could tell me. And based on that, I thought it was likely that the glycogen was secondary, if anything, to a mitochondria, as people call it, or oxidative phosphorylation defect.

The decision was made to focus on that as previously suggested prior to Megan's death by her attending physicians and some of the consultations.

Q. Did you ultimately rule out or confirm the existence of that condition?

A. We could not establish that she had an electron chain transport defect.

&. So that from a probable --

A. I should probably still finish answering your previous question.

Q. Go ahead.

A. Then I also got back to Dr. Dahms and told her what we had found and hadn't found and I informed her that we couldn't come up with a consistent metabolic pattern that would allow me to give her a final diagnosis.

I'm not sure how many conversations that was, but I would say that would be the three stages of our conversations.

Q. Did there ever come a time that you attempted to set up a meeting to talk with the Kaschaks about the final results?

A. We spoke a number of times about that.

Q. Did you ever have an in-person meeting?

A. No, we didn't.

Q. Do you know why that is?

A. I just know it wasn't possible to set it up with Mrs. Kaschak on the phone. I mean, my impression was it was just too difficult for her.

Q. Fair enough.

A. But I don't know that for sure.

Q. Again, referring to the autopsy, doctor, to my knowledge in reading the deposition (SIC), the placenta was normal on review.

Was that the information that you had, as well?

MS. MALNAR: You are reading the autopsy?

MR. MISHKIND: Yes.

MS. MALNAR: You said deposition.

A. I'm sorry, where am I looking?

Q. On page four under the summary and comments, the third paragraph, about five lines down.

A. The placenta was normal on subsequent review, and what is your question?

Q. If the placenta was abnormal, would that cause you to have --

A. The placenta was normal, however.

Q. If it had been abnormal, would that have caused you to consider other factors being contributory to the baby's cardiopulmonary arrest?

A. One, I would have spoken with the pathologist and asked him what the abnormality was and what they thought it could be. That would generally be something they would tell me as opposed to the opposite.

Q. Now, there is a note --

A. I'm slower than you.
Q. Okay, that's all right. I don't mean to cut you off.
A. The fact is, if the pathologist would have reviewed the placenta and said they found something unusual or something suggestive, we often would get involved in that, because part of medical genetics, it deals with things like that. So I might have done something else I think is what you are really asking me.
Q. Correct.
A. But that was not said to me.
Q. I am looking to see whether you can help me with certain terms in the autopsy. I recognize you did not prepare it, but certainly you are familiar with the terminology as it relates to this baby, and hopefully you can help me.
The bottom of that page where it says certainly this prolonged cardiorespiratory arrest could explain the severe hypotensive/ischemic encephalopathy observed at autopsy --
A. Yes.
Q. -- can you explain what that means?
A. The brain is absolutely dependent upon

oxygen to function. In the absence of oxygen, the brain cannot function and undergoes destructive changes.

If you do not have adequate blood flow when you are hypotensive and your blood pressure is low, you get ischemia, which is the insufficiency of oxygen, and you subsequently experience damage to the brain, which is called encephalopathy.

Q. In this particular case, do you know how prolonged the cardiorespiratory arrest was before there was adequate resuscitative efforts given to the baby?

A. I may have known that at some point, but I don't know it now. And the most accurate answer to your question is my assumption was that it was rather long and it was a terrible event, so that's where I left it when people gave me that information.

Q. Again, from a general ethics standpoint, when one looks at a hypotensive/ischemic encephalopathy, is the length of time where the resuscitative efforts are not adequate after a cardiopulmonary arrest, the longer the length of inadequate resuscitative

effort, does that increase the potential for more damage to the brain?

A. I am probably not the one to ask, but in my opinion --

MR. NORCHI: Objection.

Q. Go right ahead, doctor.

MR. NORCHI: Go ahead.

A. From a biochemist's point of view, the longer the brain is without oxygen, the more at risk it is for damage.

The part I am having trouble answering, just to be clear, you made the statement of inadequate efforts to resuscitate and I didn't make any effort to assess whether efforts were adequate or not. I just knew the duration, okay?

Q. There was some suggestion in another deposition about some suggestion of a dysmorphic finding in the University Hospital records. Did you see any suggestion that there was any dysmorphic characteristics or dysmorphic findings?

A. I haven't reviewed that for a long time, and my recollection is that it was not the feeling that this child had significant

dysmorphism.

Q. And to the extent that there is some reference --

A. Actually, I am slower than you.

Q. I'm going to slow down.

A. As a rule, what the pathologist does on the first page, they would summarize that, and if there was a suggestion prior to death that there was significant dysmorphism, that would generally be included in the clinical diagnosis or summary statement. I don't see that. I'll look carefully, but I don't see a statement to that effect.

Q. If there was significant dysmorphic features, would that cause you as a medical geneticist to look to other metabolic or genetic disorders as an explanation?

A. Depending on the nature of the dysmorphism, yes.

Q. But absent any such evidence in this case, there is no reason to have looked to that level; correct?

A. I can't remember what was done, whether the chromosome analysis was done, for example, or something else. My feeling is that

the neonatal intensive care unit with their consultants would have looked for such things.

I would not have done any more than that unless the pathologist had told me after summarizing everything that there was still a question about that. Is that an answer?

Q. Not only is it an answer, but it's responsive too.

I want to jump back for a second, because I am looking at my notes. You said that you are a clinical geneticist?

A. I am. That's my board.

Q. There are medical geneticists that are not clinically based?

A. I am trying to think. The American Board of Medical Genetics first started certifying people the year I graduated from my fellowship, so I took my boards in 1981 and that's when I took clinical genetics. I thought I was done.

There are actually five subboards on that board. My recent boss wanted me to take another subboard, so I sat in '96 for the subboard of clinical biochemical genetics.

So that the direct answer to your

question, there are people who are certified by the American Board of Medical Genetics who are not physicians, in fact, and are boarded in other activities.

Q. Going back to the autopsy now -- thank you for clarifying that.

In the autopsy, there is a reference, page five, about halfway down in the first paragraph of the page, there was no evidence of structural congenital anomalies in the central nervous system to explain the infant's course.

A. Yes.

Q. Do you see that?

A. Yes.

Q. What type of structural congenital anomalies in the central nervous system would typically be looked at to explain the course that Megan experienced?

A. I can answer this only from a geneticist's perspective, not a pathologist's. From a geneticist's perspective, if a child stops breathing, you want to look at the portion of the brain that controls breathing, and so they would look in the mid brain, for example.

Similarly, they would look for

evidence of increased pressure, hydrocephalus, things like that.

Q. These would be things --

A. They would look for a whole range of things.

Q. They would be looking for things that essentially would be incompatible with life?

A. Not everything they would find would be incompatible with life.

Q. Were there any findings, either from a genetic standpoint, or from a neuropathology standpoint, as you understand them, to suggest that Megan had some characteristic that made her incompatible with life?

MS. MALNAR: Objection. Go ahead.

A. From this sentence alone, it would seem that Dr. Dahms didn't see any such thing. I don't know where the neuropathology report is. That's different. It's done by a different pathologist, and they see things that Dr. Dahms would not see. They usually have an addition. I don't know where that is.

Q. There is a neuropathology diagnosis on page two.

A. Okay.

Q. Are there any findings that would suggest or be consistent with some state that would cause Megan to be incompatible with life?

A. I think here I have to defer.

Q. Fair enough. What is it that causes you the inability?

A. I'm not smart enough. I'm not trying to be cute. I just don't know enough about this.

Q. The electron transport chain enzymes that were done at University Hospitals by the CIDEM unit --

A. Would you like to know what that stands for?

Q. I will in a moment.

MS. MALNAR: I would like to know where you are.

MR. MISHKIND: Page five, second last paragraph.

MS. MALNAR: Thank you.

Q. Are the results of this CIDEM unit, are they part of the documents that we have in Exhibit 1?

A. Yes.

Q. And were they normal?

A. No.

Q. Of what significance was the abnormality?

A. I can't explain the significance. They formed a pattern that I could not interpret.

Q. Of what significance would this pattern have had, if any, on Megan, had she not experienced the cardiorespiratory arrest on day one of her life?

MR. NORCHI: Objection. Go ahead, doctor.

A. I can't answer the question as phrased. My difficulty is if I can't interpret the significance of the results, I can't tell you either biochemically -- I can't turn around and tell you the clinical significance to judge the past or what might have happened in the future.

Q. So in other words, even though there is something abnormal in the CIDEM unit, the electron transport chain enzyme test, in terms of how that might have or would have manifested itself in terms of disability, if any, to Megan, you can't provide any type of an opinion on that; is that correct?

A. Yes.

Q. And let me ask you this, just to try

to save some time.

I understand that you have indicated to me thus far that all of the tests that were done, the metabolic and genetic tests that were done, did not permit you to conclude more likely than not that any of the conditions that you were looking for were likely the cause of her cardiopulmonary arrest; correct?

A. I'm sorry, I wouldn't phrase it that way. I couldn't find a diagnosis, that's what I was doing. I was looking for a diagnosis.

Q. From a metabolic and genetic standpoint?

A. I couldn't find a diagnosis.

Q. So in other words, in lay terms, there is nothing in the metabolic or genetic tests that explained why she experienced a cardiopulmonary arrest on the first day of her life?

MR. **NORCHI:** I'm going to object to what explained means. It doesn't take into content the probability, which is what you were looking at before, and possibilities, but go ahead and answer the question.

A. If I'm not sure what the answer was, I couldn't then turn around when I was speaking to

Mrs. Kaschak and say I know what happened. I just couldn't do that. And that's my answer to your question.

Q. And basically, what you wanted to be able to say to Mrs. Kaschak is that I found a metabolic or a genetic condition -- strike that.

There are several things that you wanted to arrive at. One was being able to say to her, I found a metabolic or genetic abnormality that explains more likely than not why she experienced a cardiopulmonary arrest; correct?

A. I probably would have phrased it why she died, but the answer is yes.

Q. And you weren't able to, after the exhaustive testing that was done, you were not able to arrive at a test result that from a causal relationship standpoint explained why she experienced the cardiopulmonary arrest?

MS. MALNAR: Objection.

A. Correct.

Q. Now, had Megan not experienced the cardiopulmonary arrest on day one of her life, is there anything from any of the test results that you have that I haven't studied or that I have

studied that would portend a poor prognosis or some adverse consequences in terms of Megan's development as she went through her infancy and her childhood and the rest of her life?

MR. NORCHI: Objection. We have already been over this, but go ahead.

A. I didn't find a consistent pattern that would have allowed me to make any predictions.

Q. So is there anything in any of the test results that would cause you to say that she more likely than not would have had neurological or motor deficits or cognitive deficits as a consequence of any of these test results?

A. As the tests stand, the answer is no.

Q. Fair enough.

I'm curious more than anything else, so I will ask it. There is a saying about curiosity.

My office had requested back into 1998 that the results of these tests performed relative to the autopsy on Megan Kaschak be provided. I have a letter to you back in February of '98 and June of '98, and those results never were provided to my office, and

certainly they were not provided to the Kaschaks either.

Is there a reason why that information wasn't provided? And I am not criticizing, I am just trying to understand why.

A. One, in my mind, I had never seen Megan and I had never seen her parents, so that my view is she wasn't my patient and I actually had no records that were unique to me.

And my thought was all the records that were available were either available through Dr. Walsh-Suyks, who would be involved in this and could send you the whole package, or the pathology department, which is actually responsible, and not me, for postmortem studies.

I have actually gotten in trouble with the pathology department because I tended to do things in the past independent of them, and they pointed out that the law requires that they deliver all that themselves, so I thought you had it.

I'm actually surprised you didn't. None of this stuff was sent to me uniquely. I was always given copies of things and I just thought, I actually thought you had it because I

had nothing unique.

Q. I am going to show you a letter that I have marked as Plaintiff's Exhibit 3. I will show it to your counsel first and then I just have one question for you on this point.

- - -

(Thereupon, Plaintiff's Deposition Exhibit 3 was marked for purposes of identification.)

- - - -

Q. First, is Plaintiff's Exhibit 3 a copy of a letter sent by my office to you back in June of '98?

A. Okay.

Q. Do you recall receiving that letter?

A. No.

Q. You don't. Are you saying that you didn't or you just don't remember one way or another?

A. I am saying I don't recall.

Q. And the only reason I am taking the time on that is that this letter was pointing out to you that we had tried to get the records and were told and were directed back basically to you. We requested the records from the hospital

and they indicated that there were no such results.

Do you ever recall having conversations with my office where we were saying that we couldn't get these records from anywhere else and we needed your assistance in terms of providing them to us?

A. I don't recall the conversation specifically. I truly thought all these records would be sent by pathology and sometimes, I mean, I will tell you probably on my end, it takes forever to get things, and I just figured it was taking forever. But I was told to have all records go through the hospital and that's what I tried to do.

Q. Who was it that advised you of that?

A. I mean, it's no one in particular. The medical records department has asked people, various administrators have asked people, I am sure the lawyers have asked people to ask us to do this.

Q. When is the last time you had an occasion to talk to Dr. Walsh-Sukys about this particular baby?

A. I can't tell you in detail when that

might be. But I have not talked about the details of the testing for some time.

Q. To your knowledge, has Dr. Walsh-Sukys arrived at or expressed to you any opinions as to the cause of the cardiopulmonary arrest that she had shared with you?

MS. MALNAR: Objection. *Go* ahead.

A. I don't think so. The longer answer is that since I was uninvolved in Megan's care, I think one of the reasons I was asked to do this is I had no prior knowledge of events, and so I didn't want to hear about anything else.

I just wanted to do what they had asked me to do. I wanted to do the lab tests without prejudice from anything else that had gone on clinically. So if someone had a conversation, I would've said, okay, *go* back and do what I have to do and that's what I would have done.

Q. You clearly did not want to know what the precipitant was or how responsive the resuscitative efforts were or were not following the cardiopulmonary arrest?

A. I mean, the story I heard was that --

MR. NORCHI: Objection. Go ahead.

Q. Go ahead.
A. -- was that Megan had had a bad time of it and it was a long time.
Q. And who shared that with you?
A. Michelle probably did and I think Dr. Dahms when she went over the clinical story.
Q. Anyone else that you recall besides Dr. Dahms and Michelle that shared with you that history?
A. Not directly with me.
Q. How about indirectly?
A. I mean, I am trying to think if in the course of things people said something, but no one had a conversation with me about it.
Q. Is there something in general that you are referring to?
A. No, no. There are a lot of people in the hospital. People talk. I am just trying to say no one spoke to me specifically about Megan's case that I stayed long enough to hear the end of it.
Q. I take it from that -- and if I am wrong, set me straight -- that you overheard excerpts of some conversations?
A. No, I am saying I may have. I just

know this was a case that there was some discussion about and people would have talked,. And I know, I might have been around the unit or talking to Michelle and someone else said something. I just don't remember details. But my information, which I think -- I am not sure what your question pertinence is -- but to me the information was given when Dr. Walsh-Suyks asked me to get involved or talking to Dr. Dahms to try to help out there.

Q. Did you ever talk with Dr. Bruce Cohn from The Cleveland Clinic?

A. No.

Q. Did you know that he was brought over to do a neurological evaluation?

A. I specifically knew that, yes. I have spoken with Dr. Cohn on numerous occasions, but I don't think I have ever spoken about any of details of Megan's care.

Q. When you say you have spoken to him on numerous occasions, did it have anything to do with any aspect of this case?

A. What I am saying is, Dr. Cohn used to come to meetings where I was at and he might -- we might have said we saw this or that patient in

the course of things, but I did not go over the details of this with Dr. Cohn.

Q. One of the potential causes of a cardiopulmonary arrest was obviously potential inborn errors of metabolism; correct?

A. Start again.

Q. One of the potential causes of cardiopulmonary arrest was the possibility of inborn error of metabolism; correct?

A. Correct.

Q. And such things as galactosemia and phenylalanine as the other classic inborn errors of metabolism were looked at and ruled out; correct?

MR. NORCHI: Objection. If you know.

MS. MALNAR: If you know, you can answer.

A. My assumption was that the state screening looked at those. On the other hand, I would not have thought to look again or more carefully at those possibilities, because they do not produce the kind of problems that Megan had.

Q. Okay, fair enough.

I'm going to quote as best as I can what I'm told as it relates to a conversation

that you had in October of '98, probably one of the last conversations that you might have had with Mrs. Kaschak. And I'll give it to you entirely and then I'm going to ask you whether or not you remember that conversation or something similar to that taking place. And if not, tell me why. Okay?

A. Okay.

Q. You understand the context under which I'm about to --

A. I'm not sure.

Q. In October of '98, I am advised by Mrs. Kaschak that you had a conversation with her and told her that all of the genetic tests done on Megan were normal, except for an inconclusive borderline electron transport chain assay test which Mrs. Kaschak told me you told her could be many things or nothing at all.

Does that sound consistent with what you likely discussed with her?

A. I discussed that kind of thing with Mrs. Kaschak. I'm not sure I would've said it that way, though, but I discussed those kinds of things with Mrs. Kaschak.

Q. When one says that the borderline

electron transport chain assay test -- which could be many things or nothing at all -- in simple terms that a lawyer or a jury can understand, what does that mean?

A. Again, I'm not sure that that's what I said. Second, what the results show is an inconclusive pattern of abnormalities.

Q. Can you be any more specific as to what the pattern of abnormalities are?

A. I can be as specific as you want if you want to go over the labs, but if you don't want me to do that, I can tell you that the results from different tissues did not agree within themselves, so that an abnormality that was found in one tissue was not normal, and was normal, for example, in another, and in one case was actually increased; in other words, certainly not deficient.

Q. Have you ever seen that kind of a pattern before?

A. Yes.

Q. And what does it mean to you as a geneticist where you have these inconclusive or inconsistent findings?

A. It means I can't interpret the results

in a consistent and helpful way. And I think that was the gist of my conversation with Mrs. Kaschak.

Q. Were there any additional tests after the electron transport chain assay test in October of '98 that you indicated to Mrs. Kaschak were being done that you were going to report back to her or that she would learn about?

A. I don't remember the date of our last conversation, but in our last conversation, I think I said that there was no more testing I had planned.

Q. And the CIDEM unit stands for what?

A. The Center for Inherited Disorders of Energy Metabolism.

Q. That's at UH?

A. You know, I actually don't know where under house auspices. It's physically located in Rainbow and at the V.A.

Q. Beside the V.A. and Rainbow, were there tests that were sent out of state?

A. Yes. As I said before, there was one test that was sent to Los Angeles and some tests sent to another building for the genetic tests.

Q. The ones to Los Angeles, was that sent

to Dr. Ng's office?
A. Dr. Ng?
Q. Yes.
A. I don't see the name on it. I think Dr. Ng is the one that actually did them. They were signed by somebody else. She subsequently left Los Angeles, so I can't remember.
(Thereupon, a discussion was had off the record.)
Q. What is an oxidative metabolic energy metabolism defect?
A. It's a defect where you're burning up some food product with oxygen to get energy from it.
Q. Was there any evidence that Megan had that condition?
A. No conclusive evidence.
Q. The glycogen deposition found on autopsy raised an issue of glycogen storage disease; correct?
A. It raised that possibility.
Q. But that ultimately was not established?
A. I thought it was more likely since we couldn't fit it into a recognized pattern of one

of the glycogen diseases to think that it was related to an oxidative metabolic disorder for which there was precedent.

Q. And what causes such a condition?

A. I think we discussed that before, but basically if the cell can't mobilize energy, it can't use glycogen effectively.

Q. But what can cause the inability of the cell to mobilize or to metabolize?

A. If there is a defect in mitochondrial function where the mitochondria is the carburetor of the cells. It takes different cells and fuels and burns them.

If the mitochondria cannot do that, various fuels will accumulate because it has no place to go, so you can get deposits of glycogen.

Q. Are there any test results that establish a mitochondrial defect?

A. No.

Q. Can you state to a probability then that there was some type of a glycogen storage disease?

A. I found no evidence in the biochemist school studies directly confirming that --

Q. ***So*** this is just --

A. -- or disproving that.
Q. -- just a possibility, but not a probability?
A. Correct.
Q. There is some reference in the autopsy to Megan's death falling into the category of a near missed SIDS.

Are you qualified to provide any opinions on whether or not her age and the circumstances surrounding her cardiopulmonary arrest and her death fit the stigmata or the description of a near SIDS death?
A. I'm not an expert on SIDS. But I can answer the question to the extent that SIDS-like episodes mean that they don't necessarily fit into the standard criteria and a subset of those can have an underlying metabolic cause.
Q. But again, we don't have anything that you could point to that establishes an underlying metabolic cause in this case?
A. Correct.
Q. There were muscle biopsies done; correct?
A. Postmortem?
Q. Yes.

A. I wouldn't call it a biopsy then. I would say muscle samples were obtained postmortem.

Q. Were there any findings that were significant in terms of leading to any definitive conclusions?

A. The pathology report would answer that. I don't remember any mention that they found such.

Q. The tests that you were performing wouldn't have any implication on any --

A. No, if you were asking me morphologic changes that the pathologist pursues. I am answering the question, some of the reports that I provided that you now have in your possession are done on skeletal muscle and that's included in the comments we have made before.

Q. Any abnormalities on the skeletal muscles that you describe?

A. Yes. The skeletal muscle does have abnormalities in some of the electron transport chain.

Q. And of what significance are those abnormalities?

A. I cannot tell you the significance

because they are not consistent within different tissues, so by sharing the results in the skeletal muscle with the heart muscle with the liver, it's the whole picture that I can't put together.

Q. Did you take into account in trying to put these findings together and arrive at some explanation for her death the fact that she had good apgars at the time of birth? In other words, the clinical picture during the first 24 hours, did you take any of that into account?

A. I took it into account, yes.

Q. And in what respect did that help or hinder your conclusions?

A. It didn't help.

Q. Why is that?

A. Because it's not helpful. You often have children who have perfectly fine apgar scores, who, until they have a requirement for energy production, do not get into trouble.

Q. And those children that have perfect apgar scores that then have metabolic studies or genetic studies done, more often than not, you are able to arrive at some explanation from a metabolic or genetic standpoint?

A. More often, I am not able to arrive at an answer.

Q. So then you ultimately wind up saying, I have no explanation?

A. Yes. You haven't asked me, but -- I know I'm not supposed to do this -- but the apgar scores, you can have normal apgar scores, abnormal apgar scores. They are not a singular useful thing and often I find that I cannot provide an explanation independent of the initial apgar scores.

Q. This is a search for the truth, so if you happen to blurt out something --

A. I am not blurting, I am trying to help.

Q. I appreciate that.

The existence of severe hypotensive/ischemic encephalopathy that's found on autopsy, is that in any way explained by any of the results from a metabolic or genetic standpoint?

A. No.

Q. Are you aware of any studies, articles, that are contained within the medical literature that are similar in any way to Megan's

case where there were concerns about genetic or metabolic abnormalities being the explanation for a cardiopulmonary arrest, where all of the tests were done and basically they were inconclusive from a genetic standpoint, a series of tests or articles?

A. It's well recognized that you don't always find the answers. It's in the literature in various forms.

Q. Where would you refer someone for, perhaps, something in the 1990s, if you will, that talks about the various metabolic tests that are performed and the conclusive or inconclusive nature of the tests as it relates to trying to come up with an explanation for why such an event would occur?

A. I don't know the specific reference to refer you to.

Q. But having said that, none of this explains the nature of the -- none of the inconclusive test results explain why Megan had the ischemic encephalopathy; correct?

A. I have already stated, no.

Q. That's a separate clinical issue which is not explained away or by what you did in this

case?

A. I don't know if it's separate or not. I don't know what that means.

Q. There is nothing that you have come up with that indicated why there was such a profound ischemic encephalopathy in this case; correct?

A. Correct.

MR. MISHKIND: Let's take a couple minute break

(Thereupon, a recess was taken.)

Q. Doctor, I just have one other question for you and then I am done.

There was some testing done of one or both of the parents, I believe, after Megan died to try to determine something.

My question to you is -- and I believe it was requested by Dr. Robin -- are you aware of that?

A. No, I'm not actually.

Q. I lied. Actually have one more question.

Do you know a reason that blood tests would be done on the parents in this context?

MS. MALNAR: Objection. Go ahead.

A. Not in the context that I was

considering. I don't know what Dr. Robin was thinking.

MR. MISHKIND: I have no further questions.

A. If you tell me the tests, I will tell you what it's indicated for.

Q. I would if I knew, but I can't, so I won't.

MR. MISHKIND: I have no further questions.

EXAMINATION OF ARTHUR B. ZINN, M.D., Ph.D.

BY MR. NORCHI:

Q. I have some, doctor. I represent the defendant in this case. Dr. Zinn, my name is Kevin Norchi.

You mentioned earlier that you were given a list of tests to perform or have performed; is that correct?

A. I was given a list of differential diagnoses -- not given a list. In reviewing the chart, there was a list prepared by the neonatologist as well as one in Dr. Cohn's consultation.

Q. So there was a differential diagnosis in the discharge summary from the chart at

Rainbow Baby and Children's Hospital. Is that what you are talking about?

A. No. I don't know. I wasn't given a list. In the discussions either with Dr. Walsh-Sukys or Dr. Dahms in going over things, I reviewed Dr. Cohn's set of recommendations, as well as any that they had advised me that their own people had considered.

Q. It wasn't clear from your earlier testimony. It sounds as though somebody gave you a list of potential diagnoses.

A. It may have felt that way, but it wasn't actually being given a list. I generated a list, I suppose.

Q. Do you have a copy of that list you generated?

A. No.

Q. Did you actually write out or type out or have printed out this list?

A. I didn't.

Q. Did anybody?

A. The list of tests are the ones that are listed through Dr. Dahms' note. That's what that list was generated to use for. So in her summary, she goes through the various

considerations that were made prior to and after death.

Q. Were you involved in discussions with Dr. Dahms when she prepared that list or did you get involved after she prepared her list?

A. Dr. Dahms got involved after the death, so at some point Dr. Dahms and I spoke and generated a list together.

Q. So that's a list you and Dr. Dahms generated?

A. As I indicated before, I had discussion with Dr. Dahms.

Q. I know that. I am wondering where the list came from; that's all.

A. From our discussions of our considerations before death and what the autopsy might have suggested to amend that list.

Q. And then your responsibility after receiving this list was to coordinate certain genetic and metabolic tests?

A. I didn't receive it, I generated the list.

Q. After you and --

A. See, the list that was in the chart was a list of differential diagnostic

considerations. The reason they wanted my help, they wanted to know how to translate that efficiently and effectively into a list of tests that could answer whether any of these possibilities are the case or not.

So Dr. Dahms is a fine pathologist, but she needs help. In actually saying if you are going to look for pyruvate dehydrogenase deficiency, then what tissues do you need and where do you send it. And so that's what we generated together.

Q. So if I understand you correctly, Dr. Dahms provided the identity of particular deficiencies that she thought might possibly exist and then your involvement was to identify the tests?

A. We review the records together, if you will.

Q. Well, you can clarify. I appreciate your help. But then you identify tests that could be done to identify whether or not each of those or any of those conditions existed?

A. Correct.

Q. And then from there, then it was your obligation to coordinate these tests?

A. To have pathology send the appropriate samples to the appropriate laboratory. I never physically carried samples and I never have responsibility for performing tests.

Q. But it was your job, if you will, your obligation, to direct certain specimens to certain pathologists or laboratories?

A. Correct.

Q. And as you mentioned, you did not perform any of these tests yourself; correct?

A. Correct.

Q. The test results came back to you, though; is that correct?

A. Copies came back to me.

Q. Was the purpose of you receiving those copies of those test results to interpret the test results?

A. No. The interpretations were provided on the reports.

The other reason I was asked to get involved, and the reason I actually agreed to get involved was that someone had to communicate with the Kaschaks. And since I had been previously uninvolved, part of my neutrality, people thought, would be useful to communicate with the

Kaschaks.

Q. Okay.

A. So what I needed to do was, my hope was that when everything was done, I would sit and meet with the Kaschaks and help them deal with and understand the information and use it appropriately.

Q. You testified earlier that there were certain inconsistent test results; correct?

A. Correct.

Q. Was it your responsibility in this setting to look at all the test results and determine whether they were consistent or inconsistent?

A. That was part of my responsibility. I was ultimately going to sit down with the Kaschaks and do that, correct.

Q. Did anybody else, any other physician, have the responsibility of looking at all the test results, determining whether they were consistent or inconsistent with a particular diagnosis?

A. None of the physicians who had cared for Megan had that responsibility. Michele Walsh-Suyks had asked me to do that for her,

thinking I was more qualified, so I would talk with her about the results in that context.

And I know, I think on at least one occasion, she got back with the Kaschaks and tried to communicate what I would say to her, because she knew them already.

Q. So if I understand, the test results came back to you and because of your qualifications as a medical geneticist, you interpreted those test results, arrived at some conclusion or inconclusion, as it were?

A. Right.

Q. And communicated that to the Kaschaks and to Dr. Walsh-Suyks; correct?

A. Correct. I also spoke with the laboratory directors if I had questions about interpretation, and on at least, I think, a couple of occasions where there was ambiguities, the laboratory actually redid certain tests and tried to refine their assays, so I had communication with the laboratory.

Q. So you did speak with the lab directors or physicians at the labs and perform these tests?

A. The lab directors, yes.

Q. Did you keep any notes regarding your discussions with any of those individuals?

A. No.

Q. Do you have any notes regarding any discussions you had with the Kaschak family or Dr. Walsh-Sukys or anybody?

A. Probably not.

Q. Why do you say probably not?

A. Because the computer systems have been changed and I don't know if I wrote anything on the old computer. As a habit, I generally didn't. I would generally wait until I had met with the family and summarize our discussions that way.

Q. You mentioned earlier that there were abnormalities found on some of the test reports; correct?

A. Yes.

Q. I would like to ask you some questions about them.

On the first page -- I believe it's Exhibit 1 that was marked -- there is an electron transport chain report for specimen type skeletal muscle?

A. Correct.

Q. And that's an ETC assay dated September 29, 1997?
A. Yes.
Q. Just to make sure we have the same page.
A. Yes.
Q. There are abnormalities noted in the interpretation below, the bottom part; correct?
A. There are abnormalities noted in words below, and to the right of the last column there are H's and L's, which means H is high and L is low. So that's the first designation of an abnormality.
Q. What is a complex I, complex II and complex III?
If that requires an hour long dissertation, I will probably abandon the question.
A. If you can imagine that the mitochondria is like a carburetor and that it mixes the fuel, and the oxygen that you contribute, the mitochondria's job is to burn that and make energy. There is different parts in the mitochondria -- you call those parts complexes -- so there that laboratory measures

four different parts of the carburetor.

Q. On the second page of Exhibit 1, do you see under interpretation by Dr. Kerr, next to that is a date, October 14, 1997, he identifies that in the assay of the electron transport chain, the postmortem skeletal muscle showed a defect in the later components of complex II; correct?

A. You are reading correctly.

Q. First of all, if we can, is it possible to explain for me what a later component of complex 11 is?

A. Sure. If you think about the carburetor having four major parts, part II, if you take it out, you can sort of, it has four subpart components to it. So the first two parts are the early part and the last two parts are the late part.

Q. What is the effect of those later parts in the oxidative phosphorylation mechanism or OxPhos?

A. Let me go back to the parts. If you look above the line on the first page, there are --

A. So complex II, its job is to take the energy intrinsic to a substance called succinate

and get the energy out of it. So the first two components of that complex are together called succinate dehydrogenase and those sort of take succinate and gives the order over to cytochrome c.

The second two parts in turn take the energy from the components and give it to cytochrome c, so the way these things are named is complex II is a bridge between the energy and succinate and the energy that will be transferred to cytochrome c. So that's it.

Q. Are there any particular syndromes that you are familiar with that are related to a defect in the later components of complex II?

A. There have been reports of patients who have defects in complex II. They have a range of medical problems.

Q. Have you ever done any research in that particular area; that is, specifically focused on defects in the later components of complex II?

A. Have I, personally?

Q. Yes, sir.

A. No.

Q. Is this a relatively new area of

inquiry in the field of medical genetics focusing on defects in a particular portion of a complex?

A. Yes.

Q. Would it be fair to assume that this is an evolving area of medical genetics?

A. Yes.

Q. I will assume most areas of medical genetics are evolving?

A. Many are. Let me go back to two questions ago.

Q. That's fine.

A. I have not done research, but I have done all these assays. I worked in Dr. Hoppel's lab for several years and I know what they are. I often interpret these results for other patients and I have some idea what electron transport chain is about. I am defining research narrowly.

Q. I didn't mean to suggest that you don't understand the electron transport chain.

A. But you asked a specific question.

Q. It was specific.

A. And I am trying to explain what I mean by research.

Q. I think we understood each other.

You had an opportunity to review these reports today before your deposition testimony?

A. Yes.

Q. The defect in the late component of complex II is one of the defects identified in these reports; correct?

A. It's one of the laboratory abnormalities identified in these reports.

Q. Are there any other lab abnormalities that are identified by these reports?

A. I can turn the pages with you.

Q. Could you, please?

A. So the first page refers to the analysis on skeletal muscle done on October lst, '97.

At that point, there are actually two abnormalities. One is the assay that measures complexes I and III together was actually, let's see -- the one that measures I and III together was higher than the range. Whereas the assay that measures II and III together was lower than the range.

Q. In and of themselves, do those abnormalities direct you towards any particular diagnosis or syndrome?

A. Not a particular syndrome. The question is does this patient, does this girl have complex II deficiency. That would be the question.

Q. And, of course, this report doesn't give you a definitive answer to that question, though, correct?

A. Correct.

Q. But certainly leads you towards inquiry in that direction?

A. Correct.

Q. Are there any other --

A. Not on that page. On the next page is Dr. Kerr's interpretation, his analysis of three different -- of two different enzymes and we will just do initials. PDC and dihydrolipoamide dehydrogenase, he found those both to be normal.

The next -- those are enzymes that live in the mitochondria that are primarily active in the liver as opposed to other tissues, but they are both present in other tissues.

On the next page, Dr. Kerr also measured in the liver two other enzymes, pyruvate carboxylase and phosphoenolpyruvate carboxykinase and he found those to be normal, as well.

So that is, all the pyruvate related enzymes live in the mitochondria, but they are not directly a part of the oxidative phosphor system. They feed energy into it.

Q. So there may be an abnormality in the OxPhos mechanism?

A. But you wouldn't say it by assaying these enzymes.

Q. Could you see an abnormality in the OxPhos mechanism by assaying skeletal muscle?

A. That was done. That's what the first page is doing.

Q. And that's looking for an abnormality in the actual OxPhos mechanism?

A. That's correct. And this was -- yes.

On the next page what happens -- and these next four, I think, reports are from 4th of November of '97.

Q. Charles Hoppel, Dr. Hoppel?

A. Yes. And these were done after he actually redesigned some of the analyses. So they represent remeasurements with what Dr. Hoppel considered a more updated set of analyses for the same complexes that we discussed reported on October lst, okay?

Q. Okay.

A. So he basically said that we found the stuff, we are going to change some of the ways we do the stuff in the lab, let me go back and do it over again, as well as do the other tissues.

Q. Who asked him to do this again; do you know?

A. Knowing Dr. Hoppel, he decided to change his own assays.

Q. Okay.

A. But I'm sure I had discussions with him about the difference and what he was doing.

The results of that skeletal muscle, again, the analysis for the succinate-cytochrome c reductase was on the low side, just on the border.

Q. Yes.

A. Whereas on this occasion, as opposed to the first, the analysis for the fourth components cytochrome c oxidase was below the range of normal and below the prime mean for controls.

On this occasion, though, the citrate synthase, which is the last enzyme on this page, which is used, an intramitrochondrial enzyme,

that's not a part of the electron transport chain, but is sometimes used as a reflection and our lab uses it as that of the integrity of the mitochondria. In other words, if you're measuring it, you want to make sure what you are measuring is at least, you know, healthy.

Q. What does the low result tell us about the integrity?

A. It's on the board and it -- let's see if the report comments.

The activity of citrate synthase, a mitochondrial marker enzyme is just below the control range.

Now, so that's Dr. Hoppel's interpretation.

Q. Does the low number for the citrate synthase suggest that we may have lost integrity of the mitochondria?

A. That's the concern. But from reading this report, Dr. Hoppel's view is borderline. He doesn't come out one way or the other saying whether it was healthy or not.

Q. Would that affect the reliability of the test in any way?

A. Certainly can.

I just don't know how complicated to make it.

MS. MALNAR: Wait until he asks the question and then go ahead and answer that.

Q. In this report of November 4, 1997, Dr. Hoppel in the second to last sentence, he states that the activities measured on this new homogenate are similar in comparison to the assay done on September 29, 1997.

A. Correct.

Q. Do you see the results of any assay done on September 29, 1997?

A. That's page one. When you read the date, to me that's the date, not his signature date.

Q. Okay. That clears that up.

Do you interpret his findings to state that the assay done on November 4, 1997 is consistent with or the same as the findings on his report dated October 1, 1997?

MS. MALNAR: Objection. Go ahead.

A. I interpret just the way he said. He said they are similar. They are not identical.

Q. Okay. Similar?

A. That's the word Dr. Hoppel uses.

The next page then is a report of the same assays used on the liver, and here what you see is a different pattern than what you saw for the skeletal muscle. And the pattern is, I mean -- you can look at it for yourself.

Q. Well, for example, the citrate synthase on the liver sample is low; correct?

A. Correct.

Q. Does that, again, refer to the integrity of a mitochondria that is being assayed, tested?

A. Again, Dr. Hoppel's comment is that the activity of citrate synthase a mitochondrial marker enzyme is below control range.

Q. What does that mean?

A. That means that the marker for mitochondrial integrity is not within the range that you would like to see.

Q. Does that mean that these tests are less reliable now?

A. The way I can answer that is that my experience with Dr. Hoppel -- and obviously you need to talk to him directly if you want to have him interpret his own sentences -- but in my experience, what that means is what Dr. Hoppel

observed; that it was low, but thought that some of the other assays on balance were interpretable and that's why he phrased it this way.

If Dr. Hoppel's results are such that he does not think that he can do an interpretation, he will state that.

Q. Doctor, you were --

A. Should I keep going through the assays?

Q. Let me ask you about this one so we don't have to keep coming back. There are some abnormal results here; right?

A. Right.

Q. And you attempted to interpret the results so you could communicate with the Kaschaks?

A. Right.

Q. What interpretation can you make of these test results relative to Megan's condition?

MS. MALNAR: Just this page?

Q. Just this page or can't that be done?

A. It can be done. It's just not very useful, I mean, to interpret this page, I mean, I can read Dr. Hoppel's report and the question about the citrate synthase, sure, it makes me

worry whether these were intact and that's why they were being used in this test and that's what Hoppel is saying. But my experience is Hoppel is not cavalier, and if he thought he couldn't do it at all, he would've said so.

But if you allow me, the real importance is comparison of this with the other results.

Q. Okay.

A. And for example, on the skeletal muscle, what you found on two occasions was a succinate cytrochrome c reductase, that was borderline low. On this case, you have a normal activity of succinate cytrochrome c reductase; even in the context in which you are not sure what the integrity of that liver is.

So what I concluded was that there is not a consistent deficiency for the components assayed by this complex II, III analysis. Therefore I couldn't say that I think there is error in complex II and 111.

There is always provisos. The provisos are that there are tissue specific defects for mitochondrial disorders. So that underscores the difficulty in interpreting these

things.

The cleanest picture is if you have one tissue that's completely abnormal or selectively abnormal and one tissue that's completely normal and then you say maybe if that corresponds to the clinical course then maybe what you have is a tissue specific defect, because the genes and the proteins of these complexes can be different in different tissues. I'm sorry to go on.

Q. No.

A. That's my interpretation here so far, okay?

Q. Okay.

A. And if you then turn to the next page, you see the results in the heart, which again, you can go through this, again the same proviso with the citrate synthase, but you see a pattern different here than you saw for the first two tissues.

So what I say is, there seems to be some areas of abnormality in all the tissues. Some of them are marginal and some less marginal or borderline, but there is no consistency between or amongst the tissues.

Q. Did you try to determine whether there was any tissue specific mitochondrial abnormality?

A. Other than by trying to look at these and see if there was a pattern that became evident.

Q. From just looking at the skeletal muscle -- well, let me ask you, is the tissue in skeletal muscle similar to tissue in other parts of the body, like heart muscle, for example?

A. There are some similarities and some differences, and there are instances in which we evaluated patients and they have the same defect in both. There are other instances where they have a defect in one and not the other, depending on the particular component.

I don't need to make this a lecture, but there are five different electron transport chain complexes. This lab has four of them. Within those four components there are about 70 different enzymes, 70 different proteins, which means there is at least 70 different genes that do all this. And those different genes often are expressed differently in different tissues. We do not have the ability to look directly at most

of those tissue differences.

Q. Do you find any similarity between the heart electron transport chain report and the skeletal transport chain report that permits you to come to some conclusion about any abnormalities in any of the ETC complexes?

MS. MALNAR: Ruling out or ruling in, or either, in general?

MR. NORCHI: General. I am not asking for a specific diagnosis. I understand he can't do that. So it's a general.

A. I can't reach a conclusion.

Q. And what would the conclusion be?

A. No, I can't.

Q. You can't?

A. I cannot.

Q. I thought you said you could.

The next report from December 11, 1997 fibroblasts, there are no abnormal results on that page; correct?

A. Correct. The comment on that page, though, which you didn't ask me, but the comment on that page, one, you cannot measure complex I in skin fibroblast, so that's not included in there.

Two, the purpose of looking at fibroblasts is that whatever might have happened with Megan during her life would not be reflected in the skin fibroblast study. You take a skin fibroblast, take a biopsy, grow it in tissue culture under as optimal conditions as you can so that it's relatively independent of the medical status, because it's done so much later and outside the body.

On the other hand, what takes away from the merit to try to interpret the other results is that the tissue specificity of the other tissue is often least reflected in skin fibroblast.

Q. Meaning?

A. So that skin is less like heart, perhaps, than skeletal muscle is like heart. This is not always the case. Geneticists traditionally try and do fibroblast studies for the reasons I just said. They are not always a reflection of what is present in other tissues.

Q. For example, if you wanted to do a tissue specific test for skeletal muscle or heart or that type of tissue, doing a skin fibroblast assay --

A. Not if the test you are going to do is a functional test measuring a particular protein. If you wanted to do a DNA base test, the genes are the same in each tissue, but how those genes make their proteins that does the work is different.

Q. Okay. That wasn't done here; correct? That last --

A. The DNA based studies I believe.

Q. There were some done?

A. They were done on the skeletal muscle.

Q. Okay. And these are the last set of DNA reports?

A. Let me go through those just to make sure.

The next page is testing for MELAS, three genetic misspellings in the mitochondrial chromosome and those were not found.

The next two pages later we looked for the common genetic misspelling and something called MERRF. And we looked for the common misspelling that occurs in patients with a particular fatty acid oxidation disorder which is abbreviated as MCAD. That was not found.

The last page, as we looked at muscle

for, I don't know, I think they looked for almost 50 misspellings in the mitochondrial DNA in Los Angeles, and they did not find any. And they also looked not just for misspellings but torn out pages or extra pages in the genetic instructions. So the extent of our DNA based testing was for a subset of misspellings in the mitochondrial gene.

Q. From your earlier testimony, I understand that you did not arrive at a definitive diagnosis that Megan Kaschak had a specific metabolic or genetic abnormality; correct?

A. Correct.

Q. Based on your analysis here that was done, were you able to rule out an underlying genetic or metabolic abnormality in Megan Kaschak as being the cause for her respiratory arrest and subsequent death?

MR. MISHKIND: Objection. Go ahead.

A. I could rule out only those things that I specifically tested for and found to be consistently normal. And the enzyme assays were found to be normal on the DNA based testing. I could not rule out other possible metabolic

diseases.

Q. Were you able to rule out a deficiency, an abnormality related to the complex II abnormalities found in the electron transport chain reports?

A. I didn't rule it out.

Q. Okay.

A. I guess I will tell you, it was not ruled out.

Q. Is there any evidence in any of these reports or the autopsy reports or any information that you have suggestive of any OxPhos metabolic disorder?

MS. MALNAR: Did you say in the autopsy report, because I don't think he reviewed the whole thing.

MR. NORCHI: I did say that. Go ahead.

A. The concern is that some of those enzyme enzymatic abnormalities in the electron transport chain assays do, in fact, reflect an underlying problem. I just didn't say I saw a consistent pattern so I could say that's the case.

Q. I have had genetics issues arise

before in cases like this and I have often had the medical geneticists tell me who I have had look at the case that they can get me to the right state, and get me to the right city; they can tell me, in fact, what part of the city and maybe even get me to the street, but they couldn't tell me what the address was that would tell me what the exact disorder was for the problem.

Is that an explanation or is that -- let me back up. Is that similar to what we have in this case?

MR. MISHKIND: Let me object to the question. It's artful, but I think inappropriate.

MR. NORCHI: It may be inartful too, but we will find out.

Q. Do you understand what I am saying?

A. I know why geneticists tell you that. The answer to your question, though, is we were looking for a possible electron transport chain defect and we were looking as hard as we were able to do given the limitations of what's available. We did not find something.

Do I worry or other people who do this

worry that there is something else there? Sure. But I can't say we missed it. I can't say I was just next door to it.

Q. The results on these reports show what I think you have termed an inconclusive pattern of abnormalities; correct?

A. Yes.

Q. And you also indicated that they are suggestive of an OxPhos mechanism disorder?

A. No, I didn't say they are suggestive.

Q. Are they consistent with?

MR. MISHKIND: Objection.

Q. Or did I just use the wrong word?

A. They are not internally consistent to allow me to make a specific diagnosis is what I think I said.

Q. I think we are saying the same thing. It's an inconclusive pattern of abnormalities?

A. I agree with that statement.

Q. There are abnormalities reflected in these test results?

A. Correct.

Q. But as you review the abnormalities in each of the tests, they don't identify for you a particular pattern that's consistent with a

specific disorder?

A. Either for me or when I spoke with Dr. Hoppel about some of these, correct.

Q. Was there a neuropathologist who didn't -- I believe there are electron microscopies done of tissue. Is that your understanding also?

A. I thought there were, but I didn't specifically review that.

MS. MALNAR: I believe they are attached to the autopsy report.

MR. NORCHI: Microscopies, have you seen them, the actual films?

MR. MISHKIND: No, the films are not attached.

Q. You didn't look at the microscopies; correct?

A. I don't remember doing so.

Q. I am almost finished here, doctor.

MR. NORCHI: Thank you.

EXAMINATION OF ARTHUR B. ZINN, M.D., Ph.D.

BY MR. MISHKIND:

Q. Just a couple questions.

Bottom line, the abnormalities that we talked about when you put all of the different

specimens together, the different reports together, and you compare the abnormalities, whether it be the skeletal muscle to the liver, to the heart, et cetera, these results in plain terms do not explain to a reasonable degree of medical certainty why Megan died; correct?

A. They do not provide me with a diagnosis that I can use to explain the events of Megan's life.

Q. The complex II syndrome that you said you could not rule out, certainly looking at the flip side, there was insufficient evidence for you to confirm to a probability the existence of a complex II syndrome; correct?

A. Correct.

Q. If there were such a complex II syndrome, of what significance would that be from the standpoint of mortality and morbidity?

A. As I said before, complex II deficiencies are, one, relatively rare, and associated with actually a quite broad range of medical problems.

Q. Are you qualified to talk to what those problems are?

A. I believe so.

Q. What are they?

A. They can be anywhere from the severest form -- I think there has been one case of complex II deficiency that's been implicated as a cause of a particular necrotizing encephalopathy, although I am not sure how strong that case is. I don't know that there is any other. I think there may be two cases in the literature, which means that the child would have it and die within the first couple years of life.

At the other range, there is adults who had no problems until 30s or 40s, walk around and suddenly get exercise intolerance and you can't run the same two miles as fast as they used to. Just based on the enzyme assay I could not say more than that.

Q. Taking the adult scenario -- and I understand you can't say to a reasonable degree of medical probability that Megan had complex II syndrome. I ask you in terms of if, in fact, she did have that, what are the manifestations -- you have given me some of them from extreme to the adult situation. The adult situation that you are aware of, besides exercise intolerance, are they associated with any degree of increased

mortality --

A. No.

Q. -- in the adult?

A. I stated it correctly. It is simply an exercise intolerance, clinical problem.

Q. Fair enough.

MR. MISHKIND: No further questions. Thanks.

MR. NORCHI: Thank you.

MS. MALNAR: You can read this deposition transcript if you would like to check for basically typographical errors. It's up to you. Would you like to read it?

THE WITNESS: If I don't have to, I think I'm okay.

MS. MALNAR: If someone orders it, I would like to have a copy of it.

- - - -

(Deposition concluded at 4:00 p.m.; signature waived.)

CERTIFICATE

State of Ohio,

SS:

County of Cuyahoga.

I, Vivian L. Gordon, a Notary Public within and for the State of Ohio, duly commissioned and qualified, do hereby certify that the within named ARTHUR ZINN, M.D., Ph.D., was by me first duly sworn to testify to the truth, the whole truth and nothing but the truth in the cause aforesaid; that the testimony as above set forth was by me reduced to stenotypy, afterwards transcribed, and that the foregoing is a true and correct transcription of the testimony.

I do further certify that this deposition was taken at the time and place specified and was completed without adjournment; that I am not a relative or attorney for either party or otherwise interested in the event of this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Cleveland, Ohio, on this 28th day of August, 2000.

Vivian L. Gordon

Vivian L. Gordon, Notary Public
Within and for the State of Ohio
My commission expires June 8, 2004.

EXHIBITS