UNITED STATES
COURT OF FEDERAL CLAIMS

IN RE: CLAIMS FOR VACCINE INJURIES RESULTING IN AUTISM SPECTRUM DISORDER, OR A SIMILAR NEURODEVELOPMENTAL DISORDER,	)	
FRED AND MYLINDA KING, PARENTS OF JORDAN KING, A MINOR,	)	
Petitioners,	)	
v.	)	Docket No.: 03-584V
SECRETARY OF HEALTH AND HUMAN SERVICES,	)	
Respondent.	)	
GEORGE AND VICTORIA MEAD, PARENTS OF WILLIAM P. MEAN, A MINOR,	)	
Petitioners,	)	
v.	)	Docket No.: 03-215V
SECRETARY OF HEALTH AND HUMAN SERVICES,	)	
Respondent.	)	

Pages: 761 through 1016/1120

Place: Washington, D.C.

Date: May 14, 2008

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Courtroom 402
National Courts Building
717 Madison Place NW
Washington, D.C.

Wednesday,
May 14, 2008

The parties met, pursuant to notice of the Court, at 9:00 a.m.

BEFORE: HONORABLE PATRICIA E. CAMPBELL-SMITH
HONORABLE GEORGE L. HASTINGS, JR.
HONORABLE DENISE VOWELL
Special Masters

APPEARANCES:

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C O N T E N T S

E X H I B I T S

PETITIONERS' EXHIBITS:	IDENTIFIED	RECEIVED	DESCRIPTION
4	928	--	Menkes Child Neurology textbook

P R O C E E D I N G S

(9:00 a.m.)

SPECIAL MASTER CAMPBELL-SMITH: This is Special Master Campbell-Smith. We are back on the record in this second test case proceeding of the OAP. I understand that there is a brief matter that we need to take up preliminarily. We can do it on the record if counsel are prepared to do that.

MR. POWERS: Yes. Thank you, Special Master. I guess I should stand up here for the intercom. My name is Tom Powers. I'm one of the attorneys for the Petitioners in these two cases and the Petitioners' Steering Committee.

We became aware at 9:30 last night that there was an electronic filing of a new exhibit from Respondent into both of the individual King and Mead claims that are subject to this proceeding.

My understanding from conferring with Respondent's counsel is that this is material that is not anticipated to be introduced into evidence today, there will be no effort to use it from Respondent's perspective in cross-examination, they will not be bringing in any witnesses today to discuss the material. So for today we don't believe that there's any issue that's created by the late-night filing of

this new exhibit. This is Exhibit LL, I believe is the designation for the record.

We do, however, at some point if Exhibit LL is going to be discussed at trial, brought into evidence, we simply ask that the person who is the apparent author of this material appear for cross-examination so that we have an opportunity to explore the issues that are raised in the correspondence that is enclosed with Exhibit LL.

That really is the only issue that we have the Court is to alert the Court that at the point at which Respondent may want to use this, if they're going to be using it, we would want an opportunity to cross-examine the author.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Mr. Matanoski?

MR. MATANOSKI: Thank you, ma'am.

MR. POWERS: And Mr. Williams just reminded me, cross, and to use it in rebuttal, if they're going to be using it in their case.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

MR. MATANOSKI: Thank you, ma'am. I have a comment on that. I think it's ironic that Mr. Powers should take this opportunity to talk publicly on the record about a late filing when so far in this case,

as discussed off the record, there have been numerous instances of late filing, late opportunities for the Respondent to respond to matters brought up by Petitioners.

In fact, as the Court is well aware, the deadline for filing Petitioners' expert reports was in November of last year, and yet, in April of this year we received Dr. Kinsbourne's report for the first time well after that deadline, indeed, well after the Court's set deadline of March for rebuttal information, which of course this expert report did not include.

Just last week the Petitioners' Steering Committee filed with the Court 208 new medical articles, many of which were not on any topics previously discussed in this case. It again is ironic that these matters have been discussed. Oh, and yesterday, obviously, and the day before the witnesses were talking about matters that have not been discussed in their expert reports.

Indeed, yesterday the witness was discussing studies that he had been conducting and before which he had information back in the summer of 2007 but we were seeing for the first time yesterday.

So I just would observe that it's ironic

that after all these things have been transpiring with Petitioners' Steering Committee, and which we've been discussing off the record as to what kinds of different remedies or procedural changes might be occasioned by these surprises, that they should choose to speak on the record today about a one and a half page letter that they received from the author of a study that they primarily seem to be relying on at this time. Thank you.

SPECIAL MASTER CAMPBELL-SMITH: Thank you, counsel. And I can assure counsel that we are aware of the issues that both counsel have drawn to our attention.

At the appropriate time, as we have addressed during bench conferences with counsel that should counsel wish to make more formal motions addressing these matters, we would be happy to consider more formal objections or concerns that counsel have at that time.

Are there any further preliminary matters that we need to address this morning?

MR. POWERS: Not from the Petitioners.

MR. MATANOSKI: Nor Respondent.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Petitioners' counsel, are you ready to call your next

witness?

MR. POWERS: Yes, we are, Special Masters. The Petitioners call Dr. Marcel Kinsbourne.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Dr. Kinsbourne? Dr. Kinsbourne, please be seated. I'll let you get comfortable. If you could, stay to the rightmost of your seating area. It assists in helping all of us to see you.

MR. KINSBOURNE: Okay. It's about as far as I dare go.

SPECIAL MASTER CAMPBELL-SMITH: Okay. Thank you. Would you raise your right hand, please.

MR. KINSBOURNE: Yes, ma'am.

Whereupon,

MARCEL KINSBOURNE

having been duly sworn, was called as a witness and was examined and testified as follows:

SPECIAL MASTER CAMPBELL-SMITH: Thank you. To proceed, counsel.

MR. POWERS: Thank you, Special Masters.

DIRECT EXAMINATION

BY MR. POWERS:

Q Good morning, Dr. Kinsbourne.

A Good morning.

Q Are you all situated there and comfortable?

A I believe so.

Q Okay. And can you hear me okay across the room?

A Yes.

Q Excellent. I can hear you. I know that as we go on if this goes on for a bit I'll ask you to speak up so we can make a clear record.

A Certainly.

Q Great. I would like to start off just with a brief discussion of your qualifications. They're certainly described and summarized in your expert report and there's I believe a CV, but if you could just describe in summary what it is about your experience, training, skills and background that qualifies you to speak about the issues today?

A Yes, sir. Well, as you know, I am a pediatric neurologist and it is customary for people in my specialty and in many others to choose a specific focus within that specialty for their particular interest, both clinical and research. From the beginning, even during my training, I chose as focus mental development disorders in children.

In fact, while I was still a resident I published two articles on dyslexia. When I came to the U.S. to my associate professorship at Duke, I was

not only chief of the Division of Pediatric Neurology, but also, head of the Developmental Evaluation Clinic where we saw many children with diverse problems of development, including of course many children with various forms of autism and autistic spectrum disorder.

I formed a loose friendship with the folks over at UNC in the TEACCH program, T-E-A-C-C-H, which is a well-known program for autistic comp care and research, and I did co-author one article with them on a topic about it. When I came to Duke I became very interested in attention deficit disorder and saw many people and started an active research program which went on for many years and has not yet concluded.

In that practice, again, one saw many children who were perhaps ADHD, perhaps autistic at a high-functioning level, so the importance of these issues remained a focus for me.

SPECIAL MASTER CAMPBELL-SMITH: Just one moment, Dr. Kinsbourne.

THE WITNESS: Yes, ma'am.

SPECIAL MASTER CAMPBELL-SMITH: Intercall operator, are we having any difficulty?

(No response.)

SPECIAL MASTER CAMPBELL-SMITH: Is the

intercall operator there?

(No response.)

SPECIAL MASTER CAMPBELL-SMITH: It appears that we are having difficulty. Let's go off the record.

(Whereupon, a short recess was taken.)

SPECIAL MASTER CAMPBELL-SMITH: Petitioners' counsel to proceed.

MR. POWERS: Thank you, Special Master.

BY MR. POWERS:

Q So, Dr. Kinsbourne, we'll have an exercise in refocusing here after the technical interruption. You were describing your qualifications, and I believe what you were describing was your work at Duke when you were living in North Carolina. Is that where your story was interrupted?

A Right. I was actually about to move to Toronto.

Q To where?

A I was about to move to Toronto when the technical problem arose.

Q All right. So let's go ahead, and if you could pick up your testimony at that point?

A Yes, sir. So at Duke, as I say, I had particular interest in and experience into mental

disorders, including of course some autistic spectrum disorders.

When I moved to Toronto to be a professor of child neurology at University I ran a learning clinic, which was a very busy one in which, again, one saw the same kind of children, including autistic children, and published a lot of article on various issues of developmental disabilities. I then came back to this country as chief of the Division of Behavioral Neurology at the Eunice Kennedy Shriver Center.

Now my research and attached clinical work was entirely in developmental disabilities. I saw hundreds, perhaps thousands, of children in the 10, 11 years I was there. Also, because the Shriver Center is on the grounds of the Fernald State School for Mental Retardation and Developmental Disabilities, I consulted on those grounds with people and also in the Developmental Disability Clinic at that center.

Then during the 1980s I published two articles on autism. One of them was a presentation that I gave to an NIH panel on the topic which then were fashioned into an article. Now, as of the early 1970s, I was contributing my chapter to the *Menkes Textbook of Child Neurology*, and of course kept track of developments in the various developmental

disabilities for that purpose, and I have continued to do this.

In fact, about 10 months from now the chapters of the next edition are due, so I'm revving up to get up to speed for that 8th edition and my chapter in that volume.

Q So, Dr. Kinsbourne, when you say revving up, are you referring to going back and rereading all the current literature so that that 8th edition is truly up to date and reflects state of knowledge when it comes out?

A Yes. The challenge is to try to find those articles which are both most novel and yet accessible to the general child neurologist because it's impossible to encompass these enormous fields now in a chapter in one book. So it's really the task of the author to give key references which will then lead the interested reader to further information.

So it's a matter of selection as much as of simply looking at everything. At any rate, these are important inducements to keep my nose to the grindstone of being up to date in autism and other developmental areas. I also wrote two articles on a disorder that I called overfocusing, which with further study seems to us to be, as it were, at the

top of the autistic spectrum bordering on the normal range.

In a recently appeared article with colleagues at University of Connecticut we were able to show that on a questionnaire study there is actually an overfocusing factor which is present in otherwise normally functioning children and yet is present all the way down the parameter of severity in autistic individuals with severe disabilities.

So in the well-functioning end of the spectrum it seems like a child with some eccentricities and unusual predispositions, and yet, that same pattern is reflected quite intensely when one goes into undoubtedly autistic individual. That's an area of a special interest of mine.

Q And now given the work that you're talking about, doing the research, it sounds that your clinical practice has ended, is that correct?

A I say effectively. Effectively it really has. It's been sort of petering out over a while, and I've been getting really very much more busy in the last few years and I haven't really had time.

Q So is it fair to say that early in your career you put a large amount of time into clinical practice, had contact with thousands of children and

have now sort of replaced that workload to a large degree with research, book chapters, articles? Is that a fair statement?

A It is.

Q Okay. Anything else in your background, in your skills, your expertise, that you think can inform the Special Masters on the issues that we're talking about in these cases?

A Only the general statement that I've done a lot of behavioral research, research with children, with adults, with old people, with brain-injured adults, with brain-injured children.

I'm very accustomed to the methodologies involved, I'm very accustomed to reading the literature on this kind of issue, I have refereed for numerous medical and scientific journals. In my current university teaching I teach methodology and show students the elements of statistics, so I'm capable of reading the literature and understanding it and deploying critical interest to the extent of my domain as a neurologist.

Q Okay. So appreciating the opportunity to talk about your qualifications, let's go ahead and start getting into the substance of your testimony here today. I think a good starting point for that

would be your expert report. This is an expert report that was filed in April and shared with the Special Masters and shared with Respondent. Do you have a copy of that in front of you?

A I'm just checking. I don't see it here.

Q I know you have materials there. Just a moment. We'll get one over to you.

A Yes.

Q Well, as we look for that report, Dr. Kinsbourne, I think we can talk about the substance of it and get that started because I'm assuming as you sit here you're certainly prepared to testify about the substance of the report without the paper in front of you. Would that be fair?

A Yes, although I do have it right over there in my little bag. At any rate, please go ahead, sir.

Q Thank you. So, Dr. Kinsbourne, the very first section in your report is something called the scope of your report. I want to note that your report here is being offered for general causation and you're not offering an opinion in either one of the specific cases, either Jordan King's case or William Mead's case, is that correct?

A That is correct.

Q So when you say you're offering an expert

opinion on general causation could you describe for the Special Masters exactly what you mean by offering a report and an expert opinion on general causation as distinct from case-specific causation here?

A My understanding of the category is that one addresses whether a particular agent can inflict a particular injury, and then, as a separate matter, one addresses whether, indeed, it did in the particular case. I am only addressing the first of these issues, whether in principle the agent we're discussing can cause some forms of autism or autistic spectrum disorder.

I'm not giving any opinion about any individual, and I have not reviewed files of any individual case for that purpose.

Q And when we talk about the subject at issue, as you mentioned, as it says in your report, we're looking at thimerosal-containing vaccines, correct?

A Yes, sir.

Q And that is the subject of your report?

A Yes.

Q Can you describe for the Special Masters what exactly you mean by putting TCVs on the list of potential etiologies of autism in a differential diagnosis where other causes have been worked out?

I'm somewhat paraphrasing the expert opinion statement because the Special Masters have read it.

I was hoping you could explain exactly what you meant by framing your opinion that way.

A Yes. The thimerosal contains the element mercury, and I discuss evidence as to whether mercury in the brain can cause autistic behavior problems. If it is the case that mercury can do that, and I will explain why I think so, then any source of mercury should be on the list of environmental factors that should be considered among whatever other ones exist as potential causes of the autism in a particular child.

On that basis, thimerosal, which, as has been amply discussed, contains mercury, should be one of those sources to be considered as to whether it, given all its toxicological properties, would be one of the forms of delivery of mercury which should be considered as potential causes.

Q And one of the reasons it would be considered as a potential cause is that you do believe to a reasonable degree of medical certainty that mercury can induce neuroinflammation and result in autistic symptoms, correct?

A And that, in summary, is the gist of what I

say in my report, yes.

Q Okay. Great. Well, let's talk about the different components of your report. You begin by talking about the autism spectrum disorder and particularly about regressive autism. Could you describe just briefly what you mean when you say autism spectrum disorder and particularly as how you would distinguish regressive autism from the other types of categories of spectrum disorders that would be included? Could you describe that?

A Yes. Actually, the autistic spectrum is really defined more along a dimension of severity than it is on a dimension that includes a question of, was the condition one that gradually emerged as the infant got older, which is the majority of cases, or was it one in which the infant apparently developed normally or nearly so and then fairly precipitously over weeks or a few months, typically in the second year of life, became autistic, okay?

Now, it is my clinical impression that the regressive type of autism tends to be cases among the more severe type. So, for example, I am not persuaded that Asperger's disease, which is one of the high functioning ones, is a consequence of a regression. If it is, I'm not aware of that. So the spectrum is a

formula of to this difference between, as it were, congenital versus regressive.

Q And so the main distinction between what would be called regressive autism and other autism spectrum disorders, it's not the types of symptoms that appear, is that correct?

A That's correct. In fact, most studies have not found very important differences in the outcome between children whose autism gradually emerges and becomes more and more clear, which is the usual situation, and children who regress into such a state.

Some articles have found that the regressive ones on average end up a bit more lower functioning or severe and others have not found that, but qualitatively, there is no difference in the pattern of disabilities or abnormal behaviors.

Q In regressive autism, what characterizes that is a period of normal, typical development that is followed by the appearance of symptoms, so it's the time course of regression that makes it distinct, is that fair?

A Correct, except with the proviso that development doesn't have to be talking normal. Another way of putting it is to say that for the first period of time, say a year or 15 months, there was no

evidence of autistic disorders. Now, a child who is developing slowly isn't invaluable to whatever causes the regression. It isn't that the autism gradually comes to the fore until the second year of life and sometimes later.

Q Now, in your paper, and you sort of alluded to it now, the majority of cases begin with symptoms of autism fairly early in life and then progress on a continuum, and regression is a minority of those cases.

A Right, and the important point is that it's rather dramatic, that the child has achieved certain milestones and amazingly somehow isn't doing what he or she could do not long before. Now, it's much more common to have some children be slow developers and then one doesn't quite know: Will they catch up? Will they have a mental growth spurt?

Actually, to lose skills you already have, that's something that really doesn't happen at all in most other developmental disorders. I mean, children with dyslexia don't begin to be able to read and then stop, for example. So that is, at least from the parents' point of view, a really rather startling and perplexing situation. Certainly draws attention to itself.

Q And not only from the parents' point of view, but presumably from a treating pediatrician's point of view, correct?

A Should. It should do, yes.

Q Right. Now, in your report in discussing what percentage of autistic children fall into this regressive category on page 5 you describe 20 to 40 percent, at another point 20 to 30. We've heard numbers of 10 to 20, numbers as low as 6 percent. What can you tell the Special Masters to help them reconcile these various percentages that are attributed to regressive autism?

A Well, I'm not sure that I can persuade the Master how to reconcile when different sources give different figures and the figures are always approximate. I mean, the majority (phonetic) says 32.5, you know? These are ranges. My best understanding of it is that it's not always clear-cut.

The criteria for saying this is where congenital finishes and this is where aggressive begins vary. Some studies simply look for a child stopping saying some words that he or she could say. Others have a stricter criteria. They also look for a change in play patterns, a change in socialization, for example.

Actually, Respondent's expert, Sir Michael Latter, has a very good discussion in his report of the issues in classification of regressive autism.

If one were to speak of the really clear-cut cases where you have significant amount of language and it really goes and doesn't come back for many months or years, or the child who has been playing in a normal, active, curious fashion now starts just lining everything up over and over again. A child who is interested when his mother approaches, father comes in through the door, a sibling comes and play sort of ignores and looks by people and keeps doing whatever he or she is doing, if you take as a clear-cut case like that, then it will be a lower percentage.

Q And do you have an idea of how low? Twenty percent? Ten percent?

A I think it probably would be below 20, but I'm just describing this. What I'm saying is that the reason for the different approximations I believe is really a different subjective impression of what it takes to be classified as regressive. Having said this, when a child is clearly regressive, that's very clear. This is not a challenge to the category, just, like everything else in biology, there is really a continuum.

Q Now, you just mentioned just now that regression can be very clear and you also described earlier that it could be dramatic. I know that there's a discussion in your report about the incidence of autism in the general population, and you describe the role of the regressive subtype of autism within there as telling us something about the incidence of autism. Could you describe that?

A Yes. As everybody knows nowadays, the diagnosis of autism is made immeasurably, well, not immeasurably but dramatically, more frequently now. Some say 20 years ago maybe one or two children in 10,000. It was thought to be a rare condition. Now, as we've already heard in this hearing, the figure given in this country is one in 150.

Now, that is an enormous increase. Now, other diseases have also increased in diagnosis. Asthma has increased, for example, certain connective tissue disorders have increased, ADHS has increased. Nothing like as dramatically as the diagnosis of autism.

Now, when that happens it is legitimate to ask are we seeing a biologically-based increase in a disease, or have diagnostic habits changed, have criteria changed, have we become more alert to the

possibility of such children being around, are we finding them more efficiently? These are all very legitimate questions, in my opinion.

And there's another suggestion as being what's called diagnostic substitution, that a child that might have been called something else, say mentally retarded but having some autistic features, might not be called autistic but retarded. You know, you could sort of shift the label without changing the case.

And I'm sure all of this happens, and I have little doubt that it accounts for some of the increase. I find it hard to believe that it accounts for such an enormous increase, however. In thinking about this it's usual to think of regressive autism as a case in point. When a child loses skills in this rather dramatic way, as we're discussing, it's really hard to think of diagnostic substitution because mentally retarded children don't do that.

You can't really confuse it with any -- there are one or two rare entities which I mention in my report where you do get some regression but nothing that could account for any of these numbers. If it's a matter of not having noticed or thinking that the child was actually just a bit eccentric, a bit odd,

that can be applied to some children, the milder cases, but this regression is noticeable, in my opinion.

If it were just a matter of being more alert, I think that would have less inference of the incidence of regression for reasons I've explained than on classifying children who don't develop quite correctly and behave in certain ways.

So thinking of this and yet noting that reports say that the proportion of autistic children of the regressive subtype has more or less stayed the same over decades tells me that the regressive subtype has become enormously more frequent. I don't see how that can be fully accounted for by these other nonbiological factors.

Q Now, Dr. Kinsbourne, what you're talking about is a perspective from somebody with clinical practice and research in the field of autism. You're not an epidemiologist?

A No, and I'm not making epidemiological statements. I'm making more statements of ascertainment and diagnosis.

Q And in fact in your report you specifically leave it to the epidemiologists to discuss population studies that are tracking the incidence of autism

spectrum disorder?

A I do so gladly.

Q Do you have to go back to school and start a new course of study to be able to testify effectively on that issue?

A Well, it's an option which I will consider now that you brought it up, yes.

Q So I want to move on to talk about the second topic of your report and that's this idea that there are genetic and environmental factors that combine across the population to produce autism spectrum disorder. Do you recall that section of the report?

A Yes, I do.

Q Now, there's no doubt, is there, Dr. Kinsbourne, that there's a significant genetic contribution to autism spectrum disorder? Is that a fair statement?

A No doubt whatever.

Q And how do we know that? How do we know there's a significant genetic contribution?

A Well, there a variety of sources of evidence. One that's most usually quoted because it's the most clear-cut is the study of twins. As the Court I'm sure knows, there are two types of twins.

They are monozygotic or identical and dizygotic or nonidentical.

From the objective point of view, that means that in the first case, the monozygotic, they will actually have the same genome. They will have the same pattern of genes. In the second case, that pattern will only be 50 percent similar. No different from just a brother or a sister not born at the same time.

Now, the methodology is that to the extent that the disorder is considered to be genetic, to that extent if one twin has it, the probability the other one also has it will vary such that if one twin of a monozygotic pair has the disorder and it's fully genetic, you would expect the other one to have it, too.

Q And is that concordance?

A That is concordance. That is a high concordance.

Q And there are studies that have been done to look at concordance rates?

A Absolutely. However, in the dizygotic case you actually find normal concordance and within brother and sister of different ages, okay? So in the highly genetic disorder there is a big gulf, and in

autism there is a big gulf. There are actually two ways in which it has been looked at.

One is looking at the strict occurrence of autism in the second twin if there was autism in the first. There, the concordance was about 60 percent in typical figure.

If you admit what's called a broader phenotype or spectrum so that you say one of the siblings of the twins is autistic, the other one isn't exactly autistic but has some other problems, other disorders that have a similar flavor or have some family resemblance, if you look at that, it's 90 percent. So there is absolutely a powerful genetic factor involved.

Q Even given the strength of the genetic factor and even given concordance studies, you still have a range of say 10 percent to 40 percent of autism cases, even between these twins, that are unexplained by the genetics. There would have to be something else involved, is that correct?

A That is true.

Q And if it's not genetics that's determining the symptomatic outcome of these children, it would have to almost by definition be something in the environment, correct?

A There are of course two kinds of other kinds. One would be some damage. You know, maybe one twin had a rougher birth than the other. You know, there are some intercurrent factors to be considered and they do occur. The other is that there may be environmental which, as it were, trigger a strong susceptibility into a clinical actuality.

Now, the thing that I like to present to the Court is this, that when you have a high concordance between two twins, that doesn't show that genes do the whole job. It may be that the concordance is not for a gene which causes autism just like that but a gene that makes them susceptible to an environmental factor which when encountered will lead to autism.

That's called gene environment interaction. So if the twins are identical they will both have this so-called susceptibility gene, and then when they both encounter the same challenge they will both succumb. Whereas, if it's a dizygotic pair, the one individual may, indeed, have the gene and succumb but the other one is quite likely not to, and there you'll see a much lower concordance.

Now, this concert of gene environment interaction is now very generally accepted, it's researched, there are meetings organized by NIH on the

question of environmental factors without in the least minimizing the importance of the genetic part of the matter.

Q And, Dr. Kinsbourne, do we now know of specific environmental factors that can lead to the appearance of autism in children? Are you aware of any?

A Yes. There are a variety of events that can cause autism and it may be that some of them cause autism without susceptibility, but more likely they cause autism in susceptible people.

It's well-known that thalidomide, the toxin which was inadvertently given to pregnant women in Europe to control severe vomiting during pregnancy, and did control it, and nobody had the least idea that the children would then be damaged if was given at a certain point in time during the pregnancy. There was a high incidence of autism among those children.

Not 100 percent. Even there you have the variability. That's one. The antiepileptic agent dilantin, valproic acid, is known to cause autism at certain times. It's been long known that if the mother has a rubella, a German measles infection, during pregnancy that there is a considerable risk of autism.

There are one or two other factors, but those factors exist. It's also the case that less commonly disease happening after birth can cause autism. There have been a number of case reports of children who have had what is called herpes encephalitis, an infection of the brain with the herpes virus, which caused autistic syndromes.

Effectively, the child was autistic. There was one well-known study by Bob DeLong who used to be a colleague of mine presenting two children. They were quite young, I forget the age, who had herpes encephalitis, both became autistic. In that case, actually, both then got better. Then Dr. Gilberg from Sweden has published some cases of much older children, I forget the age, age seven, eight and nine, who became autistic.

These are rare events, but it simply underlines what everybody agrees now which is that there are diverse causes for autism even when you can't tell that by looking at the child. In other words, this is called a functional convergence. Many different causes may converge to the same clinical appearances.

So when you see the child you can't say, ah, this must be one of those.

Q And one quick note. Some of the environmental causes you were describing are prenatal, in utero exposures, correct?

A Right.

Q And some of them are postnatal exposures?

A Correct.

Q But whether prenatal or postnatal, they would all fall in the category of a nongenetic contributing factor to autism, correct?

A Right.

Q We're going to move on and talk about mercury in the brain. Before we even do that just, again, to make clear, the scope of your testimony and expertise here. You're not a toxicologist. We already heard from a heavy metals toxicology expert, correct?

A Yes, sir.

Q You're here to talk primarily about the childhood neurology and what goes on in the brain once mercury is in the brain. Is that how you understand the scope of your testimony?

A Not primarily, exclusively. I mean, I do intend to stay within my domain of expertise.

Q Okay. So before we get into the description of the mechanism again that the Special Masters have

read and to talk about neuroinflammation, I would just like you to give a quick description of the type of brain structures we're going to be talking about because there are different cells that we're speaking about that do different things.

We've heard a lot of this scattered through the literature so far. If you could sort of sum up for the Special Masters those issues of brain structure and function that are relevant to your opinion?

A Yes, sir. Relevant to our discussion are three types of cells in the brain: the neurons that do the actual work, the control functions, of the brain; the astrocytes, star-shaped cells which have a variety of what we might call caretaker functions that I will come back to and explain; then our connective tissue cells in the rest of the body; and then there are the microglia, which are part of what is called the innate immune system; and the like cells called macrophages in the rest of the body.

Now, I'd like to first talk about the structure where a neuron communicates to another neuron because that's basically what the brain does is for the brain mostly talks to itself. Neurons talk to other neurons, and at times they get information from

the outside world in one or other way or send orders out.

As I'm sure the Court knows, when neurons communicate with each other they do so by what is called a chemical messenger, namely a neurotransmitter, because the neurons aren't continuous with each other like an electrical circuit. They have discontinuities which are bridged chemically. They're called synapses.

At the presynaptic end, where impulse is coming from, there are structures which release the neurotransmitter in question. That chemical diffuses into the synaptic cleft, that very tiny structure of fluid medium, and then the molecules that impact the postsynaptic surface of the other neuron have receptor sites sensitive to that chemical.

So the neurotransmitter leaves the presynaptic end of the transmitting neuron, attaches to the receptor surface of the receiving neuron, and there, in one of several mechanisms, stimulates a further impasse. Now, it is important from the point of view of the survival of the brain not only to send these messages but to control the amount of chemical which actually passes.

So around the synapse there are devices to

mop up those chemicals which didn't make it to the receptor surfaces but diffused in various directions. Why is it adaptive? Well, if they diffuse, they might stimulate other synapses uncalled for and blur the message, for example.

In one case it's even more important than that because in the case of glutamate, which is my main topic in my discussion, it's actually dangerous. If too much glutamate escapes from synapsis it can actually damage neurons, make them fire too much causing seizures or even kill them. That's call excitotoxicity. Now, I'll come back to that.

Now, some synapses have enzymes in the synapse which break down the spare, unused neurotransmitter, but more pertinent to my discussion are other synapses which have what are called receptor -- they have transporters. They have structures which pick up the spare molecules and return them to the neuron. So it's like you're recycling.

So the transporter sites are devices which hold down the total amount of neurotransmission. There are transporter sites on many neurons. Interestingly enough, there are also transporter sites for glutamate on the astrocytes. These glial connective tissue cells have a caretaker function.

They mop up spare glutamate.

As I have described to the Court on another occasion, actually, the astrocytes are wrapped around the synapse almost like a basket, and, as the glutamate diffuses, the reuptake areas on the astrocytes reabsorb the glutamate and ideally then pass it back to the neuron subsequently for later use.

So in this way what is maintained is called homeostasis. Just the right balance of enough glutamate to send the message but not so much that it spills and causes mischief. Also, it's an economy to save not having to manufacture more than is necessary.

Now, again, just making the salient points for our discussion in among an enormously more complex situation, the microglia are cells which when dormant, when not doing anything, don't do anything. That's different from the neurons and astrocytes that are always doing something.

All neurons always fire. It's just a matter of the rate at which they're going to fire. The astrocytes do the work collaterally. The microglia do nothing until there is a challenge, until some invader, some invading agent enters the vicinity, is detected chemically by the astrocyte and classified as a potentially threatening substance.

That then causes what is called microglial activation. The microglia undergo chemical changes, they swell. They often manage to engulf the invader. It could be a virus, it could be, pertinent to our discussion, a small amount of a heavy metal. Whatever it is, the microglia isn't specifically sensitive to one kind of invader.

If there's something that shouldn't be there, the microglia may internalize it. The microglia also emit a number of chemicals called cytokines, and many of the cytokines are called proinflammatory cytokines, meaning they cause inflammation.

What they are doing of course is to squirt defensive chemicals at the invader, which in evolution mostly would be the bacterium, really, to basically kill it. But, as I say, the microglia don't discern what exactly it is, they just fire. Among the agents that the microglia release are what are called reactive oxygen species, forms of oxygen which in fact cause oxidative stress, which was explained in great detail to the Court by Dr. Deth yesterday.

As he did explain, and as I have in my report, these are substances that are apt to damage any cell in the vicinity as well as the invader. So

there is an issue of friendly fire. If the invader is quickly dealt with and none is left, well, there's inflammation, as it were, for a while, just if you scratch yourself on the skin, but it goes away.

If the invader is still there in spite of what the microglia are doing, then we can get a chronic continuous outpouring of these cytokines and other agents that can now be damaging to astrocytes and damaging to neurons.

Q And so, Dr. Kinsbourne, the idea would be is if there's this persistent invader so to speak the microglia continue to recognize it and just keep pounding away with their inflammatory response, correct?

A That's correct.

Q And so you get a condition where you have an ongoing chronic process, is that right?

A Yes.

Q And that ongoing chronic process is releasing cytokines and reactive oxygen species? That's ongoing?

A Well, that is ongoing in those situations.

Q When proinflammatory cytokines and reactive oxygen species are being released in a chronic way, you're describing that can actually damage the

structure as well as the function of neighboring cells?

A Yes. It actually particularly apt to damage the astrocytes.

Q Why is that?

A Ultimately, one would have to ask that question of nature and nature isn't forthcoming, but the fact is that the astrocytes are quite vulnerable to being attacked by this friendly fire, including, in a particular way that's pertinent from my perspective on the matter, which is that the attack from the microglia impair the astrocytes' ability to scavenge glutamate.

In other words, they block the transporter on the astrocyte and actually also cause the astrocyte to release more glutamate as opposed to take it out.

Q So this is sort of a vicious cycle rather than a virtuous cycle that results?

A It sounds vicious, yes. Definitely. So this actually happens even at the stage when the neurons are not yet materially damaged. So the effects of this microglia activation on neurons is often mediated by the effect on the astrocytes. They seem to be first in the firing line.

So if the astrocytes are no longer

scavenging the glutamate, then the glutamate is able to accumulate and spill over. So what will then happen is that glutamatergic cells will fire more than they could/should, meaning more than is called for by the particular situation, and also that more of them will fire because of the spilling to enabling synapses.

So you're going to get a general excitation of the brain, a higher excitation level of many parts of the brain.

Q And that higher excitation level is a result of this excess of glutamate, which is an excitatory neurotransmitter?

A Right. Now, and then the next step that can happen is that the excitation of certain neurons is so great it kills them, and that's called excitotoxicity. It's called excitotoxicity. So you have the excito, which I've described, and then if it's too intense it's actually toxic to the neuron that receives the glutamate and kills the neuron.

It's a very well-known phenomenon and it occurs in numerous disorders. None of this happens in just one disease. This is a rather general mechanism. Now, in the brain, the brain is so organized as to maintain the level of excitation within boundaries.

One of the ways it happens is that there is of course also in the brain inhibition. So there are, whereas the glutamate, which is a very frequently seen neurotransmitter, is excitatory, there are neurotransmitters which are inhibitory. And GABA, G-A-B-A, is the main one that's spoken about.

There's a thing called the glutamate/gaba ratio which basically decides the level of general excitation in the brain. So there tends to be a certain amount of homeostasis and it's kept within certain bounds, but, as one perceives, if the glutamate is out of control in the way I've described, then excitation goes up and the excitatory level in the brain increases.

Well, how could that be held in balance? Only if the gaba also goes up to sort of track it and that, to some extent, can happen. As Dr. Deth explained yesterday, the mechanism that he was discussing with the D4 receptor sites, if the Court recalls, and the D4 receptor sites, I think he pointed out, project onto GABAergic neurons, neurons that produce GABA, and impair the production of GABA.

So the ability of the inhibitory cells to keep up with the increasing level excitation is limited. So overall, there's going to be an

overexcitation, overactivation of the brain.

Q And ultimately, Dr. Kinsbourne, is it true that the astrocytes not just being impaired can actually die, is that correct?

A Yes. The astrocytes, again -- see what happens typically is that if the immune challenge continues there actually is an increase in the number of microglia.

Q So let me interrupt. Now, you've talked about the microglia that are there change their size and get larger, correct?

A Right, right. They can actually multiply if the situation continues.

Q And is that proliferation?

A Yes. They proliferate, there are more of them, because there's more work for them to do.

Q So there's actually three things that are going on with the microglia. There's the activation of the microglia, proliferation of microglia and then those new microglia, so to speak, are active, also, is that correct?

A Right, and then they will do the same thing. Now, the astrocytes are then bombarded in the way that I've described and over time they will die. They will be apt to fall out one after the other. When they die

they leave a typical appearance called gliosis, which is analogous to a scar on the body.

So it's just like some dead material, which is the traces that there were astrocytes which are glial cells, were there, so that over numerous years what one will tend to see would be an increase in microglia, a decrease in astrocytes, the appearance of gliosis and in severe cases also loss of neurons.

That's the simple statement of the complete picture. Just to refer you to a source, among the articles submitted was one by Lopez-Hurtado.

MR. POWERS: And let's go ahead and put that up, Scott. For the record, also, this is Petitioners' Master Reference List No. 0446. Scott, if you could just blow up the title.

BY MR. POWERS:

Q Dr. Kinsbourne, is this the article you're talking about? It's entitled *A Microscopic Study of Language-Related Cortex in Autism*.

A Yes, it is.

Q And this is a study that I think has been discussed earlier, but it involves an analysis of autopsied brains of people who had autism, is that correct?

A I actually don't recall that it was

discussed earlier, but at any rate, if I may discuss it briefly?

Q Yes, please.

SPECIAL MASTER CAMPBELL-SMITH: Pardon me, Dr. Kinsbourne. I'm just going to ask Mr. Powers that we would give Dr. Kinsbourne an opportunity first to describe what he recognizes about the article.

MR. POWERS: So, Dr. Kinsbourne, you see in front of you a screen and on that screen is an exhibit that's been marked 0446. Could you describe for the Special Masters and for the record what that is?

THE WITNESS: You see, I'm in the throes of an approach/withdrawal conflict. I like to look over there to read this. That takes me away from the edge that the Court has told me to occupy. Then I have to move these things. So I'm juggling for a moment.

SPECIAL MASTER CAMPBELL-SMITH: Okay.

THE WITNESS: This was a study of brains taken from a bank of, you know, an official repository of brains from autistic individuals who died for various reasons. These investigators decided to focus on a particular area of the cerebral hemispheres, namely the area that subserves language.

That was a reasonable choice because, as the Court knows, problems with language are particularly

salient in many autistic individual, most of them. So they thought they'd look at language-related cortex, and that is what they did.

Now, what they found in brief was the situation I just alluded to, a proliferation of microglia, a diminution of the density of astrocytes, the presence of gliosis and some loss of neurons. Interestingly enough, they looked at an age range between seven and 44 I believe, a wide age range, and they found that the older the age of the person when they died, the more striking those changes were.

So it seemed as if an ongoing process over all these years gradually increased the number of microglia, knocked out astrocytes, and finally, knocked out neurons, too. So this is more likely towards the end point of a long process which began apparently by some challenge to the microglia many, many years earlier.

MR. POWERS: And, Dr. Kinsbourne, if we could look at page 11 of the exhibit.

Scott, we're looking at page 11 of 16 of the exhibit that's still in front of you. On the text of the study it's page 140 but the exhibit number is 11. Scott, if you could blow up the highlight portion at the bottom of the left column and going up to the top

of the right-hand column?

BY MR. POWERS:

Q Now, Dr. Kinsbourne, take a look at that. I'm not going to ask you to read it, read it out loud that is. Take a look at that and describe for the Special Masters why that's significant to you.

A Well, these sentences do refer to the proliferation and this hypertrophy, the swelling, and what's called the reactive gliosis, the gliosis that was caused as a reaction to the death of the astrocytes.

Q And so I just wanted to make clear that when they're talking about the gliosis here, they're talking about astrocyte death?

A Yes, yes. When neurons die they don't leave gliosis, astrocytes do.

Q Anything else in that section, Dr. Kinsbourne, that you find significant that you'd want to share with the Special Masters?

A Not really. I mean, the interesting thing is that there are actually more glial, and yet, more glial have died, so it's like sending in more troops.

MR. POWERS: All right. So, Scott, if you could pull that down and we're going to look on that same page, which is page 11 of the exhibit, page 140

of the article, there's another section. Thank you.

BY MR. POWERS:

Q So, Dr. Kinsbourne, take just a second and take a look at that. Again, we're not going to read it into the record since the Special Masters have this, but if you could explain the significance?

A Well, the point made here is that what they see would be compatible with the effect of a toxin on the brain.

They point out that indeed, particularly metals, as they say, such as lead, iron and mercury, are known specifically to cause glial proliferation, which we discussed and which was seen. And they point out that metals have this toxic effect to increase oxidative stress, and indeed they cite evidence that both increased metals and increased oxidative stress are reported in autism. So they are saying that this is one way of explaining what they saw.

Q And then, Dr. Kinsbourne, in the discussions in this paper of glial cells and gliosis, is that consistent with your description in your report and your testimony of the neuroinflammatory process?

A Absolutely. Yeah.

Q So this is autopsy evidence that supports not just that it's a conceptual idea but that it

actually happens in the human brain?

A That is correct.

MR. POWERS: Okay. Just pull that down.

BY MR. POWERS:

Q And we're going to keep talking primarily about neuroinflammation, Dr. Kinsbourne, but as a quick note, in your report you do describe your review of the literature and your citations to the literature that describe how inorganic mercury in the brain is related to this process. Do you recall that discussion in your report?

A I do. I'd like to preface that by a more general statement about neuroinflammation. There are numerous different causes that could send up neuroinflammation. The first point is that when you look at the inflammation you can't tell what the cause was. You have to separately look for the causative agent and see if you can find it.

Now, the causative agents fall into three categories. One category is viruses, namely neurotropic, neuropathic viruses that have the capability of staying for long periods of time.

The second category is toxins, the specific toxins of which heavy metals are mostly mentioned and that include mercury, although there are other ones,

and I think we discussed terbutaline at some point earlier in the hearing which is obviously not a metal and nonetheless is related to neuroinflammation by some research.

The third category is neurodegeneration, and I want to explain that for a moment. One of the situations in which microglial cells detect an unfamiliar agent in the vicinity is if cells are actually breaking down and emptying out their contents.

Now, for the neuroglia, those contents are new, they haven't previously experienced them, so the neuroglia might react to the contents of breaking up cells as if they were invaders. That is why particularly in the well-known diseases of Alzheimer's disease and Parkinsonism in which neurons break down there is neuroinflammation thought to be secondary to the neurons spilling their contents and the microglia reacting to that spillage.

So when one is looking for the causes of neuroinflammation in a given case one of the things to look for is a neurodegenerative disease. That's on the list of differential. You would look for viruses, though of other type described, and you would look for toxins that are known to potentially have this kind of

effect.

Q And so what you're talking about here is if you're looking at a child with autism and you're considering thimerosal-containing vaccines and that differential diagnosis you would be looking at the first stage to rule out other causes of neuroinflammation, is that right?

A Yes, and there are a number of them.

Q So assuming those are then ruled out, thimerosal-containing vaccines, in your expert opinion, ought to be on the list for consideration as to what might be causing the neuroinflammation?

A Right. Indeed, any form of mercury, however delivered, should be considered.

Q And in these cases, as you describe in your report, we're talking in particular about the inorganic form of mercury? It's been referred to as HG++.

A Correct.

Q And that's what you're talking about in your report, correct?

A Yes, sir.

Q And is it your belief to a reasonable degree of medical certainty that thimerosal-containing vaccines in fact deliver inorganic mercury to the

brain?

A Yes.

Q What's the basis for that opinion, understanding that you're not a metals toxicologist?

A Right, I'm not. My understanding is, and I think it was effective in discussions, you know, around the testimony of Dr. Aposhian, but it is that, as is well-known, thimerosal is 49 percent ethyl mercury and ethyl mercury is transported. When it enters the body, some of it does go into the brain.

The ethyl part of the molecule makes that possible. However, in the brain the ethyl is broken off gradually from the metal itself, and now the metal has no way to get out again so it stays, and it stays probably for years, for all we know, indefinitely. It's like the roach motel, you know? You check in, you don't check out.

(Laughter.)

I understand from toxicologists that really all of us have some amount of mercury because there are ambient sources from factory fumes, and from dental amalgams and from fish, you know, there are all these sources of mercury.

So the notion that inorganic mercury, once the mercury is delivered in a vehicle that can bring

it into the brain, is apt to accumulate there is not welcome (phonetic) controversially, as far as I can tell.

Q And it's your expert testimony to a reasonable degree of medical certainty that the inorganic mercury in the brain that could be delivered by thimerosal-containing vaccines is an agent of neuroinflammation, correct?

A It could indeed cause the inflammation, just like mercury of any other kind could.

Q Now, in causing neuroinflammation, neuroinflammation is not by definition autism, is it?

A Not by definition.

Q Neuroinflammation itself doesn't define autism, does it?

A No, no.

Q So could you explain to the Special Masters then really sort of the, I would describe it as the last component of your model or mechanism of injury here whereby neuroinflammation might express itself as the symptoms of regressive autism?

A Well, actually, that's the part I enjoy most, but I'd like to before that perhaps to present to the Special Masters some evidence that mercury in fact has an effect that leads me to believe it can

cause neuroinflammation by the glutamate route.

MR. POWERS: Right, we should do that, and I think we're going to refer to a couple of articles here. I'll ask Scott if you could pull them up. The first one that we're going to pull up is, let me make sure I get the exhibit number correct for you, this would be Petitioners' Master Reference List Exhibit 0570.

BY MR. POWERS:

Q Dr. Kinsbourne, do you see that on your screen?

A Yes. That's Dr. Aschner's article.

Q Okay. Do you need a paper copy, also, or are you comfortable working off the screen there?

A I am, actually. Yeah. So far I'm fine. Please go ahead.

Q Okay. Great. So you see the exhibit on the screen in front of you. Can you identify for the Special Masters and for the record what that is that you're looking at on that exhibit? It's a medical article.

A Yes. The title is *Involvement of Glutamate and Reactive Oxygen Species in Methyl Found Mercury Neurotoxicity*.

Q Now, in general, before looking at any

passages in that article, can you describe for the Special Masters why this particular article is significant to you and why you're including it in your testimony?

A Yes. Well, first of all, Dr. Aschner is a neurotoxicologist and he's particularly well-credentialed and respected one. Secondly, he has taken up the particular question of how it is that mercury becomes neurotoxic. What is the mechanism by which it does that? He's mentioning two things: glutamate and reactive oxygen species.

Now, the reactive oxygen species was discussed yesterday by Dr. Deth. I would like to focus on the glutamate part. I think in quotations to come we will see what Dr. Aschner says about the role of glutamate in that process.

MR. POWERS: Yes. And let's go ahead and look at the relevant passages here, the ones that you have identified as significant. On page 2 of the exhibit, Scott, there's a highlighted section there that let's go ahead and blow up.

BY MR. POWERS:

Q If you could take a look at that, Dr. Kinsbourne, and as we've done here not read it aloud but just explain the significance of this section to

your opinion.

A Right. The methyl mercury here has in fact the property that I've referred to of inhibiting the uptake of glutamate by the astrocytes thereby increasing glutamate concentrations in the external fluid. The -- glutamate is now bathing the neurons to an excessive extent and sensitizing them to excitotoxic injury, which is specifically what I described.

So Dr. Aschner is stressing that this organic mercury compound really is apt to increase glutamate to its toxic effect, which then leads me to think of it in line with other agents, such as viruses, as a realistic cause of overactivation of the brain, to which I will come back in a moment.

Q And we should make a note here that Dr. Aschner's paper, this review paper, is talking about methyl mercury in particular, correct?

A Yes.

Q So in this paper he's not distinguishing between methyl mercury and its inorganic HG++ byproduct, is that right?

A That's true.

Q Does that make a difference in your opinion in terms of the neuroinflammatory process that's

induced?

A No, because, as we have said, we're really thinking of the mercury itself.

Q Okay. So let's go ahead and look at page 4 of the exhibit, please.

SPECIAL MASTER HASTINGS: Mr. Powers, before we go on to that, let me just note for the record that the sentence you were referring to in the right-hand column is the sentence that begins with the small letter *c*, the one sentence that begins with methyl mercury. Go ahead now.

While I agree we don't want to read a long paragraph, we need to identify it somewhat so when we go back and read the transcript here we know which section of the page he's talking about.

MR. POWERS: Okay. I'll sort of try to take the lead with Dr. Kinsbourne and focus him and make the record really clear. I appreciate that.

SPECIAL MASTER HASTINGS: That would be wonderful.

MR. POWERS: So if we could, Scott, pull down that section and move on to page 4 of the exhibit. Now, there's a very long section, basically the second half of the left column on page 4 of the exhibit, has been highlighted. So if we could just,

Scott, zoom in to the very first half of that. Maybe a little bit less than that.

The first full sentence, which would go up to where the footnote that says 46. Yes. Correct.

BY MR. POWERS:

Q So, Dr. Kinsbourne, we're now looking at the first full sentence of the highlighted section on page 4. Take a look at that and again explain the significance of that to the Special Masters.

A Yes. It says that the methyl mercury inhibits the astrocyte glutamate transporter, so the astrocytes don't take up the glutamate they should.

Therefore, there's more left on the outside, leads to increased glutamate concentrations in the extracellular fluid, the fluid around the cell, and that hyper activates certain glutamate receptors, namely the so-called NMDA receptors, and by hyperactivating them it admits sodium and calcium ions to go into the cell.

That's actually of importance because if too much calcium goes in, the cell dies. That's a way of understanding the excitotoxicity aspect. Calcium has a critical role in the transmission of the nerve impasse but not if it's there in excess.

MR. POWERS: Okay. Now, we're going to move

on to the next section. Scott, I'll appreciate your skill here. We're going to begin with the word "increase." It's the next full sentence after the one you highlighted. We're going to go down that full sentence to footnote 17 and 18. You got it. Thank you.

BY MR. POWERS:

Q So, Dr. Kinsbourne, take a look at that. It's the second full sentence in the highlighted section on page 4 of the exhibit.

A Yes. It actually takes that point further and says if you increase the calcium levels in the neuron then you are generating reactive oxygen species, those dangerous forms of oxygen that we referred to before.

Q Excuse me. When you say referred to before, that was in your testimony?

A Well, referred to I think by Dr. Deth, but anyhow, I have also already mentioned them. These are well-known forms of oxygen which cause oxidative stress and injure the metabolic function of cells.

MR. POWERS: And in fact Scott, if you could go to the next section, the very next sentence beginning this ROS formation.

BY MR. POWERS:

Q Dr. Kinsbourne, does that complete the thought on reactive oxygen species?

A Yes. It just goes on to talk about what the ROS then does to the mitochondria, which are in the central part of the metabolic workings of the cells, and it says overproduction of reactive oxygen species mediated, at least in part, by glutamate. So it brings us back to the glutamate as being the mediator of this potentially dangerous situation.

Q And when you say glutamate is the mediator, glutamate is the excitotoxic or the excitatory functional neurotransmitter?

A Right.

Q Okay. So let's go ahead and pull this article down. I know there's another piece of work by Dr. Aschner that we should discuss. This is going to be Petitioners' Master Reference No. 0568. We'll pause here and let that come up on the screen. So, Dr. Kinsbourne, in front of you do you see the exhibit on the screen, and if you do, could you go ahead and describe for the record what that is?

A Yes. The article is called *Methyl Found Mercury Alters Glutamate Transport in Astrocytes*, and it's by Dr. Aschner and others.

Q Okay. What's the significance of this

particular journal article to you?

A Well, actually, this is the same point that we already made in the other one.

MR. POWERS: So we'll be brief here. I just want to turn to page 3 of this exhibit. Scott, there's actually a highlight up before. If you look at the top of the right-hand column on page 3, the partial -- yes. Thank you. And then if you could just zoom that in to the word because, beginning the sentence because glutamate.

BY MR. POWERS:

Q So, again, to make a clean record here, we're on page 3 of the exhibit, it's a continuing paragraph on the top of the right-hand column and it is the second complete sentence beginning there. Do you see what I'm referring to, Dr. Kinsbourne?

A Yes. This is actually a bridge to Dr. Deth's testimony yesterday. It says what he pointed out, that the glutamate and cysteine share the same transporter. So if there is more glutamate around, it could compete with cysteine transport into astrocytes, and Dr. Deth explained in detail why that's harmful to the functioning of the astrocytes.

So that may be one reason why the astrocytes are under strain and many ultimately die.

Q And that reason being oxidative stress?

A Yes.

MR. POWERS: Okay. Let's go then, the last thing we'll talk about here is, Scott, at the bottom of the right-hand column of page 3 of the exhibit, the last full paragraph, and we're looking at the first sentence of that paragraph.

THE WITNESS: This makes the important point that methyl mercury preferentially accumulates in astrocytes. So I mentioned before that it accumulates in the microglia, which engulf it. It also accumulates in the astrocytes. You will find them in those two cells before you find them in neurons, actually.

It says here that this fact is a causal factor in why methyl mercury makes neurons degenerate because I believe the point he is making is that if the astrocyte is disabled, the neuron lacks its support. It becomes less viable.

BY MR. POWERS:

Q And, again, this is consistent with your theory that you described in your expert report about neuroinflammation and its sequelae in the pediatric brain.

A Right. I want to just stress this. I

stress the point that it isn't that everything dies. If everything dies, then nothing would happen in the brain at all and that's not the situation. It's rather that the brain gets into an abnormal state, it's still functioning, and the neurons don't necessarily die, or if they do, some might, but most don't. It is more that the neurons that are there are firing too much.

MR. POWERS: So let's go ahead and pull this down, Scott.

BY MR. POWERS:

Q Dr. Kinsbourne, are you prepared now to talk about the overactivated brain and how it might be expressed as the symptoms of autism?

A Yes. So I've mentioned that as the glutamate levels in the brain go out of control they will tend to stimulate more neurons to fire and neurons to fire more frequently so that the excitation inhibition ratio will increase.

Now, that is a situation which is consistent with one of the existing models of what brain change it is that underlies autistic behavior and which I called in my report "the overarousal model." Now, I want to preface this by saying that there are several different models of what abnormality it is in the

function of the autistic brain which causes autism.

This is not an open-and-shut case. I'm presenting a particular model, and I'm pointing out to the Court that if one adopts that model, then there becomes a clear connection between neuroinflammation and why that brain should manifest autistic behavior.

I don't want to imply that therefore everybody should instantly agree that that is the correct model. It is one that I have thought about actually ever since I met its originators back in the 1960s, some people called Hutt and Hutt at Oxford who first wrote about overarousal.

The model has been around a long time, it's been referred to by some excellent scientists. It's only one of several. Now, there is some evidence that the brain of autistic individuals is overaroused.

I submitted an article by a group I think from Rhode Island showing that their autistic subjects had elevated heart rates, that instead of having a flexible heart rate which goes up when one is active and excited and goes down when one is at rest the autistic individuals had a higher heart rate which didn't seem to change.

It's like they were in a what's called sympathetic autonomy. The sympathetic nervous system

increases heart rate and if the sympathetic nervous system is functioning at a high level, the heart rate just stays up. You can imagine a person who is very anxious or panicky and they can feel the heartbeat going fast.

Well, these children who actually don't show moment to moment distress actually I believe have a fast heart rate and feel the way one does when one does. Then there's evidence from EEG studies and some evidence from neuroimaging also that at least some systems in the brain, such as the amygdala, which has to do with emotion, is overaroused.

So, actually, you have an individual, an autistic person, who can't tell you how they feel actually, and you can't tell on their face how they feel, but if you measure them psychophysiologically you can infer that they are actually in some turmoil, that they're in an overaroused state.

Now, under those circumstances one would expect a variety of consequences. The consequences would be for how well they can do certain kinds of cognitive functions, the kind of environments in which they like to be and what they do to help themselves when they are particularly overaroused. These are three categories of manifestations of autism.

The first one is that as the arousal level of the brain rises, so the focus of one's attention constricts. Now, that's not new. That was first described in 1959, and I have a reference, and not controversial.

You can imagine, for example, imagine an expert testifying before a Judge and the expert is understandably nervous and over odd and his attention now is to the point that all he can look at is maybe a part of the Judge's face and all he can think is one thought.

As the overarousal goes up, what you can consider in solving a problem diminishes. It's called the narrowing of cue, C-U-E, utilization. Now, we see as a powerful phenomenon in autistic individuals how when they perceive the world it seems as if they're perceiving it in very tiny bits of fragments.

Been described for decades that they might look at a person's left ear rather than the person's face, or they might notice a scratch on an object rather than the object. It's a very dramatic focus, narrow focus, and that is something that is known to come with overactivation.

Now, I'm not saying that it's the only reason for it, but it's compatible with

overactivation. Now, if you have a very narrow focus then there's a lot of things you won't notice in the world and there's a lot of things you won't learn about the world.

If that focus is diverted away from people then you won't learn about people, other people: how they feel, what they intend, what they think, what their reactions are, what they think about you, all the things that most of us are really good at.

I mean, we are evolved to be very good at that but we can't get this information if we aren't seeing the face. So the autistic person is notoriously apt to have gaze avoidance. They don't look at you, they look by you. This has been shown elegantly.

They don't look at, you know, some furniture in the back or a world, they look by people's faces. That way they're not going to pick up the information they need for social interaction, and of course they're notoriously bad at social interaction. Also, for a brain to function well routinely in simple situations, that's fine.

You focus on what it is and you do it. Suppose you have to do a complex task or a novel task? Well, to do that you have to put things together. You

have to look at one thing, consider a second thing, remember a third thing. So you can see different parts of the brain are active.

When that happens, if the brain is overaroused, that differential of all these patterns in the brain collapse into one. This incident is the point that Rubinstein and Merzenich make in an article that was submitted. So, as has been stated, autistic people are much better at simple tasks than complex tasks. Well, everybody is, but disproportionately better at simple tasks than complex tasks.

My understanding is is for complex tasks you have to hold various parts of the brain together in a very patterned way, and the overactivation really goes against the pattern because to keep a pattern in your mind you have to have inhibition between the activated areas and the inhibition is suppressed, as I've described.

Now, if one is in the situation in which one is already overaroused and it doesn't feel good, one is going to try to be in environments that are low arousing, understimulating environments. It's opposite of of course sensation seeking, which is the opposite problem of being underaroused.

So a person who is autistic would like

everything to be stable, everything to be the same. It's very upset if you move something that seems inconsequential to anybody else, but why did you shift this? Why did you move my stuff? They like everything the same environment.

They are very tentative about change being introduced, even a stranger coming into the house or even not knowing when a familiar person is coming, but when are they coming? So they have these constant questions to assure themselves, that have organized what's going to happen, and nothing surprising happens.

That's also why it's thought they don't look at people's faces because people's faces are actually probably the most common source of surprising things, out of control. So they like to remain in a very stable situation, and they like to deal with things that they can control, limited sets.

For example, an autistic child might know about every type of shark that exists, and specialize in it and think about it constantly. Well, there are only so many sharks that you can know, none of them are going to come on land to get you. Same as applies to dinosaurs. They liked dinosaurs before anybody else did.

There are many examples. They have narrow interests. They don't like to deal with open-ended questions. They like to have well-defined situations that they can organize, arrange. In those situations, they can become even savant.

They practice it so much they can tell you all sorts of information in this narrow category that you don't even want to know but they seem to find congenial and comforting to work with. The propensity of autistic individuals to hold sensation down is also shown in how they arrange things.

As the child regresses into autism, he or she will stop playing with the train set by going vroom, vroom, vroom, thinking of a little one, and instead line up the cars in a line or go to the supermarket and line up the diapers on the shelves so they all face the same way.

These behaviors, which are not particularly adapted, don't seem to serve any particular use, I see as being soothing to the individual, holding down the level of stimulation. Incidentally, being still and addressed is not soothing. What is soothing is behaving repetitively.

The Court won't take it amiss if I mention a little poem I wrote in my head for autists. It goes

like this. One potato, one potato, one potato, one. One potato, one potato, one potato, one. That's my tribute to autistic view. So these are preferences which are not just strange or arbitrary, they are adaptive. The child is trying to keep herself in a stable situation where that is threatened constantly.

What happens when the child can't control the environment, when the stranger is coming, when her mother takes her to a birthday party? She doesn't want to go, but her mother feels she should be socialized, and she comes into this uncontrollable gang of children, and her mother pushes her in and says go, go talk to everybody.

What happens often enough is the child just goes wild, out of control, can't handle it, overstimulated. In a situation short of that the child will go into the very well-known stereotypic behaviors: flapping, whirling, foot tapping, you know, doing repetitive movements with the fingers, making various movements which are called manneristic.

All of them have the quality of being nonadaptive. They don't serve an external purpose, they serve an internal purpose. They are dearousing. I've read an article on this which I think I submitted to the Court. So I see the abnormal behaviors of the

autistic children again as dealing with this overarousal state that I've already described.

I'm sure there are other examples, too, but I think this gives the Court a flavor of what I take to be the explanatory value of autistic behaviors of the overarousal model and some rationale for why if a child is victim of neuroinflammation, why it should affect the brain in that way, autistic, other than in whatever other way.

In other words, I have a continuous mechanism of cause and effect formula. Whatever provokes a microglial activation, including a metal, to the glutamate excess, to the overarousal and to the autistic behavior that results.

Q So, Dr. Kinsbourne, then in describing this model it clearly is dependent on the existence of a neuroinflammatory process, correct?

A Yes.

Q Are you aware of any peer-reviewed published studies that evidence the presence of neuroinflammation in autistic individuals?

A Yes.

Q Now, would that include the Lopez-Hurtado article we discussed?

A Well, first of all, of course the Vargas

article, which is fundamental to, I'm sure the Court is aware of --

MR. POWERS: Let's hold on. If you're mentioning that, let's have Scott put that up. It's Petitioners' Master Reference 0069.

BY MR. POWERS:

Q Dr. Kinsbourne, you've got the exhibit on the screen in front of you. Can you explain to the Special Masters and for the record what you're looking at?

A Yes, sir. The article is called *Neuroglial Activation and Neuroinflammation in the Brains of Patients with Autism*. Now, it actually mentions data in two contexts. One is on autopsied brains of people with autism who died, just like the Lopez-Hurtado article that I already mentioned, and then also on the cerebral spinal fluid of living autistic children.

Now, in brief, what they describe is, which really was a surprising finding, a pioneering finding, people haven't realized this, that the brains of autistic individual are not as used to be thought what's called an empty fortress, the shell of some earlier damage and now they're left with a devastated dwelling place, as it were, but rather, there's active disease going on over time.

Now, these were people who had been autistic for a long time. It isn't as if it was just an inflammation to begin, like an encephalitis, which then caused structural problems. They are ongoing process, must be an ongoing process, over years. They found the microglial activation that I mentioned and a certain amount of gliosis.

They didn't find much gliosis. It is the other one who found that. They did find some problems with neurons. The important point is they found newer inflammation in about two-thirds, three-quarters of the small series of brains they looked at, so it wasn't a rare phenomenon, actually, not in their series.

MR. POWERS: And, Dr. Kinsbourne, let's focus specifically on page 11 of this exhibit.

Scott, if you could pull that up?

BY MR. POWERS:

Q What I'm going to direct your attention to is on the right-hand column there's a highlighted section, and this is a column that's above a table. In about the middle of that section of text there's a highlighted sentence that begins in these conditions. Could you take a look at that and explain the significance to the Special Masters?

A Yes.

MR. POWERS: Excuse me. Scott, I'll need your help here. It actually continues on to the first two lines of page 12.

THE WITNESS: Yes. Well, they say more formally what I've just said, which is the microglial activation is chronic, it goes on. It is responsible for a sustained neuroinflammatory response. The neuroinflammation goes on. In the course of that neuroinflammation there's the production of what they call multiple neurotoxic mediators.

We've discussed some of those, the proinflammatory cytokines and reactive oxygen species that we've talked about. Then what they say is -- well, you see above there they talk of a number of different disorders, including HIV, and they're saying that neuroinflammatory activation may be a common pathway leading to dysfunction in all these disorders, but we haven't considered those.

In the case of autism, the presence of microglial activation supports the view that innate immune responses are present both in the cortex and in the lower levels of the brain and that a state of chronic activation and reactivity may be involved in the mechanism of neuronal and synaptic dysfunction.

I've just been describing to the Court a state of chronic activation and reactivity.

BY MR. POWERS:

Q So this would actually be pathological evidence that's consistent with your testimony and your theory on causation and a model for affecting regressive autism?

A I believe so.

MR. POWERS: You mentioned that there were a couple of studies. This is one of them. I'm going to ask Scott, if we could pull this one down, and we'll take a look at what's been marked as Petitioners' Master Reference 0072.

BY MR. POWERS:

Q That's now up on the screen, Dr. Kinsbourne. Can you identify for the Special Masters and the record what you're looking at?

A Yes, sir. The article is called *Immunity, Neuroglia and Neuroinflammation in Autism*. The senior author is Dr. Pardo who is the head of the laboratory in which Dr. Vargas works. In other words, this is the Johns Hopkins group that's been very productive in this field.

Q And what's the significance of this article to the expert opinion that you're offering in this

proceeding?

A Well, Dr. Pardo, this is 2005, he was overviewing the findings mostly of his own laboratory. I believe we have a passage marked later in the article that distills the point that one wants to make.

Q Well, let's go ahead and just jump to that then. We'll be looking at page 5 of the exhibit, and we're looking at the left-hand column. About a third of the way down there's a highlighted section and the first two words are "in normal." We have that up on the screen now. Take a look at that, Dr. Kinsbourne.

A Yes. It starts by saying that normally astrocytes help neurons to survive by certain chemicals and by removing excitotoxic neurotransmitters, namely glutamate as the main one. There are some others, too. However, for an astroglia activated because of injury, they, themselves can produce factors that cause inflammation.

Then they list a number of types of chemicals that may magnify immune reactions within the CNS. Now, immune reactions are fine to magnified if they are contesting an invader, like a bacterium, but these immune reactions are just firing at the local vicinity.

Q And in this firing, as you talked about earlier in your testimony, is it being initiated and sustained by the presence of that, in these cases you believe, inorganic mercury that's in the brain, this pounding away of the inflammatory response?

A Well, when you say these cases, I'm not talking about individual cases. I'm saying that there are a variety of persistent stimuli to the microglia, any one type of which can elicit this reaction. Heavy metals, including mercury, are among that list.

MR. POWERS: And then the last thing that we'll talk about in this paper is further down, Scott. If you can pull that highlight? It's that last highlighted section, and we're looking at about three-fourths of the way down the page on the left-hand column of page 5.

SPECIAL MASTER CAMPBELL-SMITH: Beginning with the words "changes in."

MR. POWERS: Yes, beginning with the words "changes in."

THE WITNESS: Changes, right. So he's saying that it's changes in the astroglia or microglia that affect how the neurons work. So the attack that they saw wasn't directly on the neurons, it was on these helper cells, but they then secondarily affect

the neurons and what the effect is the control of the neuronal firing.

(Away from microphone.)

So he says in a more general way that neuronal dysfunction, and I was describing a particular neuronal dysfunction which was firing too much, and that the -- organization as those seen in autism may also be responsible for reactive vicious cycle. They may then cause more neuroglial activation.

In other words, as you were saying earlier, it could be a vicious cycle.

BY MR. POWERS:

Q So is this passage also, do you believe, consistent and supportive of your opinion that neuroinflammation can lead to nervous system dysfunction expressed as autism?

A Yes.

Q The last thing I wanted to discuss, and briefly, Dr. Kinsbourne, is you've made several references to the testimony yesterday of Dr. Richard Deth.

A Yes.

Q And they've been scattered throughout your testimony today. What I was hoping you might be able

to do is explain to the Special Masters how you see Dr. Deth's testimony about oxidative stress perhaps interacting with the process that you're describing here, which is the neuroinflammatory process in the autistic brain.

A Right. In neuroscience, different specialists study the brain at different levels of organization all the way down from behavior, which is the highest level of organization for the individual, to molecular changes, which is the lowest level. High and low, it's just descriptive. It doesn't mean better or worse.

Dr. Deth works at the molecular level. At that level, he gave a very complete account of oxidative stress, and how it affects the workings of the cell and what the mediators are because in the nervous system it isn't just a one on one situation, it tends to be a cascade, *A* causes *B*, and *B* causes *C* and so on.

He gave us elegant illustrations of that. I am discussing at the systems level. I'm discussing at the level of the cells in the brain. What he says speaks to particular points in that system, the effect of the oxidative stress that I discussed as being caused by the microglial activation. Well, he really

explains that.

I mentioned it to say it damages cells. He tells you how, what goes on. We have in common that both of us are explaining changes to the brain which are not killing cells. We both talk about functional changes. Now, when there is an acute invasion of the brain by viruses or an acute mercury-toxicity, it doesn't stop at changing function. A lot of cells simply die. That's a different situation.

Both of us were discussing how cells will keep on working but working inefficiently and in a deviant fashion, and I was discussing the consequences for behavior of them doing that.

Q So, Dr. Kinsbourne, then would it be your testimony to a reasonable degree of medical certainty that thimerosal-containing vaccines belong on the list of potential environmental factors to consider if one is looking at what might have caused regressive autism in any particular child? Would that be your testimony?

A Yes. To expand, there are two steps to this. One is that mercury certainly should be on that list regardless of where it comes from. The second is that thimerosal is a known quantifiable source of mercury, and clearly, in the differential one has to

consider whether that particular source of mercury is damaging in the particular case.

Q And that is testimony that you would leave to somebody who is evaluating that individual case and using the testimony that you've provided here to make that differential diagnosis?

A Right. I would see this as a conjoined effort by a neurologist and a toxicologist.

Q And perhaps by a treating physician?

A Well, necessarily, yes.

MR. POWERS: All right. Thank you. No further questions at this point.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. We've been going a little over two hours. It looks like an appropriate time to take a break before we get to cross. Just a couple of things to clear up on the record just to make the record clear. I had made notes. Thank you, George, you kind of stopped us.

If we could go back and pull back up the Lopez-Hurtado article from PML 446? There were two references that Dr. Kinsbourne was interpreting. The first was at page 11 of that document. I did write this down to memorialize this for the record, and I'd like to do so now.

I believe the first one was on the left

column at just nearly the bottom beginning with the words since thickness and extending over to the right-hand column. I believe the second reference was a little further down on that page about halfway through that began with a toxic etiology. Those were the references that I had from the Lopez-Hurtado article.

SPECIAL MASTER HASTINGS: And that was the whole paragraph.

SPECIAL MASTER CAMPBELL-SMITH: That's correct, and that was that whole paragraph there. The next reference, just for clarification, the article to which Dr. Kinsbourne was referring regarding the heart rate studies was the Goodman article which was referenced in his opinion as PML 496.

I believe those were the references that had not been clearly identified in the record, but just to do so, I wanted to take that moment. I think with this being our morning break and for ease of reference if we were to do 15 minutes that would put us at 11:25. Will that work with your watch, Mr. Powers, or shall we push a little further?

MR. POWERS: That would work just fine.

SPECIAL MASTER CAMPBELL-SMITH: Okay. How about you, Mr. Matanoski? Would that give you adequate time to prepare your cross or would you like

the additional five minutes?

MR. MATANOSKI: No, ma'am, that should be adequate time.

SPECIAL MASTER CAMPBELL-SMITH: Okay. Well, we are in recess for the next 15 minutes. Let's convene again at 11:25. Thank you.

(Whereupon, a short recess was taken.)

SPECIAL MASTER CAMPBELL-SMITH: We are back on the record. While we're waiting for Respondent's wingman to join him at counsel table, just a reminder that as the CSO security officer indicated, for those of you who are that side of the bench, we're going to have to ask you and remind you to turn off all your devices including your Blackberries, because the click, click that we heard apparently during Dr. Kinsbourne's earlier testimony was related to the interference from the Blackberries.

Apparently, it's been a busy morning with your Blackberries. So we are going to have to ask you to turn those off. Dr. Kinsbourne, if you would join us back in the witness stand. Respondent to commence cross.

MR. MATANOSKI: Thank you, ma'am.

CROSS-EXAMINATION

BY MR. MATANOSKI:

Q Good morning, Doctor. I'm Vince Matanoski for the United States.

A Yes, sir.

Q Doctor, Mr. Powers informed us I believe in March that you had come to him to offer your services in rendering an opinion in this case. Does that comport with your recollection?

A No. I had come to him to offer my services?

Q Yes, sir.

A No. I don't go to lawyers and offer my services.

Q I see. When did you first become involved in this case?

A Probably about in March. I don't remember exactly.

Q I'm sorry?

A A short time ago. I don't remember exactly. Shortly before I wrote my report, whatever the date of that was. I don't remember.

Q I see. What is your definition of regressive autism?

A Nobody has a definition of regressive autism. We do have descriptions of what the phenomenon is, and the phenomenon is a child developing at a certain rate, whether fast or slow,

and then actually losing skills that he or she had already attained and progressively losing them in such a fashion that they end up in an autistic state.

Q That's your definition of regressive autism, is it?

A It's my description of what I understand as being regressive autism. There haven't been to my knowledge very consensual formal definitions.

Q What are the diagnostic criteria for regressive autism?

A They are descriptive. They are that the child having attained a certain observable milestones over a period of weeks or a few months gradually loses them and begins to behave in ways recognized as being autistic.

Q And that is the description of regressive autism that I could find in DSM-IV?

A I couldn't tell you.

Q So you don't know what the description is in DSM-IV?

A No.

Q Do you know what the description of regressive autism is in ICD-10?

A No, I don't.

Q Is that because you haven't been treating

children in this area for quite some time?

A No. It's because I haven't looked it up.

Q You said that you were preparing and reviewing the literature to prepare your chapter for *Menkes*, the next edition on developmental disorders, is that correct?

A I'm beginning to collect some articles, yes.

Q And in that chapter you will be discussing autism?

A Yes. It's part of my responsibility to have a section on autism.

Q And you haven't reviewed the diagnostic criteria currently for the definition?

A My chapter doesn't go into the diagnostic criteria.

Q In reviewing this literature and preparation for your chapter have you found the term clearly regressive autism as a distinct disease category within the description of autistic disorders?

A Dr. Rutter mentions something along these lines. As I was explaining to the Court, there are some cases that are marginal or subtle and in some cases that are clear.

Q In reviewing the literature in preparation have you seen that described, that term --

A I don't recall. I may have seen it.
Q You don't recall?
A No.
Q What is a differential diagnosis?
A Of regressive autism or what is a differential diagnosis?
Q Yes.
A Right. When one is confronted by an individual with a particular problem, be it physical, or mental, or both, it is almost always the case that there's more than one possible cause of the appearances that you see.

One then lists to the best of one's ability the various disease processes that could lead to that outcome and to the best of available investigative capability tries to find out which one of them it is ruling out the others.

Q Would you then proceed from a list of known or suspected causes of a disease and then proceed from that list?
A I would look for a list of what I suspect to be possible causes of the disease.
Q And in preparing your book chapter in *Menkes*, Volume 6, you prepared such a list of known associations with autism, did you not?

A There was quite a long list, yes.

Q So if I were a doctor and I was trying to make a differential diagnosis, I would go down that list to try to find a cause, is that right, that I could do that to make a differential diagnosis?

A Certainly you could do that. I mean, even my long list isn't exhaustive, but, yes.

Q And if I went down that list and I scratched off every single association that's on that list and I had none left, as a matter of differential diagnosis, what would I conclude?

A That I didn't know what caused it.

Q Will you review your chapter in *Menkes*, Volume 6, the chart of known associations, I believe it is conditions associated with autism, and tell me if thimerosal-containing vaccines are on that list?

A Well, no.

Q Now, you prepared a similar list when you testified in this Cedillo case, correct?

A I think so, yes.

Q And it appeared in your expert report in that case?

A I'm sure, yeah.

Q And when you prepared at that time you added measles virus to the associations with autism.

Otherwise, that list was virtually the same as what appeared in the *Menkes* chapter that we've been discussing.

A Correct.

Q Did that list include thimerosal-containing vaccines?

A No.

Q To the best of your knowledge, what percentage of cases are there conditions associated with autism?

A In what percentage are there known conditions? That's what you're asking me?

Q I should rephrase it.

A Yeah.

Q Amongst cases that are eventually diagnosed as autism, in what percentage of those cases is there an association with some factor?

A Is there a known association? About 10 to 20 percent.

Q So in the remaining 90 to 80 percent, after going through a differential diagnosis, one is left with an unknown cause, is that right?

A Yes.

Q Now, in your expert report on page 9 at the very bottom you stated in many cases, however, there

is no viable alternative diagnostic option other than the involvement of a postnatal environmental insult or exposure.

SPECIAL MASTER CAMPBELL-SMITH: Excuse me, Mr. Matanoski. You need to give us the particular cite reference.

MR. MATANOSKI: I'm sorry. I believe the report itself is Petitioners' Exhibit 30.

SPECIAL MASTER CAMPBELL-SMITH: Petitioners' Exhibit 30.

MR. MATANOSKI: And it was at the bottom of page 9 of that report.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

MR. MATANOSKI: Are you suggesting, doctor, that when you exhausted your list of associations that one must then conclude that in cases of regressive autism at least that it must be an postnatal environmental insult or exposure?

THE WITNESS: No.

BY MR. MATANOSKI:

Q Now, in your report you've hypothesized a genetic vulnerability that could lead to regressive autism, is that correct?

A Yes.

Q And this morning you described it as a

susceptibility, but I imagine the terms are meant the same way?

A Correct.

Q Could you describe what that vulnerability is?

A The vulnerability is that under circumstances in which a particular event occurs that is harmless to most people, that event, however, is harmful to a subset of the population who are regarded as susceptible.

Q Could you tell me what that susceptibility is to? What event, what particular characteristic in the individual creates the vulnerability?

A There are innumerable vulnerabilities that have been presumed to be genetic in origin but most of them have not been identified in terms of particular genes or gene resemblance.

Q We've heard Dr. Deth describe it as a lowered state of glutathione, and he has identified that. Can you describe for me what in your hypothesis is the particular susceptibility?

A I cannot give you -- the neurobiological basis for why most people under certain circumstances don't become autistic and some do is not known.

Q I'm talking about your hypothesis that

exposure to TCVs, thimerosal-containing vaccines, will in a susceptible population lead to regressive autism. I'm wondering what the particular susceptibility is. Is it to an allergic response? Is it that they have a lower threshold? Can you describe what it is in your hypothesis?

A I'm afraid I can't help you. The fact is that when the great majority of children received the usual vaccination schedule at a time when thimerosal was used they all received more or less the same amounts and most of them, as far as we can tell, were unscathed and some of them perhaps were not.

We know in general that a certain amount of mercury challenge may affect some people much more adversely than other people and that the medicine is pervasive. It happens in all aspects of disease that some people are more susceptible than others to the same challenge.

Now, in hardly any of these situations do we actually know the neurobiological basis, and here is one of those cases that we don't know the neurobiological basis.

Q Dr. Aposhian hypothesized that it was an efflux disorder is what made these individuals susceptible. Dr. Deth was hypothesizing that it was a

glutathione or a sulfur metabolism process, an abnormality in that, that made these individuals susceptible. In your theory, in your hypothesis that you've laid out, you have neuroinflammation, you have glutamate, you have hyperarousal.

Can you describe what it is that you think, and I'm not asking you to tell me what genes are involved, but what is the particular susceptibility or vulnerability that these individuals have in your hypothesis?

A As I've said, we don't know. I mean, we could ask, for example, whether the innate immune system responds more vigorously in some people than others for reasons that may be genetically determined, but that would be speculation. I don't know.

Q So you haven't worked out what it is that you think the vulnerability is?

A No, I haven't worked that out.

Q Now, I'm going to try to ask a series of questions that will follow through what is happening with the thimerosal that one receives from the vaccination, ultimately where it ends up in the body, brain, at least as far as your hypothesis of what's happening.

I'll try to skip us forward because I know

we've had testimony already on what happens to thimerosal and its change that occurs and move us right to after a vaccination of a thimerosal-containing vaccine when will the ethyl mercury enter the brain? How long after the vaccination?

A It is likely to enter the brain while it is still detectable in the blood, so it will perhaps be a few weeks.

Q You believe it's detectable in the blood for a few weeks?

A Yeah.

Q Do you know with any further precision how long it's detectable in the blood?

A No. It doesn't really help me with my hypothesis to know it with further precision.

Q How much of the ethyl mercury will enter the brain let's say the first day after vaccination?

A That is a question for a toxicologist.

Q Is it important to you how much comes into the brain at any given time?

A It is important for me to be told by a toxicologist whether enough has entered the brain to elicit the inflammatory action that I am talking about.

Q When it first enters the brain, where will

it go in the brain?

A It's been found in the cerebral cortex, in the cerebellum and in the amygdala. There are a number of structures. It's fairly widespread.

Q This is the ethyl mercury now?

A I think that whether it's ethyl or methyl doesn't make a great difference in where it goes.

Q So you mentioned the cerebral cortex. Where else?

A Cerebellum.

Q Where else?

A And certain brainstem nuclei.

Q Anywhere else?

A Not to my knowledge.

Q And this is both, I should say it's ethyl, methyl, and is it inorganic as well?

A Yeah.

Q Will the ethyl mercury go to all areas of the brain?

A Well, I don't think anybody has ever looked at all areas of the brain. I think that it's fairly widely distributed when we are dealing with low-dose administrations of any mercury-containing product that there's not the same distribution as when one is dealing with an acute mercury overdose.

So in an acute mercury overdose one is going to find foci of structural destruction in particular cell populations, but that will not be expected with low-dose mercury burdens.

Q Will there be different areas of the brain affected in the acute high-dose exposure versus the chronic low-dose that you were just discussing?

A Well, the cerebellum will be one area that is particularly affected with the high dose, but with a high dose the cerebral cortex is affected.

Q Do you consider immunization with a thimerosal-containing vaccine to be an acute high dose or a chronic low dose?

A A low dose. Absolutely.

Q And in what way is it chronic?

A In the way discussed by the toxicologists, which is that once the ethyl mercury enters the brain it is degraded to ionic mercury, HD++, which then is chronically present.

Q Will methyl mercury go to the same or different areas of the brain?

A I didn't see much evidence of difference.

Q After it moves to these areas of the brain that you've described, what happens next?

A Over a period of time the deethylation or

methylation, whatever the agent is, continues until the bulk of the mercury is in metallic form, mercuric form, and then it stays there and may or may not elicit the inflammatory actions that I've discussed.

Q How long does that take?

A It could be a matter of a few weeks, or months, or longer.

Q And for ethyl mercury from the vaccine, how long will it take for it to go through the same process?

A For it to?

Q For it to go through the same dealkylation process you've described?

A It's a progressive matter lasting a number of months.

Q A number of months?

A Uh-huh.

Q For ethyl mercury?

A Yes.

Q You said that the importance of the timing was that enough ethyl mercury get into the brain to cause the process that you've described.

A Yes.

Q How much ethyl mercury is necessary for that process?

A That you must ask a toxicologist.

Q You don't know how much ethyl mercury would be necessary to cause neuroinflammation?

A No. That's not in my field of expertise. One would ask a toxicologist to determine that.

Q You've rendered an opinion that the amount in childhood-containing vaccines is enough to cause neuroinflammation that will lead to regressive autism, but you don't know how much?

A You are misstating my opinion.

Q Correct me.

A Yes. I've rendered an opinion that mercury, in sufficient amounts, will set up the process of neuroinflammation with its consequences. I've rendered the opinion that it will do that regardless of the vehicle in which it comes, whether it's mercury vapor, or whether it's a vaccination, or whether it's fish, anything.

I have not rendered the opinion that the mercury in thimerosal is sufficient to meet such a threshold because it is up to the toxicologist to define that threshold. So my opinion has been that if toxicology tells us that there is enough mercury in the vaccines to cause inflammation in the brains of children, then the process which I have discussed is

initiated.

Q When you wrote this report what were you relying on then to determine that there would be enough in childhood vaccines to cause neuroinflammation?

A Could you point me to the place where I say that there would be enough?

Q I'm sorry, sir. The thrust of your report is in fact your conclusion is that childhood thimerosal-containing vaccines will cause regressive autism in a susceptible population, and you said you'd need a toxicologist to tell you how much that is.

How can you reach that conclusion without knowing that there's a certain amount that would reach a neuroinflammatory state sufficient to elicit the hyperarousal condition that you've hypothesized?

A I'm afraid I'm perplexed by your question. Could you point me to the line in my report at which you're referring?

Q Doctor, you've rendered a conclusion, you've rendered an opinion that thimerosal-containing vaccines will cause regressive autism in a susceptible population. I'm trying to find out what you're relying on to say that the amount of mercury in thimerosal-containing vaccines is enough.

You've turned me to toxicologists. When you wrote your report what were you looking at to render that opinion? You've rendered an opinion at that time. What were you looking at?

A You keep telling me that I rendered a particular opinion. I would like you to point me to the form of words I used to render that opinion.

SPECIAL MASTER HASTINGS: Perhaps I can intervene here. Let's see if I understood what you said, Dr. Kinsbourne, in response to Mr. Matanoski's earlier question. Pardon me with a scratchy throat here. I think if I understood you correctly just now you're saying you haven't given an opinion that the thimerosal component in thimerosal-containing vaccines can cause autism.

You're saying your opinion is strictly that mercury in the brain could cause autism by the mechanism that you describe. That's all your opinion is.

THE WITNESS: Right, and that if toxicology tells us that there is enough mercury in the vaccines to set up that reaction, then I'll add that to my opinion.

SPECIAL MASTER HASTINGS: But you don't claim to know whether the amount in thimerosal-

containing vaccine is enough to do that. You don't claim to answer that question.

THE WITNESS: Absolutely not. I'm a neurologist. It's not the kind of thing that I would know.

SPECIAL MASTER HASTINGS: Okay. I'll turn it back to you, Mr. Matanoski.

MR. MATANOSKI: Thank you.

BY MR. MATANOSKI:

Q How much mercury then is necessary to create astrocytic death and microglial activation?

A I don't know.

Q So you don't know whether the amount in childhood vaccines would be enough to do that?

A As I just said in response of the Court, that I don't know and I don't regard it as in my professional domain to know that. This is something which I consult the appropriate specialist who is a toxicologist.

Q And in writing your report you hadn't consulted any such toxicologist, correct?

A I have not, and I did not render the opinion.

Q Before you wrote your report you were able to read Dr. Aposhian's expert report, correct?

A Yes.

Q And Dr. Aposhian told us on I believe it was Monday or Tuesday that he had not spoken to you since the Cedillo trial, is that right?

A He had not spoken to me?

Q Correct.

A Yeah, that's correct.

Q So in that regard, when you rendered this opinion the toxicological advice that you had been given as to how this mechanism would work was based on your reading of Dr. Aposhian's expert report, is that right?

A It was, but I had also read some literature, which I referenced, which made me believe that toxicology can in fact determine whether the amounts in vaccines are enough to put the child at risk for inflammation, and I'm referring particularly to the Burbacher articles which I read independently of Dr. Aposhian's report.

Q I'm sorry, which articles?

A The work with the macaque monkeys who were administered a series of thimerosal vaccinations stated to be analogous to what human infants receive.

SPECIAL MASTER VOWELL: Did you say Burbacher articles?

THE WITNESS: Yes.
SPECIAL MASTER VOWELL: Okay.
THE WITNESS: Yes.
BY MR. MATANOSKI:
Q So that would include the Burbacher article and the Charleston articles that were discussed in your report?
A Right. Burbacher is the head of the group, but, yes, there were the charts and articles 1994 through 1996, and the more recent one was the Burbacher.
Q And you read those and interpreted them independently of Dr. Aposhian or the involvement of a toxicologist?
A Yes. I have not discussed them with him.
Q So what you wrote in your report is your own view of what those articles mean and what you make of them?
A It's what I saw written there, yes.
Q By written there, you meant in the articles?
A What I saw in the article. I read the articles and I commented on them.
Q So you don't know whether one vaccination is enough to cause the astrocyte damage that you've described?

A No. As I've said, the quantitative aspect -- to restate this, obviously a single atom of mercury is not enough to make a child sick. There must be a certain amount to put at least some children at risk, though probably that amount won't put most at risk and then a greater amount will finally put everybody at risk.

Now, as a neurologist, I start at the point the toxicologist leaves off. He or she tells me whether a particular product administration, inhalation, ingestion, is likely to have delivered enough mercury to the brain to set up the process that I talk about, and I pick it up from there and describe the process and its consequences.

So what I was expressing in my report was that given that thimerosal contains mercury, we have to consider it as a potential cause of the neuroinflammation I discussed because we know for sure that mercury can cause neuroinflammation.

However, it's not possible for me to make a final decision on this because I need to hear from a toxicologist whether the evidence that exists that the amount of mercury in thimerosal is sufficient to cause inflammation is reliable and evidence that I should accept for my own working purposes.

Q In your report you stated on page 24 for the reasons summarized in this report, it is my opinion to a reasonable degree of medical probability that a series of TCVs can result in or contribute to an accumulation of HG++ in the brain. The mercury in the brain may trigger an inflammatory response in some children that results in a hyperglutamatergic state, and so on.

So are you saying that you don't hold the opinion to a reasonable degree of medical certainty that the series of TCVs can result and accumulate in this --

A As I say, I think they can depending on whether there's enough mercury that enters the brain from that vaccination, and I'm not the person to decide, to advise the Court on that point.

Q So whether that would or not be enough depends entirely on the testimony of the toxicologist?

A Yes. In other words, in my differential diagnosis I would consult a toxicologist. Basically I'm learning that here's a reaction that mercury could cause, I look around for a source of mercury as part of my differential diagnosis, guess what, the child received mercury by a vaccination route.

So now I would like to know did that child

receive enough mercury to account for this reaction and the toxicologist would tell me what the evidence is that it was or was not enough.

Q And you have no idea what that amount is?

A I have no idea about what?

Q What the amount of mercury is necessary to cause the response that you've hypothesized?

A Well, I certainly wouldn't memorize the milligrams or micrograms involved.

I have already referred to the Charleston articles which have shown in adult macaque monkeys which were studied as analogous, their brains being analogous to that of humans, that what they say was the amount of, were delivered mercury in amounts comparable to that which children used to get, that those monkeys had measurable mercury in their brains, enough to cause inflammation.

Now, that suggests that it's worth taking seriously the question of whether thimerosal-containing vaccines in fact could do this with humans, too. Now, more recently this issue was studied even more directly by doing a similar experiment with infant monkeys.

Again, the amount of mercury in the brain was measured. I don't know the amount but I know that

it was about one-fifth of the amount that had been found in the adults. Now I understand we're waiting to find out whether in the infant monkeys that amount was sufficient to cause inflammation.

Q Now, your understanding that you just were referring to, the 2005 Burbacher article?

A Yes.

Q And your understanding of the earlier work by that group with the adult macaques, that the amount of mercury used in that experiment simulated that received by childhood vaccinations during the period?

A They claim that it did.

Q You have no idea how much mercury it will take to cause an astrocyte to die?

A It wouldn't help me in my opinion.

Q It wouldn't? I thought your opinion was that the mercury was having an affect on astrocytes and microglia. So it doesn't matter how much mercury there is as to whether it could provoke that reaction?

A What matters to me is that a toxicologist tells me that there was or wasn't enough to do that. It's not my specialty to figure that out.

Q Now, when you wrote this report, what toxicologist had told you that there would be enough for any value to cause the reaction that you've

hypothesized?

A Could you ask that again, please?

Q When you wrote your report, what toxicologist had told you there was any mercury value, any mercury dose, that could cause the condition that you've hypothesized of astrocyte death and microglial activation?

A Well, I mean, Dr. Aschner has reported very clearly that mercury in the brain can cause microglial activation, inhibition of glutamate reactate and so on. I think he's a pretty reliable toxicologist.

Q Did you consult with him?

A Huh? No, I read his article.

Q And you were relying on his reports of the toxicology of mercury, correct?

A It was his report of the neurobiology.

Q Of methyl mercury, is that correct?

A In the article that I mentioned this morning it was methyl mercury, yes.

Q And you described that as a neurobiological article. Is it a neurotoxicological article?

A Well, it's both because he looked at the system, which is, you know, the cell, and he quantitated a toxin. So it really overlaps those two fields.

Q And you described Dr. Aschner as a neurotoxicologist?

A Yes.

Q And as a pediatric neurologist, this is your interpretation of his work?

A My interpretation of what he says is what he says. Once I know that mercury at some super threshold amount can unleash a neuroinflammatory process which has much in common with that which has been found in autistic children independently by other research groups, then I have to consider mercury as one of the multiple possible causes of that neuroinflammation.

Now, in principle that must be the case, and the inference then is that the various delivery systems for mercury should be scanned for whether any of them might in fact have delivered enough mercury to do this. Now, to answer that question I need a toxicologist. The toxicologist will then refer to evidence, such as the Burbacher papers, in framing his or her response.

Q And you felt free within your level of expertise to discuss the importance of the Burbacher papers, the Charleston papers, et cetera, on toxicological issues as to how they impacted on your

opinion of a mechanism by which thimerosal-containing vaccines could cause autism?

A Well, obviously I will free to discuss any article I want, but what I didn't do, actually, is discuss it. I basically cited their conclusion. Now, a toxicologist might wish to discuss in a more specialized way whether he agrees, or doesn't agree, or what other factors might be considered.

I put down conclusions but I leave it to the toxicologist to determine whether this particular source of evidence will enable them to tell me whether the vaccines contain enough mercury. That's not my role.

Q Did you or did you not extrapolate from those articles to a conclusion that mercury would create astrocytic death and microglial activation resulting in neuroinflammation and a hypergammatalurgic response?

A Well, I concluded that from numerous articles.

Q You extrapolated that from numerous articles.

A I didn't extrapolate it. There are a whole variety of studies that show that mercury is capable of doing that. I don't think that's really what's

contentious. What's contentious is whether a particular form of administering mercury contains enough mercury to do that.

Q The Charleston article was about methyl mercury in adult macaques and you extrapolated that to an affect in humans, correct?

A Probably, but perhaps you could say it again.

Q The Charleston articles were about methyl mercury in adult macaques and you extrapolated that to an affect on humans, correct?

A Not entirely. I'll say it again. I'm pointing out that there is evidence available to a toxicologist who can evaluate the usefulness of this particular animal model and determine from that data, and maybe other data, that he has available, that I don't know whether in fact this will help him determine how much mercury is required to cause the neuroinflammation and whether what's in the vaccines is that much.

Q And when you wrote your report you did not have that evidence from a toxicologist, correct?

A No, I didn't.

Q Do you know how methyl mercury enters astrocytes?

A I don't recall.
Q Is the same mechanism available to ethyl mercury?
A Yes.
Q But you don't recall what that mechanism is?
A No. Not in my regular detail, no.
Q Can you tell me then the detail that you do recall?
A No, I'm not able to tell you how methyl mercury enters astrocytes.
Q How about inorganic mercury? How would that enter astrocytes?
A I would be speculating.
Q So you don't know?
A What I know is that these substances are found in astrocytes and microglia, which is what I need to know for my analysis of the situation.
Q Once mercury kills an astrocyte where does the mercury go?
A After it's?
Q If it kills an astrocyte where does it go?
A Well, it might go into what one might call the debris of the astrocyte. In the Lopez-Hurtado paper they refer to lipofuscin which accumulates in these dying cells. Lipofuscin is a conglomerate of

lipids and proteins which are the inactivated products of cell contents and are known to contain metals, if metals were around, so it might be stuck in a cluster of that nature.

Q So it may be stuck in a cluster of that nature, is that what you said?

A Yes.

Q And you were talking about Lopez-Hurtado. Did that article deal with mercury in any way?

A It refers to heavy metals, yes.

Q What, if anything, happens to neurons during this process?

A During this process neurons will, as I explained, be, as it were, flooded with excess glutamate and fire more than is usual for them.

Q Will anything else happen to them?

A It's a matter of degree. If that excessive firing reaches a certain limit, then the person will show epileptic form or epileptic manifestations. They may have seizures because the neurons were firing excessively.

So one of the consequences of an excitotoxic challenge over and above the arousal that I've already mentioned is that seizures be triggered, which of course is a common phenomenon in people with autism.

Q Are you implying that seizures in autism are caused by mercury?

A I'm trying to think of another way of telling you which works better than the way I've tried to. If you have neuroinflammation for whatever cause and there are markable ones, mercury is just one, then you get into a state in which, among other things, you are more liable than normal to have seizures.

Q In this hypothesis that you have of astrocytic death, microglial activation, what would the neuropathological findings be?

A The kind of findings reported by the Vargas group which would be sweating of the microglia, and a certain amount of edema and the presence of coinflammatory cytokines, which that group in fact reports. If the process have been of a very long standing you might also find the gliosis that Lopez-Hurtado reports.

Q Why would you find gliosis?

A Because astrocytes will have died.

Q Isn't gliosis an overgrowth of astrocytes in the area of damage to the brain or the spinal cord?

A It is an overgrowth which leads to a scarring, just like a scar on the skin is an overgrowth of connective tissue cells which is inert.

So is gliosis.

Q So if you see gliosis you actually have an excess of astrocytes, correct?

A You have an excess of astrocytes in reaction to the challenge, but then those astrocytes can die leaving, as it were, the appearance of scars in the brain.

Q Are you saying that gliosis is both an overgrowth and a decrease in astrocytes?

A It is like a scar. It is both an overgrowth and a neutralization of function of the structures. In gliosis, astrocytes do not perform their function. It's an abnormal collection due to a disease process.

Q And your mechanism relies on astrocytes not being available because they have been knocked off as innocent bystanders, friendly fire, from the microglia so they're not available to mop up excess glutamate, isn't that right?

A Not exactly. My model relies on the well-demonstrated effect of microglial activation in inhibiting glutamate transport into the astrocytes and its also documented tendency to have glutamate exit from the astrocytes. In other words, the astrocyte no longer fulfills its function in controlling the flow of glutamates. Doesn't have to be dead.

Q Among the various papers you cited, do any show methyl mercury causes Purkinje cell loss?

A I think that methyl mercury is likely to cause granular cell loss but that's from situations where the dose was very much higher than we're discussing.

Q And ethyl mercury, would that cause Purkinje cell loss?

A I know that ethyl mercury does not particularly cause granular cell loss. I believe it may cause some loss of Purkinje cells, yes. But, you see, what's causing it, in my opinion, isn't the ethyl, it's the inorganic mercury.

Q So then, I believe you just answered my next question, you'd expect to see Purkinje cell loss with inorganic mercury?

A I really can't hear.

Q Did you say you expected to see Purkinje cell loss with inorganic mercury?

A I would expect inorganic mercury to set up the excitotoxicity potential that I've described, and, if there is excitotoxicity, the Purkinje cells are a very likely target because they're more vulnerable to excitotoxicity than most other cell types in the brain.

Q Did you know that the papers that you cited with respect to Dr. Aschner stated that Purkinje cells were not damaged in methyl mercury poisoning?

A I am not discussing what happens in methyl mercury poisoning.

Q Do you agree with Dr. Aposhian that methyl mercury will convert to inorganic mercury in the brain?

A Absolutely.

Q So after exposure to methyl mercury, then inorganic mercury would also accumulate in the brain, is that correct?

A Yes.

Q And yet, and this is one of the articles you were relying on, Petitioners' Master List No. 568, after exposure to methyl mercury poisoning the Purkinje cells were not damaged?

SPECIAL MASTER VOWELL: And that would be page?

MR. MATANOSKI: I'm sorry. It's pages 201 to 202.

THE WITNESS: Actually, let me look at this.

SPECIAL MASTER VOWELL: And that would be page 3 and 4 on the Petitioners' Master Reference 568. They're separately numbered.

THE WITNESS: Could you continue that paragraph? Right. What I can see here, but perhaps I'm missing your point, is that indeed doses high enough of methyl mercury to kill cells preferentially kill granular cells is what this is telling me.

BY MR. MATANOSKI:

Q And these were the same doses that you were relying on before for your glutamate proposition, is that right? This was the article you referred to, PML No. 568.

A That's the Charleston article.

Q No, sir, it's the Aschner article.

A All right. Tell me again. And this is the same article I refer to for what proposition?

Q Excess glutamate after methyl mercury exposure.

A Right.

Q You were explaining to the Court how this fits into your theory of mercury creating an excess of glutamate and a hyperarousal state.

A I relied upon this article to point out that exposure to mercury products has the effect of inhibiting glutamate reuptake. Now, I wasn't talking about killing neurons, I was talking about a functional state of overactivation. Now, of course

it's a matter of degree, and if the dose is large enough the effect is enough to kill neurons, that will also happen.

The death of neurons is not a part of my model that I presented to the Court.

Q Are you familiar with Bauman and Kemper's work in performing and reviewing autopsy samples of autistic individuals?

A I'm aware of their early work which was pioneering in that field.

Q Are you aware of what findings they made with respect to Purkinje cells in those individuals?

A In autism, yes, there is a smaller number of Purkinje cells than expected in the cerebellum of the autistic people that they autopsied.

Q And after exposure to methyl mercury in one of the articles you're relying on for your theory, the Purkinje cells were relatively spared?

A My model is one of excitotoxicity, and I have documented for the Court the fact that Purkinje cells are particularly vulnerable to excitotoxicity.

Q And if excitotoxicity is a model of autism, then should we see Purkinje cells missing in autism?

A If you have excitotoxicity you will see an overexcitation of neurons and in a case like autism

that I am talking about it may rise to a sufficient level to kill some cells. If it does, they're likely to be Purkinje cells because they're more vulnerable to excitotoxicity than other brain cells.

Q And this paper that you're relying on for part of your process doesn't find that to be happening with respect to the Purkinje cells, correct?

A I'd like to tell you again, my overarousal model does not depend on the loss of Purkinje cells. If there are Purkinje cells lost, that's probably because the excitotoxicity rose to that level. If they're not lost, it's probably because they didn't rise to that level.

Q Isn't excitotoxicity glutamate excess, which is the proposition that the Aschner paper was being cited for?

A I didn't hear what you said.

Q Isn't excitotoxicity glutamate excess? Is that correct? You just nodded your head.

A Yes, yes, yes.

Q And isn't that the proposition that the Aschner paper was being cited for?

A Yes, the Aschner paper says that excitotoxicity can result from these mercury products.

Q And they didn't see this result with

Purkinje cells that one sees in autism, correct?

A It's an empirical fact that in methyl mercury poisoning, which we don't have in autism, the granule cells are more vulnerable than the Purkinje cells to being killed. I don't know why that is, and I don't think other people do either.

Q You've cited several studies on methyl mercury other than the one we were just discussing to support your claims about thimerosal. What is your relative confidence that ethyl mercury will toxicologically act the same way as methyl mercury in the articles that you've discussed?

A Would you refer me to what you're reading here?

Q How about we'll start with the Charleston article.

A Ethyl mercury and methyl mercury, as we have discussed, both have the same end point of inorganic mercury. I am picking up the story at the inorganic mercury.

Q Now, in your report on pages 10 and 11 you cited Charleston, which is PML No. 116, the 1996 Charleston article, for the proposition that the astrocyte population in the brain decreased significantly after six months of methyl mercury

exposure while microglial cells proliferated.

Do you know how much mercury is in one dose of hepatitis B vaccine as preserved with thimerosal?

A Do I know how much mercury is in what?

Q One dose of hepatitis B vaccine that was preserved with thimerosal.

A It may be 12.5 micrograms or something of that order.

Q Do you know how much mercury is in one dose of diphtheria, tetanus and acellular pertussis vaccine preserved with thimerosal?

A It's off that order, but, as I have said, the exact amounts are matters on which I would consult a toxicologist. I couldn't deduce anything from a figure like that by myself as a neurologist.

Q You have an extensive discussion of this Charleston article. Do you know the amount of mercury administered in one day to the macaques in that study was?

A I didn't note the amount. I just noted the statement that this was meant to replicate or parallel the human vaccination ranging. That's the part that matters to me as a neurologist. Whether those numbers in fact do that is not something that I can personally judge, but a toxicologist can.

Q So you're relying on this article because you believe that the amounts there mimic the amounts used in childhood vaccines?

A I'm citing the article because of what they say they did. I'm not the person to appraise it critically, and this is why I say a toxicologist needs to tell me whether indeed this is reliable, this can be upheld and this is helpful in determining whether the amount of mercury in the vaccine rises to the level that is required to cause neuroinflammation in some children.

Q So you believe this acts as a roughly comparable amount in childhood vaccines, the amount that is being used in this Charleston study?

A There's nothing particularly that I believe. I cited an article that is pertinent to the question of whether it is the case that the amount of mercury acquired for a vaccination with thimerosal could, in some cases, cause neuroinflammation.

However, a toxicologist would have to evaluate those articles and the context of other ones available and tell me what his or her conclusion is about that matter. I am not drawing a conclusion about that matter.

Q You reached a conclusion in your report

without the benefit of the consultation with that toxicologist, correct?

A No, I didn't reach a conclusion. I've told you that what I was offering was a mechanism of injury in general causation. I leave it to toxicologists to tell us, tell the Court, whether the amount of mercury received in this way is compatible with the mechanism that I have presented.

Q So you're comfortable relying on this report in forming your expert opinion without any notion of whether the amounts of mercury involved in that study in any way mimic the amounts that children are receiving in thimerosal-containing vaccines?

A The way that my report is organized is not to say thimerosal is good or bad. I am talking about mercury as a potential cause of neuroinflammation, and mercury is a potential cause of neuroinflammation. Once one has established that, then one must put on one's differential diagnosis: whatever routes exist by which a child might have acquired mercury.

Thimerosal-containing vaccines is one such route. At this point, the clinician must find out from a toxicologist whether the mercury delivered by that route was indeed sufficient to explain the disease process that he or she is seeing in their

patient.

Q So you have no idea what the threshold amount of mercury is to create the neuroinflammation you've hypothesized occurs?

A As I've said, I have no idea of the toxicology involved in determining a threshold dose.

Q So you have no idea whether the damage that was observed in the Charleston study would at all be related or we could in any way expect that after vaccinations, or I should say doses, of mercury in the amount received in vaccinations?

A I'm sorry, I have to keep asking you to repeat yourself.

Q I'm sorry. I will repeat that.

A I'm not doing this on purpose. I really can't hear.

Q No, I understand. You have no way of judging whether the amount of mercury that caused the cell damage that you described on page 10 in this Charleston article would be replicated by the amount in vaccination? Though you describe it as cell damage, you don't know whether the amount of mercury in thimerosal-containing vaccines would cause a similar amount of cell damage or any.

A I understood the Burbacher work as an

attempt to check on an animal model the possible toxic affects of a vaccine which incorporates a mercury-containing preservative. They were studying whether that is dangerous or not. You can't study that on children, you use macaques as an animal model, and given the stature of the investigators, I assume it's a valid animal model.

Now, for the nontoxicologist it is of interest that they believe they found that in their animal model very low doses of an order comparable to those administered in vaccines at that time in fact caused microglial activation, signs of inflammation. Now, that is of interest to a neurologist.

To take it further one needs to know from a toxicologist whether there's any reservations one should have about this finding and whether the analogy can be upheld, and, if it is, whether indeed it does tell us that the small amount of mercury in the vaccine is enough in some individuals to cause the inflammation.

Q Would your opinion be any stronger or less strong if the amount of mercury involved in the Charleston study was let's say four times the amount in a vaccine?

A Four times the amount of?

Q Yes, in a vaccine.

A I would not in fact engage myself in these quantitative considerations because they are not in my field. I don't know as a neurologist whether increasing something 50 percent or 400 percent makes this much difference or that much difference. That really is a toxicological question, and toxicologists are involved in this hearing because it is indeed a toxicological question.

In cases like this, as you know as well or better than I do, sometimes you need multiple specialties to contribute their specialized knowledge and that be integrated and considered in that sense by the Court. I am contributing what I feel a neurologist can, and I believe that to be helpful to the Court. It doesn't lead me to the final decision with which you credited at me at the onset of your cross-examination.

Q So, again, without the benefit of a toxicologist, you have no idea whether childhood vaccines would cause any -- any -- of these changes that were observed in the Charleston study?

A Well, you use the phrase "no idea." I have an idea. I've read the Burbacher articles and they are potentially alarming, but I can't take it further

as a neurologist. It certainly makes it worth my while to consult a toxicologist as to what's going on here.

Q And if these studies that you're relying on or that you discuss actually have far greater amounts -- far greater amounts -- of mercury involved in them that are in childhood vaccines, would you be less confident in your opinion?

A If I were to discover that these studies were incompetently done, then I would no longer put any weight in them.

Q What do you mean incompetently done?

A What I mean is if it were the case, which I don't believe for a moment, that although they purported to be mirroring the amount of mercury given to children in their animal model they weren't doing that at all, then of course I would lose confidence in that.

But, in any case, it doesn't matter because a toxicologist is going to make the final decision here. I would defer to that person.

Q In the Charleston articles you discussed, where did the researchers look for microglial activation in astrocyte death? Let's start with the 1996 Charleston article. Where did they look for it

in the brain of the adult macaque?

A Well, I can refer to it of course. I know they looked for it in the cerebral cortex and in the cerebellum. If you want more detail, I'll look it up in the article.

Q So you believe they looked for it in the cerebral cortex and the cerebellum, is that your answer?

A I'm sorry.

Q In the 1996 Charleston article, you believe they looked for microglial activation and astrocyte death in the cerebral cortex and the cerebellum?

A Well, I don't need to believe. If you refer me to the article and the page I will give you --

Q No. I'm asking what you believe they did in that study in rendering their opinion.

A Well, I've already answered that question.

Q And your answer was the cerebral cortex and the cerebellum?

A Yes, but, again, it has no impact on my opinion because my opinion isn't focused on a critical area.

Q So if astrocyte death and microglial activation didn't happen in the cerebral cortex and the cerebellum or if you had no evidence for that,

your opinion wouldn't change?

A If I know that microglial activation has been reported and I know that the glutamate system is all over the cerebrum, then that sets the stage for my model. Whether it is overactivation of the neurons in the cerebrum or whether it is brainstem nuclei that are firing excessively overactivating the cerebrum makes no difference at the level of analysis that I'm discussing.

Just to make sure that what I've just said is intelligible to the Court I'd like to say it again. One can get overactivation of the cerebrum either because the neurons in the cerebrum are firing more than they should, which might happen if the precipitant toxin were there, as, for example, the Lopez-Hurtado article implies. Or it might be that systems in the brainstem, lower systems, which send activation up to the cerebral cortex are firing too much and causing overarousal that way.

In either of these ways, you would get the overarousal and the consequences that I described.

Q So it doesn't matter to you where the astrocyte death or microglial activation occurs?

A Well, I'm not sure that you need to rephrase my answer. I gave my answer. I told the Court two

different possibilities, either of which would lead to the same outcome. I don't like to say that something just doesn't matter.

Q Are there any other areas of the brain involved, other than the two that you've just discussed, that would lead to the effect that you have described as the cause of autism?

A Yes, there are. As I just mentioned, nuclei in the brainstem which project to the cerebrum and activate it. If those were working too hard, firing too much, one will get the overarousal that is critical to my opinion on general causation.

Q Any other areas of the brain?

A I don't recall what they found, and you don't wish me to refer to it. It may be that the hypothalamus was involved, but I'm not sure.

Q The hypothalamus, did you say?

A It may be that the hypothalamus was involved, but I'm not sure.

Q Is that one of the areas that you're opining that if there was astrocyte death and microglial activation it will result in the effect that you've hypothesized is involved in this process?

A What I'm opining is in my report, and I don't recall opining on those specific areas.

Q Do you have an answer for my question beyond that, sir?

A No. My opinion doesn't critically depend on the particular area that's most affected. I'm talking about a system, the glutamate system, and general overactivation of neurons.

Q And it doesn't matter what area of the brain that activation may occur for the effect to be seen?

A In my opinion, it's fairly general.

Q Were any behavioral disturbances observed in the macaques in the Charleston papers?

A I don't recall them.

Q You don't know whether there is or you don't recall that there were any?

A I don't recall that there were.

Q How do the neuropathological findings in the macaques in the Charleston paper compare with the neuropathological findings in autistic patients? Are they similar? Are they different?

A I don't recall being struck by any particular similarity but the neuropathological finding in autistic people --

SPECIAL MASTER HASTINGS: Both of you gentlemen, and probably for me with my cold, I'm not hearing either one of you very well. If you could

both speak up a little bit.

THE WITNESS: I don't believe that the neuropathology done in the Burmeister articles in the mid-1990s really examined the brain in the same way, the highly specialized way, in which the brain of autistic children is examined. So it's really hard to make an analogy as to whether when the macaque monkeys were given these low doses of mercury, the particular areas, same areas, were affected in the brief time that they stayed alive as is found at autopsy in autistic individuals many years after their condition began.

I haven't seen comparable studies. I haven't seen a group applying the same methods to autistic brains and brains of animals dosed with mercury to make that comparison.

BY MR. MATANOSKI:

Q So you don't have any information on that?

A I don't think the study offers us that kind of information.

Q Is neuroinflammation a part of normal brain development?

A To a minor extent it can be.

Q Does it ever serve a beneficial affect?

A Yes. I mean, it wouldn't have evolved if it

didn't serve a beneficial affect. The beneficial affect is what I've already mentioned to the Court which is that it is part of the defense of the organism against intruding substances.

Q In your hypothesis, how much time elapses between the deposition of mercury in the brain and the start of neuroinflammation?

A I don't know that. I don't believe a fixed time is known.

Q What time would you expect there to be? What period would you expect?

A Well, if the brain is treating an invader, whether it's a virus, or a metal, or another toxicant, as an intruder, it will of course react to that to some extent right away. Now, that reaction, however, as I have testified, may go on for a long time, and it may wax and wane, it may get greater, at which point one could detect it histologically. One would have to ask a neurohistologist.

My best answer I can give to your question is that it should begin within a short time.

Q And what do you mean by a short time? Can you give us that in hours? Days?

A Well, days or a few weeks.

Q What's the lower bound of that timeframe?

A It's a matter of degree. You might have some response almost immediately when the intruder enters the brain, but that response may gather and become clinically apparent at some later time. I wouldn't say it would take three years.

I think that since it is a defense reaction it would have to happen within the timeframe where a useful defense could be mounted.

Q When, under your hypothesis, will it become clinically manifest?

A Within days or weeks.

Q How many days in the lower bound?

A No, I can't tell you how many.

Q I'm sorry, you cannot tell me? Is that what you said?

A I can't tell you how many days.

Q And in the upper bound, how many days or weeks will it be?

A First of all, we're dealing with probabilities. To expect an answer to a question like that one is regarding the presence of inflammation and its degree as being some simple reaction which is unaffected by anything else. There could be a variety of factors in the brain.

Sometimes there are intruders in the brain

that stay in the brain for years and don't elicit information, and something happens to perturb the system and the inflammation occurs, so to start giving time limits like this is not helpful. The best I can do to help is to say that it would be quite compatible with the theory for the effects to be seen within days or a few weeks.

Q To the extent you're comfortable to 50 percent, a little more than 50 percent probability, can you put a range of time on when to expect this that's any more precise than that?

A Well, I'd like to explain to the Court why I cannot do that. As the Court knows, the measles virus is capable in some cases of staying in the body for years. Now, here is an intruder, and yet, in the case of SSPE, subacute sclerosing panencephalitis, it's not unusual for six, eight or 10 years to pass and then the inflammation, and the damage, and the necrosis, and finally, the death, occur.

So we don't know the factors that permit some reactions to be quick and hold off other reactions for months or years and then they happen anyway with an agent that must have been there all along. So I was just explaining to the Court why I cannot offer you the numbers that you ask me for.

Q You used the example of SSPE, when that manifests itself. This was one of your examples in the last time that you were testifying with this hypothesis of neuroinflammation leading to autism.

A Yes.

Q What is the result of SSPE?

A I'm not comparing SSPE to autism, I'm making a particular point. People with SSPE almost always die, people with autism fortunately don't.

Q In your theory, does the neuroinflammation continue as long as the inorganic mercury is present?

A Yes.

Q Will the neuroinflammation subside if the amount of inorganic mercury decreases?

A Presumably, although I know of no empirical evidence of that.

Q Will the neuroinflammation increase if the amount of inorganic mercury increases?

A It sounds logical that it should, but I know of no situation where these various levels have been compared within the same person.

Q Do you know of any situation where these various levels have been measured at all, that is, that there's been a neuroinflammatory response to inorganic mercury in humans?

A All I know about are measures at autopsy.

Q For inorganic mercury and neuroinflammation or just neuroinflammation?

A I'm sorry, I thought you were talking about measuring mercury in the brain, is that right?

Q I was trying to find out since you couldn't tell me, you said it sounds logical but you were hedging your answer, about neuroinflammation increasing at the amount of inorganic mercury increase. You said because you didn't have any evidence you were hedging an answer.

A I don't quite know how one would find this out experimentally with means available now, so I really can only give you an answer which doesn't tell you more than you already know, which it's unreasonable.

Q So logically, though, you'd expect the neuroinflammation to increase if the inorganic mercury is increased?

A Well, if it is the case in a particular person that inorganic mercury is causing neuroinflammation, then giving some more would presumably make it worse, but, you know, I can't back that up with numbers or I can't cite an article on that.

Q Why would neuroinflammation under your postulate only manifest itself as regressive autism?

A You asked me why it only manifests in regressive autism?

Q Yes.

A I don't know that it only manifests in regressive autism. Did I say in my report that it only does?

Q Your report on page 4 begins with an extensive discussion of regressive autism.

A That's correct.

Q And you talked this morning extensively about regressive autism.

A Yes.

Q Are you suggesting now that your opinion extends beyond regressive autism?

A No. You just asked me, and an only question, and the answer is rarely that something happens only in medicine. Regressive autism has a timing which is consistent with an environmental, as it were, second hit which could have occurred in one or multiple events preceding the age of 15 months or whatever it is.

In other words, if you have a child who is slowly becoming autistic over time it is still

possible that any of the agents causing neuroinflammation were accumulating in that child, but we don't know. What is very dramatic is that the child was developing normally and then suddenly, fairly suddenly, something really changes and the child gets very, very sick.

Now, in such an event, if that happens, an environmental factor of the appropriate timing has to be considered. That is a particularly striking situation calling for explanation. Put it another way, regressive autism is a serious loss of mental skills in young children and requires an explanation.

To say, oh, well, this is just the way autism presents sometimes is not an explanation.

Q You asked where in your report you had limited your opinion to regressive autism.

On page 24 you say it is therefore medically reasonable to consider the involvement of a TCV-induced encephalopathy when one engages in the differential diagnosis of a case of regressive autism, particularly when other known medical causative factors in the differential diagnosis have been ruled out or are not supported by reliable evidence. So your report is limited to cases of regressive autism?

A Yes. That doesn't mean I said it could only

occur there. I am discussing regressive autism pointing out that whereas there are many causes known or postulated for the classical autism, there really are very few diagnostic alternatives with regressive autism that are known.

Q The mechanism that you have laid out applies then equally to regressive autism or nonregressive autism?

A No. I'm putting it forward for regressive autism. Whether it extends to any other kind of autism, I haven't considered it in that context.

Q Why would neuroinflammation, as you've described it, only manifest itself as regressive autism?

A I don't believe for a moment that it only happens in regressive autism. I also believe that it has more than one cause. For example, if one gives a mother terbutaline during pregnancy and then finds neuroinflammation in the autistic child, that would be another cause of neuroinflammation.

I wouldn't be surprised if there were other viruses than the measles virus and if there were other toxicants than mercury that could do the same thing. I began by saying that there are multiple potential causes.

Q So your hypothesis of neuroinflammation is not restricted to regressive autism?

A No. Not at all. I'm sorry if I gave that impression.

Q You described Dr. Deth's opinion as an opinion of this process that you've described at a molecular level, is that accurate?

A No. What I was expressing was that he was studying at the molecular level a particular component of the broader process that I was invoking.

Q I'm sorry, I didn't hear that.

A Okay. He was taking one component of the disordered system that I describe, namely the oxidative stress, and explaining it very expertly at the molecular level.

Q Is that the operation of neuroinflammation at the molecular level in your view?

A It is. When there is neuroinflammation one of the situations that is set up, as I have explained, is oxidative stress. He was explaining to us how that works.

Q If his description of oxidative stress were less likely to occur, do you believe that would impact on the likelihood of the mechanism that you've described?

A If you mean if there was oxidative stress but explained to us some other way would it make it less likely, is that what you're asking?

Q Yes, sir.

A I need help here. Could you rephrase?

Q Are your tying your neuroinflammation theory at the molecular level to oxidative stress?

A No. Oxidative stress is a well-known phenomenon studied by many people. It is known to occur in this situation. The mechanism by which it occurs is not critical to my particular account that I'm offering to the Court.

Q You don't know how the neuroinflammation would cause the cell death?

A I don't know.

Q Do you know how the neuroinflammation would cause the cell death and then thereafter the glutamate excess?

SPECIAL MASTER HASTINGS: Can you speak up, Mr. Matanoski?

THE WITNESS: Yeah. I'm hoping I'm answering your question because I didn't hear it very well. I know that when microglia are activated they release reactive oxygen species, ROS, which are a known potent cause of oxidative stress. Now, the

biochemistry by which they cause oxidative stress in its details I certainly don't know as a neurologist.

BY MR. MATANOSKI:

Q How much excess glutamate is necessary for astrocyte death?

A I'm sorry, I have no idea what you said.

Q How much excess glutamate is necessary for astrocyte death?

A If you're asking me for quantities, I cannot tell you at all. I don't know whether there is a specialized literature that determines that. It doesn't really impact on my opinion.

Q You cited Aschner and Mutkus -- I'm sorry, I do not have the PML for this -- for the proposition that methyl mercury alters glutamate transport.

A Yes.

Q Do you know how that experiment was conducted?

A I don't recall now. I mean, there are so many studies that draw the same conclusion.

Q If it was in cell culture, would it affect your level of confidence that the same would be seen in a human?

A Not very much.

SPECIAL MASTER CAMPBELL-SMITH: Excuse me,

Mr. Matanoski. We've been going for a little while now and just getting an idea of how much longer you anticipate your cross to go.

(Away from microphone.)

MR. MATANOSKI: I think I could --

SPECIAL MASTER CAMPBELL-SMITH: That's fine. In terms of quantifying matters, how much longer do you --

MR. MATANOSKI: I think if I could have until 1:30 I could finish up. I'm going to try to cut some of this down.

SPECIAL MASTER CAMPBELL-SMITH: Okay.

MR. MATANOSKI: I'm sorry, it was PML 571. Thank you.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

BY MR. MATANOSKI:

Q The amount of methyl mercury used in that experiment, how does it compare with the amount of methyl mercury from a DTaP vaccine? Is it greater or lesser?

A I don't recall. It wasn't offered as being at the level of a vaccine.

Q Does it matter to you how much, what the relative difference is?

A Well, it matters enough for me to want to

consult a toxicologist on whether the amount of mercury delivered by the vaccination program is enough to cause a microglial activation and inflammation. It's all the same question back again.

Q And in rendering this opinion you had not consulted with such a toxicologist prior to rendering an opinion?

A I cannot give you a toxicology opinion, no.

Q You had not consulted with one when you wrote this opinion, though, correct?

A No. I left that open. As I have said before, I was offering what I take to be a reasonable mechanism of injury.

Q Is excess glutamate known to be a cause of regressive autism?

A No.

Q Is it known to be a cause of autism?

A It's not known to be. Once you see the Vargas-type findings one can become quite suspicious of that being the case. The question of the role of neuroinflammation in the causation of autism is being very actively studied, including by the Hopkins group.

They certainly know very well that excess glutamate is part of that process. They have enough suspicion of that new information in fact being the

cause of the autism that they are now administering an agent that counteracts microglial activation in an attempt to reduce or even cure the autistic manifestations.

This is a project using a substance called minocycline which has a specific effect of decreasing microglial activation and for which they got a funding support from the National Institutes of Health.

Q The symptoms that you expect after the mechanism that you described, are they any way clinically distinct -- I'm sorry. Are the symptoms that you describe after this, are they clinically distinct in there's a difference between those in regressive autism or in autism?

A No. As I pointed out, once the regression has occurred, the person is in an autistic state. I mean, varies in severity just like it does with congenital autism. Any differences are quantitative. There are no really big qualitative difference. For example, there's a greater for regressive autistic people to have seizures but it's a matter of degree. The similarities are more than the differences.

Q And you don't belong to any toxicological societies?

A No.

Q You don't read and review any toxicological publications?

A No.

Q You haven't been invited to speak on toxicology?

A No.

Q And you haven't published any papers on toxicology? I'm sorry?

A Sorry, I'm thinking. I'm reviewing my CV for a moment. That's why my eyes are watering. No. Not specifically on toxicology, no.

Q And you haven't had a clinical practice with children to speak of in about 18 years?

A Yeah.

Q And in the 1980s you published two articles on autism, and since then you've published a textbook chapter that discussed developmental disabilities and that's been the extent of your publications on autism in the last 20 some years or 30 years?

A I published an article probably about two years ago, Ellis, et al.

Q That was the results of a general survey?

A Well, I don't know about general survey. It was a study of certain autistic behaviors performed in collaboration with Dr. Deborah Fein at University of

Connecticut, and it utilized my questionnaire for overfocusing that I referred to briefly earlier in the discussion.

Q Now, in Cedillo, I asked you a question about the relative strength of your hypothesis, the various parts of your hypothesis, and you went through those for me. Do you recall that?

A I do.

Q And this mechanism that you've given us today is essentially the same mechanism, right?

A Yes. I mean, that is the point I'm making. I'm not presenting it as specific to mercury, let alone thimerosal.

Q And I asked you how confident you were that this innate immune response, which is the neuroinflammation we're talking about, correct?

A Yes.

Q I asked you how confident you were that the innate immune response at that time to measles vaccine or measles virus was having, correct?

A Yes.

Q And we can substitute in for our purposes now TCVs, or I should say mercury, correct?

A It's mercury.

Q And at that time you stated that your

confidence hovered at about the 50-percent mark?

A It was over, yeah.

Q Just, yes, about 50 percent I think is what you said. Is it the same today?

A The situation is slightly different, so let me talk about it for a moment while I consider my answer. I am very confident that mercury can cause neuroinflammation and that is well-documented in the literature. I don't think it's at all a matter of controversy.

I think there is a good arguments, good reasons for supposing that when you get neuroinflammation that the kind of consequences that I describe, manifesting autism, in fact occur, but, you know, I mean, there are other theories, as I've pointed out.

I am not at all confident whether the amount of mercury in the vaccines is at the level to elicit this inflammation because that is something that, as I've explained, for which I need assistance from a toxicologist. Now, I see enough evidence from the macaque work to believe that it is really important to find from a toxicologist what that answer is.

Q I asked you to describe the weakest part of your hypothesis at that time, and in answer to that

question you said that it was your particular mechanism of injury. Let's call it the glutamate excitation hypothesis. Is that still the weakest part?

A Okay. Again, if you could just repeat what I said? Could you do that again?

Q It was essentially that the weakest part of your hypothesis was the glutamate excitation. Is that still the weakest part of your hypothesis?

A Well, it's gotten stronger, but let me answer it this way. For most of what I've been testifying I'm relying on published literature by people other than myself and literature which I believe is of high quality.

My analysis of the neuroinflammation as having the outcomes that I explained to the Court I am fairly confident of; however, that is my personal opinion appreciation analysis. I do have some confidence in myself, yes.

Q In terms of this overall theory, is it about just over the 50-percent mark, or are you very confident in this hypothesis you've given us, is it somewhat lesser than that?

A If I were very confident, then I would claim that this was at the scientific level, way above the

level called for by these proceedings. All I can really say is that I believe it to be above the threshold set by the Claims Court for a reasonable mechanism of medical injury.

Q Now, you testified in Cedillo and Snyder, and in each of those cases the child had also received thimerosal-containing vaccines, and in each instance you didn't opine that the thimerosal-containing vaccines were more likely or even a potential cause of the autism in those instances, is that right?

A Did you ask me that about the thimerosal?

Q You reviewed those cases and were offering an opinion in each of those cases. Each of those cases had thimerosal-containing vaccines, and you offered the opinion in those cases that it was the measles vaccine, is that right?

A I did.

Q And you didn't offer the thimerosal-containing vaccines as even a potential cause of the autism, correct?

A No, I didn't at all. I haven't studied the matter, and I haven't formed any opinion whatever on the rights or wrongs of the thimerosal theory at that time, nor had I been asked to.

Q In the Cedillo case you had written a 27

page report discussing that case, and, again, in the Cedillo case the child had also received thimerosal-containing vaccine, and that report didn't contain a suggestion that thimerosal-containing vaccines were a cause of that child's autism, correct?

A No, I haven't studied or been asked to study that possibility at all, nor had I much reason to because when you actually find a neurotropic virus in the body of a child, that's a very potent phenomenon in the differential diagnosis. As I was telling you earlier, we've really only begun to consider the question of mercury very recently.

Q And in that instance the Court was considering whether the combination of thimerosal-containing vaccines and the measles vaccine caused autism, and yet, you still didn't render this opinion that thimerosal vaccines could have any role.

A At the time I left that discussion, as is proper, to the toxicologist.

Q In Snyder, you also presented a 27 page report, and in Snyder they also, thimerosal-containing vaccines, and in that instance you also did not opine or even suggest that the thimerosal-containing vaccines could be a potential cause of the child's regressive autism, isn't that correct?

A That's correct.

Q And while the vaccine at issue is different in these cases, significant portions of your causation mechanism are precisely the same, correct?

A Could you say it again?

Q While the vaccine at issue is different in this instance, in this case, or at least your causation opinion is to a different vaccine --

A So is there a particular vaccine at instance in this case?

Q Thimerosal-containing vaccine versus measles vaccine.

A You mean the range of them, yes. Yes. If you're saying that MMR does not have thimerosal, that is correct.

Q Significant portions of your causation mechanism are exactly the same, correct?

A Oh, yes. Absolutely.

Q In fact, if we compare passages in the Cedillo trial and several key points, they're virtually identical with your report here, is that right?

A Absolutely. When I realized that mercury can set up essentially the same neuroinflammation that viruses can, then I began to take seriously the

question of the possible intervention of mercury. That's not something that I had worked on until quite recently.

Q In fact, they're virtually identical except that you essentially replaced the word "measles virus" with "thimerosal-containing vaccines," correct?

A Well, it took me an awful lot of hours to be identical. No, I don't agree with that, but that's a matter of detail which -- you can ask me again to answer if you want me to.

Q I think we'll leave this to our closing briefs. Actually, now we do have these passages up. Can you review that? This is your report in the Cedillo case I believe, is that right? In the Snyder case.

SPECIAL MASTER VOWELL: And that would refer to page 16 of what's labeled Petitioners' Exhibit 29 on the left of the screen?

MR. MATANOSKI: Correct. I'm sorry, ma'am.

SPECIAL MASTER VOWELL: There are two things up there and if you say this is, we don't know which one when we read it later.

SPECIAL MASTER CAMPBELL-SMITH: And you're comparing that with --

MR. MATANOSKI: With page 13 of the report

that you submitted in this matter.

THE WITNESS: Uh-huh.

BY MR. MATANOSKI:

Q And the changes that are seen are highlighted, and those are the only changes, correct?

A As I've testified, when I'm describing neuroinflammation I'm describing the same thing because there are multiple causes for that thing.

Q You served as an expert witness in 130 cases for petitioners in this program, or approximately 130 cases, is that right?

A I haven't counted them. I would rely on you to tell me how many.

Q Does that sound about right in terms of your recollection?

A Yes, it does.

Q How many vaccine cases are you retained in currently?

A How many?

Q Are you retained as the expert in currently?

A How many cases am I active at the moment?

Q Yes.

A I'm sorry. I'm visualizing my study and my visual memory isn't that great. I don't know, 20, 30.

Q I'm sorry, did you say 20 or 30?

A See, as you know, vaccine cases take forever, you know, many, many years, and some of them are getting quite dusty on the shelves and some are active. You know, right now I guess I have like half a dozen cases that are active but others are going to be, you understand?

Q When will you testify next in a vaccine case?

A The next one, there is one hearing before Special Master Golkiewicz in June and one before Special Master Edwards in November. Those are the ones that I'm aware of currently.

Q Could you list some of the conditions you've claimed are related to vaccines?

A The conditions I --

Q You have claimed are related to vaccines.

A Conditions that I have claimed relate to vaccines. Encephalopathies, seizure disorders, Guillain-Barré syndrome, transverse myelitis, ADEM, asepticemia caused by a contaminated vaccination needle in a baby causing abscesses. If you had a list, that would really help me.

Q There may be more?

A Huh?

Q Are there more? That's all you can recall

at this time?

A I expect so.

Q Have you ever previously rendered an opinion involving heavy metals?

A I don't think I have previously offered any such opinion.

Q Now, in Cedillo you discussed your career, as you did here today, and you mentioned a change in your career plans or career path. You said you made a decision to no longer work in conventional faculty fashion in terms of service, teaching and research but to concentrate on your research program.

What prompted your decision to change your career path at that time?

A I found that service and teaching, and my interest in research, as my CV reflects, became increasingly intense and my group published more and more articles. And there came a point when I felt that I really couldn't sustain effectively all my teaching service responsibilities and yet without losing momentum in research. So I went instead to a position in which was basically a research institute where I would still see many children but see them on a selected basis. At the time it was mostly children with attention deficit disorder, so I could study them

intensely and perform the kinds of experiments that I wanted to do.

It was the kind of midcareer decision that quite a few medical specialists make.

Q So you made that decision after spending six years in Canada at the University of Toronto?

A Yes.

Q And what were the circumstances that prompted your departure from the University of Toronto?

A There was a disagreement with the new chairman, the details of which I'm not at liberty to disclose.

Q You were terminated, weren't you?

A Actually, I wasn't. Actually, I resigned. I certainly didn't want to stay there.

Q And the grounds the university was using in their termination of your employment was that you had committed unethical billing practices and that you billed for services you hadn't performed, correct?

A No, none of that.

Q And another ground was that you falsified information on your curriculum vitae, information that they relied on in appointing you to the faculty, correct?

A No.

Q This is an excerpt from --

MR. POWERS: Excuse me. Could we have a copy at counsel table? I can't read anything that far away at this point. Do you have a copy that we could take a look at?

MR. MATANOSKI: I didn't think we were going to have to go through this, frankly.

MR. POWERS: Well, I'm just asking for a copy that I can look at.

BY MR. MATANOSKI:

Q This was taken from a grievance panel proceeding where they were working through some procedural aspects of a case where you were contesting your termination from the University of Toronto and the grounds the university had notified you of, at least as found by this grievance panel, that you're aware of were these grounds for their action, correct?

A I'm not sure I heard everything you said, but I can tell you what is correct. These were accusations made against me, I filed a grievance, the grievance committee found in my favor, I decided to leave anyhow, and I was paid a sum of money, some compensation, but I was perfectly prepared to leave. The fact is that these accusations were dismissed at

the hearing by the committee.

MR. MATANOSKI: I have no further questions.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. We are in a position now to take a lunch recess. My thought would be, and we'll probably give some discussion and thought to where we anticipate going this afternoon. Petitioners' counsel, how much redirect for Dr. Kinsbourne?

MR. POWERS: I anticipate 20 to 30 minutes of redirect, Special Masters. To be on the safe side, I would say the half hour in terms of scheduling my end of that.

SPECIAL MASTER CAMPBELL-SMITH: Okay. Do you have some thought just looking forward to the extent of our day? I know that we have as well time allotted to hear from Mr. Mead and Ms. King. Do you anticipate that will require our moving into a late day or is there a reasonable breaking point, if you will, that we could perhaps reserve some testimony to commence tomorrow?

MR. POWERS: I would propose the latter, Special Master, and I'm sort of low blood sugar enough I can't even do the clock math. But assuming Mr. Mead is able to take the stand and testify until relatively close to the end of the day, rather than extend late

we would propose having Ms. King come in tomorrow morning and testify.

They're both available tomorrow and they'd be ready, willing and able to do that. So I would much rather do that, and even if it meant ending technically a little bit earlier rather than trying to get both folks in. That's what we propose.

SPECIAL MASTER CAMPBELL-SMITH: Just a thought so that as people go into lunch and have thoughts about a working lunch you know what work might be anticipated not only during lunch but later in the day. Is there any concern that you have about that, Mr. Matanoski?

MR. MATANOSKI: No. No, ma'am.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Well, so advised. We'll take an hour. I'm looking for a timepiece that will give me some sense of time. I have here, which is purportedly chronologically correct, 1:38, which we'll round to 1:40, so we'll look to see you at 2:40 this afternoon to restart.

ALL: Thank you, Special Master.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

(Whereupon, at 1:40 p.m., the hearing in the above-entitled matter was recessed, to reconvene at 2:40 p.m. this same day, Wednesday, May 14, 2008.)

A F T E R N O O N S E S S I O N

(2:40 p.m.)

SPECIAL MASTER CAMPBELL-SMITH: Please be seated. I've been advised that I am somewhere between two mics that are live, so I'll be moving around to speak into my mic and an encouragement as well from those who are listening to our witnesses and to whomever is doing the questioning to make sure we're close enough to the mic.

We appear to be fading in and out at some point. Also, a reminder to those that are in the courtroom on the other side of the bench that the quality with the sound system is being interfered with. If you turned on your Blackberries or phones, just check again and make sure you have them off.

That apparently has created a disturbance. Before we move to redirect I'd like to ask, Mr. Matanoski, the document that you had used in last question to Dr. Kinsbourne regarding the departure from Toronto, if you would care to mark that as a trial exhibit to make it part of the record?

MR. MATANOSKI: Yes, ma'am. I'll do that. I had not planned on making it a trial exhibit until we went through the questions and got the answer we got. So I will do that but I don't have it right now.

SPECIAL MASTER CAMPBELL-SMITH: Okay. All right. Are there any other matters before we return to redirect?

MR. POWERS: No, Special Master. We're ready for redirect.

SPECIAL MASTER CAMPBELL-SMITH: Please. To proceed, counsel. Dr. Kinsbourne, you continue under oath.

Whereupon,

MARCEL KINSBOURNE

having been previously duly sworn, was recalled as a witness herein and was examined and testified further as follows:

REDIRECT EXAMINATION

BY MR. POWERS:

Q Good afternoon again, Dr. Kinsbourne.

A Yes, Mr. Powers.

Q And since sound, volume and logistics are an issue I just want to make sure that you can hear me across the room here.

A Very well, thank you.

Q Great. I can hear you. I do want to address some issues that were raised by Respondent's counsel in their cross-examination. Now, do you recall a series of questions relating to Volume 6 of

the child neurology textbook in which you wrote a chapter?

A Yes.

Q And those questions were directed towards Volume 6, as I recall. Is that what you specifically remember, too?

A What was the date of that volume now?

Q Well, how about if I put it this way. The questions that were asked were in relationship to some material that appeared in the 6th Edition of the *Menkes* textbook.

A Yes, that's right. That's right, yeah.

Q Okay. And the current edition is the 7th Edition, is that correct?

A Yes, that's correct.

MR. POWERS: Okay. And, Special Masters, I'm going to discuss a couple of things about this textbook so I think we have to mark it as an exhibit, although physically it might be a little hard to reproduce it and pass it around, but I think the questions won't actually necessarily need reference to the material in the book.

SPECIAL MASTER CAMPBELL-SMITH: Are you limiting it to the particular chapter that Dr. Kinsbourne has authored?

MR. POWERS: Yes, I am, Special Master. This would be Chapter 18. What trial exhibit would we be up to, madam reporter?

THE REPORTER: Four?

SPECIAL MASTER CAMPBELL-SMITH: Four is what I have.

(The document referred to was marked for identification as Petitioners' Exhibit No. 4.)

BY MR. POWERS:

Q So for the record, and for you, Dr. Kinsbourne, we'll call this Petitioners' Trial Exhibit 4, and by that I'm referring to the child neurology textbook, 7th Edition.

A Thank you.

Q And since people listening in can't see what we're doing, I'm holding up so you can look at it. Do you see it?

A Yes, sir.

MR. POWERS: When I open this book I notice that there is a Library of Congress catalog and publication date of 2005. With the Special Masters' indulgence, I'd like to just show that page to opposing counsel and to the witness.

SPECIAL MASTER CAMPBELL-SMITH: Please.

SPECIAL MASTER HASTINGS: Well, we'll take your word for it.

MR. POWERS: Okay.

SPECIAL MASTER HASTINGS: I mean, I think maybe what you could do is whatever pages are appropriate you could file those after you go through it.

MR. POWERS: I'd be happy. To the extent that we do need to follow some of the foundational introduction rules of evidence I wanted to do that, but if we can just make it shorter, which we can, I will represent to you that the publication date was 2005. Does that seem right for that book?

THE WITNESS: Yes.

BY MR. POWERS:

Q So if the publication date was 2005, do you have a rough idea of when you would have had to have completed the materials for your chapter?

A Probably a year and a bit before.

Q So at some point in 2004, perhaps earlier, is when you would have finished your review of the literature that would have appeared in this book?

A Right. At the latest.

Q So between the time you did that and the submission of the report here today you have developed

an opinion that you have since expressed about the potential role for mercury in causing neuroinflammation, is that correct?

A Yes.

Q And that's an opinion that has developed from the time that the book was published until you presented your expert report here?

A Absolutely.

Q In fact, if one looks at the references that you cite in the attachment to your expert report here, and, again, I'm not going to ask you to count them but I will represent to you that there are 22 articles cited there that were published in 2005 or later. Does that sound about right to you?

A Yes, it does.

Q And this would include articles that you rely on in your report and in your testimony including one of Dr. Aschner's studies, the Burbacher infant monkey study, Vargas and Pardo. Does that all sound correct? These would be after 2004?

A Yes, indeed.

Q So would it be fair to say then that from the time this book was published until offering your opinion today there's been, to the extent that it informs your opinion, a significant body of new

scientific literature upon which your opinion is based?

A Yes, it is.

Q Do you also recall a line of questioning relating to your expert report and your testimony in the Cedillo matter and the Snyder matter?

A There was such a line, yes.

Q And that was a line during cross-examination with Mr. Matanoski, correct?

A Yes, sir.

Q You were asked why you did not include any reference to your current opinion regarding mercury as a potential cause of regressive autism. You were asked why you didn't express that opinion in June of 2007. Do you recall having that question?

A Yes, I do.

Q Why didn't you express the opinion back in June 2007?

A I hadn't formed it at that time.

Q You were asked again by Mr. Matanoski why you didn't proffer this opinion in the Snyder matter which was heard in November of 2007, and I can't recall if you answered it specifically so I'll ask you now. Why didn't you proffer today's opinion back in November of 2007?

A I had not formed it at that time.

Q What did you rely on between November of 2007 and April 2008 when your expert report was filed to develop the opinion that you express today?

A At least some of what made me think harder about the matter were some articles by Aschner, one of which was filed, and the Lopez-Hurtado article, which came out I think just a very short time ago.

Q And, excuse me, the Lopez-Hurtado article, was that the autopsy study?

A That was the autopsy study with the striking loss of astrocytes in the language area, yes.

Q So would it be accurate to say that the opinion that you have ultimately come to here today did not become final until some time in the period between January and early April 2008?

A Absolutely.

Q I want to now talk about some of the substance of the science that came up on cross-examination. Do you recall a line of questions from Mr. Matanoski asking you about astrocyte death? Do you recall those questions?

A Yes.

Q Do you recall questions specifically asking about what dose of mercury it takes to kill

astrocytes? Do you recall that?

A Yes.

Q Now, in looking at your neuroinflammatory model, is it essential to the model that you have astrocytes dying in large numbers? Is that an essential part of your model?

A Not at all. As I explained to the Court, the critical point of information is that the astrocytes under attack by microglia suspend their ability to reuptake glutamate and scavenge it away from the synapse so that they no longer can exert their regulatory function because of which the glutamate goes out of control and then the consequences I mentioned of overexcitation follow.

So whether they, astrocytes, actually die subsequently would not affect this particular function. Makes no difference.

Q And you were also asked if it was the mercury itself that was directly toxic to the astrocytes to kill them. Do you remember those questions?

A Yes.

Q In your theory or your model of causation here, the inflammatory model, is it necessary that the mercury itself directly kills or impairs the function

of the astrocytes to create the sequelae you describe?

A No. The mercury in the astrocyte could attract the immune attack but the microglia trying to eliminate it and result in the death of the astrocyte.

Q And not only in the death of the astrocyte, but would it be accurate to say the cytokine environment could impair the function of the astrocytes without killing them?

A Right, and, as I mentioned before, my model really does not rely on cells actually dying, although some do, but rather on cells suspending certain vital functions.

Q So this is a functional issue, not a cell count issue necessarily?

A Absolutely.

Q And, again, the function that you're describing here with whether it's the death of astrocytes or the functional impairment of astrocytes is the glutamate uptake, is that right?

A Yes.

MR. POWERS: Now, I am going to show a couple of articles up on the screen for you and ask some questions about those. Scott, if you could put up, I should have it memorized by now, I think it's 116, the 1996 Charleston article. And if you could

zoom in to the title of that, please, Scott.

BY MR. POWERS:

Q Dr. Kinsbourne, can you describe what you see on your computer monitor there?

A Well, the title of the article is *Changes in the Number of Astrocytes and Microglia in the Thalamus of the Monkey Macaca Fascicularis Following Long-Term Subclinical Methyl Mercury Exposure*, and it's by Charleston and Ellis.

Q Now, do you recall a line of questions when you were on the witness stand under cross that focused on the Charleston article that you see in front of you now?

A Yes, there was such a line of questioning.

Q During that line of questioning, were you provided with a copy of the article to refer to in response to specific questions?

A No.

Q Do you recall being asked what part of the brain was being examined in this paper?

A Right, I was asked that.

Q Do you recall what your answer was?

A My answer was cerebrum and cerebellum.

Q Looking at this exhibit in front of you now would your answer be any different now than it was

earlier?

A Yes.

Q What would your answer be now?

A Thalamus.

Q And that's just clearly in the text of the article, correct?

A Yeah.

MR. POWERS: Scott, if you could turn to page 2 of the exhibit. Again, for the record, this is Petitioners' Exhibit 116, page 2.

BY MR. POWERS:

Q And, Dr. Kinsbourne, we're going to draw your attention to the right-hand column. You see a section that's labeled methods. Do you see that?

A Yes.

Q And about halfway or about a third of the way into that specific section there's a sentence that's highlighted that begins four groups were. Do you see that?

A Yes.

Q Take a look at that sentence and tell me what your understanding is of what's going on in this study.

A Well, the animals were given methyl mercury on a daily basis, a low dose, but a high-range low

dose, not an extremely low dose.

Q So these were adult monkeys being given methyl mercury, correct?

A Right, and being given on a daily basis.

Q And during your cross-examination do you recall referring to this adult monkey study as having involved the administration of thimerosal vaccines?

A Actually, I don't, so I hope I didn't.

Q Okay. Because it's your understanding of this article that these were methyl mercury exposures involving oral administration, correct?

A Right. No, the thimerosal came up later.

MR. POWERS: You can pull that down, Scott.

BY MR. POWERS:

Q And when you say the thimerosal came up later, what are you referring to?

A Well, the infant study that I mentioned. It was to the infant macaques that the vaccine schedule and thimerosal was relevant. That's where they tried to establish some parallel in the dose so as to elicit some hopefully parallel changes if they occur in the brain.

MR. POWERS: Okay. Let's go ahead and put that on the screen, Scott. That would be Petitioners' Exhibit 26. And, again, Scott, if you could zoom in

on the title there.

BY MR. POWERS:

Q Dr. Kinsbourne, now that it's up, could you describe what you see on the screen?

A Title is *Comparison of Blood and Brain Mercury Levels in Infant Monkeys Exposed to Methyl Mercury or Vaccines Containing Thimerosal*, by Burbacher and others.

Q Okay. So what of these two articles that I've just shown you, the Charleston article and the Burbacher article, which of these two articles were you referring to when you described it as an experiment that administered doses of thimerosal in a way meant to mimic the human thimerosal exposure?

A Well, the 2005 article by Burbacher and others which was about infants.

MR. POWERS: And in fact let's just make sure of that. Scott, if you could turn to --, and in the left-hand column under materials and methods the heading that begins mercury dosing schedule, if you could zoom in on that, please?

Actually, Scott, if you could extend down to the full length of that paragraph?

BY MR. POWERS:

Q Dr. Kinsbourne, could you read that

highlighted section?

A Yes, sir. Seventeen infant monkeys assigned to the thimerosal group were given the typical schedule of vaccines to human infants.

Q If you could then look down, it's not highlighted but it's the very last sentence in that paragraph and it begins with the words "a dose of."

A A dose of 20 micrograms per kilogram was chosen based on the range of estimated doses received by human infants receiving vaccines during the first six months of life.

Q So whenever you were referring then to a monkey study involving sort of a schedule designed to simulate human exposure it would be this 2005 Burbacher paper, is that correct?

A That's correct.

MR. POWERS: And, Scott, you could pull that down. Thanks.

BY MR. POWERS:

Q Now, Dr. Kinsbourne, is it your understanding that Dr. Burbacher has a second portion of the 2005 study that's underway?

A Yes.

Q What is your understanding of what that study seeks to determine?

A My understanding is that that study seeks to determine whether there is neuroinflammation in the brains of these infant monkeys.

Q And is this the type of evidence you would be looking for to provide an answer to the question of what dose of thimerosal in vaccines might reasonably be thought to trigger neuroinflammation? Is this the sort of evidence you would be looking for?

A Very much so, yes.

Q This would be evidence that you would rely on in forming an opinion about whether the specific dose of thimerosal could trigger your inflammatory model, is that correct?

A That's correct.

Q I also want to give you a hypothetical. Let's assume that a reliable, credible toxicologist testified that if one compared between the 2005 infant monkey study, if you looked at the highest doses of inorganic mercury remaining in the brain, it's the highest doses among those monkeys, and you then looked at the 1996 data for the adults where they actually found inflammation, if that range of exposures overlaps, would that be evidence to you suggesting a threshold dose of thimerosal that might cause inflammation?

A To make sure that I understand this, we start with the fact that the adult monkeys were given bigger doses than the baby monkeys in the later, right?

Q Correct.

A Now, we know that on principle infant monkeys, humans, other creatures are more susceptible to mercury. However, what you are suggesting is that the highest doses given to some of the infant monkeys might have overlapped the lower doses given to the adult monkeys, is that correct?

Q I'm sorry? Let me rephrase the hypothetical for you if need be because if you have this many questions about the hypothetical it's apparently not a clear hypothetical.

A Okay.

Q The hypothetical was this. You have one study that shows that with a certain amount of inorganic mercury that ends up in the brain you have neuroinflammation. So that's a given, that's the Charleston paper. You then have another paper that looks specifically at thimerosal-containing vaccines.

That paper doesn't show any inflammation yet, but it does show how much mercury actually got into those parts of the brain.

A Right.

Q If there was an equivalence between that infant dose that we know is in the brains and the adult dose that we know is in the brains and causes neuroinflammation, would that increase your ability to answer the question of what the threshold dose would be, assuming that, as I said before, a reliable toxicologist explained that?

A Right, and assuming that it was systematically true of the group of monkeys, that would. It would, indeed, because there's no reason to suppose that a given dose, a given amount of a heavy metal is less effective in eliciting neuroinflammation in infants than it is in adults.

Q Is there any reason to believe that it might be more effective at causing neuroinflammation in infants under the age of two than it would be in adults?

A Yes.

Q What's the basis for that?

A Just experience that infants are more susceptible to these anomalous reactions.

Q Another question. The Burbacher study, the 2005, because I don't want to create any more confusion since Burbacher is on many of these studies,

the 2005 infant schedule, if you recall the excerpt up there, it mimicked the vaccine schedule for the first six months of life, correct?

A Yes.

Q So it didn't mimic the schedule for the first full year of a human's life or the first two years of a human's life?

A Right.

Q Do you believe that repeated exposures to ethyl mercury via thimerosal can lead to an accumulation of inorganic mercury in the brain?

A Well, there are some mercuries delivered every time, and since it is broken down to inorganic mercury, and since that can now no longer leave the cells, it must accumulate to some extent.

Q So one would expect then if an animal, and let's talk specifically if a human being, if a human child received not just the six months of thimerosal-containing vaccines but the full-year and the full two-year schedules, you, based on your review of the literature, believe that additional inorganic mercury would be deposited in the brain, is that fair?

A Yes, I do.

Q And if additional inorganic mercury would be deposited in the brain would it increase the

likelihood that the mercury put into the brain by thimerosal-containing vaccines might be at a dose sufficient to trigger inflammation?

A Perhaps you would repeat that last bit.

Q I should make it even simpler. If you get extra inorganic mercury in the brain does it increase the likelihood that in fact it will lead to an inflammatory dose?

A It most surely do that, yes.

MR. POWERS: I have no further questions.

SPECIAL MASTER CAMPBELL-SMITH: Mr. Matanoski?

MR. MATANOSKI: Thank you.

RECROSS-EXAMINATION

BY MR. MATANOSKI:

Q Doctor, what's the dose necessary to elicit neuroinflammation? What dose of mercury is necessary?

A You've asked me this before and I told you that I didn't know.

Q And what else did you say? Did you say you needed a toxicologist to explain that?

A Well, there's nothing to explain exactly to determine that.

Q Mr. Powers just asked you a series of questions about what you'd expect from a series of

doses and what the expectation would be after the receipt of inorganic mercury and you answered those questions.

A Yes, because they were different from the ones that you asked me. You asked me for doses. He asked me whether if a certain amount of a substance elicits neuroinflammation, would adding to it elicit more neuroinflammation? That I'm competent to answer. Yes, it would.

Q And what's the lowest threshold that you can think of before neuroinflammation would start --

A That is what I would like a hypothetical toxicologist to tell me.

Q And if inorganic mercury comes from methyl mercury, then that would increase in the brain over time, too, correct?

A Certainly.

Q And I believe in your report you said it stays in there for years?

A Absolutely.

Q And in your testimony this morning you said maybe for life, correct?

A I did.

Q And if one takes in methyl mercury with this organic component in it and one gets it from fish,

from dental amalgams, in utero from the maternal sharing of the blood, correct?

A Yeah.

Q From breast-milk-feeding, from tunafish sandwiches, from eating chicken, according to Dr. Aposhian. All those methyl mercury exposures would continue to build up inorganic mercury in the recipient's brain, correct?

A Correct, which is why I kept telling you that I talk about mercury from whatever source.

Q Okay. And if, as you said, it could stay in there for years, maybe even for life, then the neuroinflammation affect that you were talking about, which would increase under the hypothetical that you were given by Mr. Powers, would continue to increase over time, correct?

A It sounds logical that it would. Now here's some immunology I'm not sure about, whether it is such a simple relationship, but it could potentially do that. In fact, neuroinflammation has been found in autopsies of people in adult life and in midadult life at the very least, so it certainly can continue for a long, long time.

Q Okay. And when Mr. Powers asked you that, you did think it would increase with increasing

inorganic mercury in the brain?

A I think that's a reasonable thing to suppose.

Q And you said you thought it would be likely to happen, correct?

A What was the last thing I said?

Q You believe that would be likely to happen, correct?

A Yes, I do.

MR. POWERS: Thank you.

SPECIAL MASTER CAMPBELL-SMITH: Any additional questions?

MR. POWERS: Not for the Petitioner, no.

SPECIAL MASTER CAMPBELL-SMITH: Dr. Kinsbourne, with neuroinflammation your theory is this is acute or chronic neuroinflammation?

THE WITNESS: It would be chronic. It would build up in and simmer, as it were, over a long period of time.

SPECIAL MASTER CAMPBELL-SMITH: Chronic neuroinflammation, does that lead to neurodegeneration?

THE WITNESS: It potentially does. It depends on the level of the inflammation. If it is at a low level, which we believe it is because the doses

are really very low doses, as we're discussing, then it would in my opinion lead to certain distortions of the functions of cells but by no means necessarily kill them.

SPECIAL MASTER CAMPBELL-SMITH: I guess what I'm trying to sort out is your opinion is a qualitative opinion. You've made it very clear that it's not based on a particular quantity. Yet, there is a response to, as you indicated, low level episodic exposures to mercury of whatever sort that permit a deposition of organic mercury in the brain.

THE WITNESS: Right.

SPECIAL MASTER CAMPBELL-SMITH: And it is your theory that it is the presence of that inorganic mercury, from whatever source, that can lead to this neuronal dysfunction through a process of continued neuroinflammation that is somehow below the level, whatever that level is, that would lead to neurodegeneration.

THE WITNESS: Correct.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

THE WITNESS: Thank you.

SPECIAL MASTER CAMPBELL-SMITH: Have my questions triggered any questions by counsel?

MR. POWERS: No, they have not, Special

Master.

MR. MATANOSKI: Not from the government.

SPECIAL MASTER CAMPBELL-SMITH: Any further questions?

(No response.)

SPECIAL MASTER CAMPBELL-SMITH: Thank you, Dr. Kinsbourne. You're excused.

THE WITNESS: Thank you, Special Master.

(Witness excused.)

SPECIAL MASTER CAMPBELL-SMITH: Petitioners' counsel, are you prepared to call your next witness?

MR. POWERS: Yes, we are. Petitioners would like to call George Mead.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

MR. POWERS: Counsel was ready. I just wanted to make sure Mr. Mead was ready.

SPECIAL MASTER CAMPBELL-SMITH: Good afternoon, Mr. Mead.

MR. MEAD: Good afternoon.

SPECIAL MASTER CAMPBELL-SMITH: Would you please raise your right hand?

Whereupon,

GEORGE MEAD

having been duly sworn, was called as a witness and was examined and testified as follows:

SPECIAL MASTER CAMPBELL-SMITH: Thank you. To proceed.

MR. POWERS: Thank you.

DIRECT EXAMINATION

BY MR. POWERS:

Q Good afternoon, Mr. Mead.

A Good afternoon.

Q Just so that we get a good, clean record, could you state your name and spell it for the court reporter, please?

A My name is George Winslow Mead, M-E-A-D.

Q And, Mr. Mead, where do you live?

A I live in Portland, Oregon. West Linn, Oregon, to be more precise.

Q West Linn is a suburb of Portland?

A It is.

Q How long have you lived there?

A Three and a half years. I've lived in metropolitan Portland since 1992.

Q Now, you're William Mead's father.

A I am.

Q Is William Mead's mother here in the courtroom today?

A She is. Victoria Shirley is his mom.

Q Okay. And with different last names,

clearly you're not married right now. You and William's mother are not married?

A Regrettably not.

Q Okay. What do you do for a living?

A I'm an attorney.

Q What sort of law do you practice?

A Construction, real estate and real estate litigation. There was a time about 10 years ago when I, well, for a period of about 10 years I did medical malpractice defense and I stopped doing that, so for the last 10 years I've been doing real estate, construction.

Q Okay. So, Mr. Mead, what I want to do is have you fill the Special Masters in on your narrative description of your son, William's, life, particularly in those first couple of years. Obviously the claim here is that there's a regressive autism case at issue, and I'd like to explore with you for the benefit of the Special Masters the facts about William's condition.

A Certainly.

Q So let's just start from the beginning. When was William born?

A May 5, 1998. He was born at St. Vincent's Hospital. My memory is that I think he was nine

pounds, 12 ounces. He was a large baby. Very healthy.

Q I'm assuming that his mother's memory is a little more distinct on that than yours.

A I think hers is slightly different than mine, yeah, but it definitely was a healthy delivery. It was a great day.

Q And an uneventful pregnancy?

A Yes. Yes.

Q Now, one thing that I had wanted to ask is did William's mom while she was carrying William to term -- and he was full-term?

A William was a full-term baby, yeah. I think he may have been two days early, but I think he went all the way.

Q So during the time that William's mom was carrying William to term did she have any dental fillings, any amalgam fillings?

A To the best of my knowledge, and this may be true to this day, Tori has never had any fillings at all.

Q Okay. You've already described just that it was an uneventful pregnancy, at least as uneventful as pregnancies can be, and it was a normal labor and birth, is that right?

A Yeah. I would like to say apropos of something that the Respondent's counsel said about William's before being born.

I can tell you that Tori went out of her way not to eat any fish and not to eat any tuna or anything like that, not simply as a matter because we were conscious of that, but also because she simply detested it at the time. And so up to the point that he had been born there had been no tuna or any kind of fish exposure.

Q Okay. Now, after he was born he was in the hospital for a couple of days. During his stay in the hospital was he immunized?

A Yeah. I don't have the immunization records in front of me but I've looked at them, and I think he was immunized within the first day with the hepatitis B.

Q Hepatitis B?

A Right, but we didn't know about that at the time.

Q Right. So now he was discharged from the hospital. Can you go ahead and just describe for the Special Masters the first few months of his life? Rather than just have it be a totally open-ended sentence, let's look at from the time he came home

from the hospital to, say, six months of age. So look at that window. If you could describe his health in general and his developmental progress in particular.

A Well, from a general health standpoint William had some bronchial issues and some ear issues fairly quickly on. He seemed to have croup, and we were in there fairly regularly in addition to getting followup for him and in terms of well baby visits and all of that, but he did have croup and had some ear infections. In terms of his personality and his verbal development, he was a great kid. He was verbal, he was interactive.

Q And let me interrupt here. In the first six months we're talking about, so are you saying he was verbal by age six months?

A Well, verbal to the degree kids can be at that age. He wasn't saying please pass me the paper, Dad. He was basically, you know, ma, da, kind of interacting very, very actively with us. Obviously he was not having full words at that time.

You know, we had read what you can expect and we had kind of educated ourselves about that, and so, I mean, he rolled over appropriately, he started to sit up when he was supposed to, and he was right on track except for this persistent bronchial issue that

we were dealing with, but globally, he was in really good shape.

Q Now, he has an older sister.

A He does.

Q How much older than William is his sister, and what's her name?

A Eleanor is his older sister, and she's, let's say 14 months older than he is.

Q So she was 14 months old when he was born?

A Right.

Q So you had had experience with a first child. William was not the first child.

A Right. I mean, we had been through it and as Eleanor was developing we were kind of doing it followup, so we were kind of knowing what to look for.

Q And I think a minute ago you mentioned you were reading the *What to Expect* book?

A Well, we had the whole series thing, you know, *What to Expect When You're Expecting*, *What to Expect in Your First Year*, *What to Expect in Your Second Year*. I'm not making any kind of plug for it but they were useful books and we read them a lot.

Q And based on the *What You Expect* book said, let's expand it all the way up to that first full year. Were you seeing in William what you had seen in

Eleanor's development and what you were led to expect by the baby books you were reading?

A Yeah. In that first year we were seeing eye contact, we were seeing verbalization. By the time William was one year old, he was using rudimentary language, he was getting all of his needs met, you know, ma, you know, hi, ma, hi, dad.

There's a video bouncing around here somewhere of the summer when William, I'm trying to think, would have been about just after his first birthday, and he was sitting, and we took a visit to Sun River, and, you know, I'm hungry. He was basically getting his needs met using two to three word sentences by the time he was one year old.

Q During that first year of life did he play? I mean, did he play with toys and that sort of thing?

A Absolutely.

Q Did he have favorite toys or favorite things he liked to do with his toys?

A Well, he had a normal, you know, he had stuffed toys, he had, you know, a variety of different Thomas and that kind of thing that he'd play with, and he had playmates.

He played a lot with his sister, he was part of a mommy and me group and the kids would come over

or he would go over, and he was fully interactive with the other children at that point, and, again, kind of having his language evolve during that time. You know, in terms of his ability to identify things, you know, I want that or I'm hungry, I hungry and pointing at things.

His eye contact was very, very good. He looked directly into your eyes. And in terms of interaction, you know, you'd play with him and it would be like, you know, is this the doggy? He's like, no, that's not the doggy. And you kind of look and be able to interact with him and play. He did all of that right. I mean, he was developing perfectly normally that way.

Q And was that with both you and his mom as well as with other kids and other adults?

A Absolutely. And the thing I think also in that time period is, you know, he could identify me by name, he could identify his mom by name. We had a dog, Baxter, he could identify Baxter by name, his sister by name.

I can't remember if exactly at that point up to a year he was identifying body parts, but I know that he was getting to the point where, you know, where's your tummy, and where's your face and all of

that and he was able to do all of that stuff.

Q You described that he had some bronchial issues and some ear infections starting some point in that first six months.

A It was within the first three months I think, yeah.

Q Okay. Did that recur up into the first year that you're talking about?

A Right. That was a recurring problem for William. We were, you know, consistently in seeing the doc. And, you know, my memory is that at no point did the doctor or anybody remark during these visits that there was anything that William wasn't meeting his milestones.

In fact, my memory is that at one point the doctor even noted that, you know, he's very engaged, very alert and very plugged in. This is right up until he was one year old.

Q And during that first year of life, and, again, we're not going through the medical records here, they're on file with the Court, would it be accurate in your recollection to say that he received the normal course of childhood immunizations at two, four and six months?

A Right. Well, obviously I've had seven years

to kind of look at this issue, and I did go back and look at his immunization schedule and I can say with certainty that he got every vaccine under the APA schedule that he was supposed to and I think maybe even one more in May, but he got everything that he was supposed to.

One other thing that was kind of an important social milestone for William during the first year of his life was because a friend of Tori's was the art director at Williams Sonoma, was not something we sought out to do because we were not, you know, we don't stage kids, but we got this opportunity where William got an opportunity basically to be in Pottery Barn.

We took him down as the Pottery Barn kid, and he was I think all of eight months at the time. The picture, again, is floating around here somewhere. But, I mean, we took him down to San Francisco, he went through a photo shoot, it was a beautiful photo shoot, it's a beautiful picture and he was, you know, a happy, engaged kid going through that.

So, I mean, that to me is kind of a really pretty good testament of how he was functioning at that time, notwithstanding the issues he may have been having with his bronchial stuff.

Q Now, let's go ahead and if we could pick up William's history at the end of his first year going into his second year and sort of lay that out for the Special Masters, if you would?

A Right. Well, by the time he reaches the end of his first year, again, my memory is that he was embarking on getting his needs met with more complex language. I want down, I want go out. Do you want to do this? No. Yes. I mean, kind of really starting to I guess master his universe.

It was kind of, you know, what time is it? It's bath time, you know, it's bed time. We're kind of embarking into that. Also, as far as his ability to navigate, he was furniture surfing and kind of taking his first steps and doing that really well. He had an active assistant in that process with his sister, Eleanor, who was kind of, you know, right there next to him.

They spent a lot of time together. He was, again, very engaged. Actually, after his one year birthday he was very verbal. I remember, you know, again, that trip to Sun River stands out in my mind as being something where he was really, we had a good time, that was a really great trip and he was really plugged in. He wasn't really suffering. I don't

remember. He may have had some bronchial stuff but not that much at that point. He was really doing well.

Q Okay. And this trip to Sun River you just referred to, he was about a year old?

A That would have been in July of 1999. He was about 14 to 16 months old at that point.

Q Okay. And then how did things progress after that, so say 14 to 16 months? You're not noticing anything, but obviously you're here because you started at some point to notice something.

A Well, right.

Q When did that happen?

A Up until he was about 18 months we continued to wrestle with the ear infections and with the bronchiolitis, and we were in there a lot. I do know there's notes in the medical records when we took a trip I think to Astoria at one point up to Ocean Beach.

It was during the summer, and he had had some coughing and stuff, and we continued to wrestle with that. But, again, the whole time he's doing really well in terms of, he's just kind of a sick little kid in the sense that it's like can't you get better as far as the bronchiolitis stuff?

Then at about 18 months, you know, in retrospect what we started noticing, we started calling him our little engineer, and I would say about 18 months he started spending more time playing with his toys. He wasn't becoming less verbal in the sense that he was becoming quiet.

Of course, you know, with the benefit of hindsight going back and looking at that stuff, there are ominous signs that I wish I could have seen better now, I mean then, than I saw. What he basically did is he started playing by himself and started playing with his toys.

He'd still play with his sister and he'd still interact with us. His language, it's not that he stopped suddenly one day talking. What he would do is he would say, you know, I hungry or hungry, but he started saying these little phrases or all I can describe it as is ta-ka-ta-ka-ta-ka-ta-ka-ta-ka.

So he'd say something like ah, hungry, ta-ka-ta-ka-ta-ka-ta-ka-ta-ka. So there was kind of verbalization going on but there wasn't any, no forward movement in terms of his development of language. It raised red flags over time. We became more concerned about it such that, you know, by the time he was two years of age we were worried that he

was, you know, having hearing problems.

There are some people who had noticed that he was having difficulty navigating with other kids. A couple of people had made a comment in his mommy and me group that William seemed to be spending a lot of time by himself. This is when he's up to about two years of age.

Q And so just to get the timeframe correct, now, you're talking about this 18 month 24 month window?

A That's right. And that's significant in retrospect because to my way of thinking kind of looking back at the video and the stuff, that's when we began the process of losing him. We didn't know it at the time because we were simply chalking it up that he was a kid who enjoyed playing with his stuff.

We also, you know, in that six month period, probably by the time he's 20 months, his sister is very gregarious and we were wondering whether she was bossing him around a bunch and stuff like that. So I guess in retrospect I would say that's when we were beginning to lose him.

We thought there were a number of other things that were going on with him. He was also still not kicking the bronchiolitis and still having

problems with the ear infections, and, you know, I'd characterize him at his two-year birthday as being a kid that, you know, we thought, well, you know, William might be having some issues with his sister, he might be having some minor hearing issues, and we were prepared to look into that.

We took him in for his two-year shots I think on May, I want to say it's like May 15.

Q Or, actually, and tell me if this is correct or not, you actually went in a little early, in April of 2000. Do you recall? We can pull the medical record if you need it, but does -- a little bit before his second birthday you went into the doctor's office?

A I remember that he went in in April, I remember that he was supposed to have a well baby visit and then there was also the bronchiolitis issue. I can't remember as I sit here what caused it, whether the well baby visit occurred in April and the bronchiolitis issue was in May.

What I remember is he got vaccinated I think in April and he got vaccinated within six weeks later at the second visit. I think the second visit was the one for the bronchiolitis. So after May of 2000 things changed for us extremely dramatically.

Within a matter of a few weeks William lost

all the language he had, he didn't recognize us, his eye contact diminished, he really kind of looked through us, and one of the things that I remember as kind of a milestone for me on this is, and the ta-ka-ta-ka-ta-ka increased more and more.

He kept doing the verbal stimming during the first part of that summer. And, again, we were concerned that it was a hearing issue, and we finally got a referral from his pediatrician for an audiology clinic in September of that year.

Over that summer he began to have explosive diarrhea, vomiting, he had unexplained welts. We took him in several times to the emergency room during that summer visit, again, on the coast once, and also took him in to see his pediatrician. The nearer they could explain was, you know, basically he might have some kind of virus and we're trying to get on top of this bronchiolitis.

William was taking albuterol for that because he was getting very, very sick over that summer. My parents came from New York to stay with us in mid-July, and they, you know, as family will often do in a loving way but in a very direct way, said this kid has something very wrong with him and you need to do something about it.

We were, it was like we're taking him in to the audiology clinic, we're getting it looked at, and we agree. From that point on really, from mid-July, William's condition began to deteriorate and his behaviors got worse and worse. He started spinning, teeth-grinding, squinting.

He would look out of the side of his head like this and kind of look this way at you and turn his head over. He started to hand-flap, he started I said teeth-grinding, toe walking, jumping in place, you know, like without a skip rope, just kind of a skip rope skipping in place, and he would not interact at all.

It was like he was on another planet. He didn't recognize anything that he had once had, frankly. I remember coming home in early September and I heard William laughing downstairs. I said to Tori at the time, boy, there's a sound I haven't heard in a while, sounds like William's laughing.

I went to the top of the stairs and I looked down into the, we have a finished basement, and there was William at the bottom of the stairs facing the corner with his arms like this just rocking back and forward and laughing at nothing in particular.

It was one of the most shocking things I had

ever seen. It was heartbreaking. So we knew that we had to get him in to audiology clinic.

Q Excuse me. Let me interrupt. Just to keep this on a timeline because timing is important in all of this, this is after he's 24 months old. You're working into about November into his third year at this point? The incident you just described.

A That was early September, so William would be 27 or 28 months of age at that point. His physical condition was not improving at all. His stomach was bloating. He looked, if you've seen the pictures of the children in Darfur with the enormous belly and the very, very, there's no meat up top.

William had massive diarrhea for weeks on end that was -- and he had an insatiable appetite for things like the fruit salad bowl. We'd go to Albertson's and we'd get the fruit salad bowl because he would eat it and it was something that he craved. He would go through one of those in two sittings and it would just come -- and it wasn't just fruit salad.

He would eat meat and stuff like that and it would just go absolutely straight through him. He was losing weight and he would get these unexplained welts on his body. He would cover his ears. That's another thing. He would kind of go like this and cover his

ears back and forth.

We ended up at the audiology clinic in mid-September and they took him through the paces and they said well, the good news is that he doesn't have a hearing problem, the bad news is that we're going to have to set you up for Dr. Stubbs' autism clinic and the first available time we have for you is mid-December because we have so many people.

In passing one of the therapists, and I don't know who she was, said, I mean, we were absolutely dismayed at the time and one of the therapists said, you know, some of these kids respond pretty well to a casein-free, gluten-free diet.

Having never heard of any wheat-free, dairy-free diet, and it seemed kind of like small measure at the time, but we went home, and we took everything out of our pantry, and put it in boxes and I gave it away or through it away.

Starting in early October we became complete casein-free and gluten-free, and what happened over that point was William's diarrhea stopped, his stomach bloating went down, his eye contact improved. Regrettably, none of his language, it didn't spontaneously return or anything like that, but we started to feel like we were kind of getting control

of a lot of the other stuff.

Right about in there there was a seminar that was sponsored in Portland called Oasis that Tori signed up to. She said well, I'm going to go to this, it's for biomedical treatment of autism. I basically said, you know, he doesn't have autism, so why would you want to do that, or something constructive like that, and she said well, I'm going to go anyway.

She came back and, you know, a box full of stuff, and she said, you know, basically, sit down, be quiet and start reading because this thing, we have all this stuff that we have to learn about, it's amazing. There was a series of presentations obviously about the diet and all the stuff that had been happening.

Meanwhile, as far as William is concerned, you know, he's still continuing to spin and do all of this stuff. Some of it got better after we started the diet. I'd say the eye contact improved, the verbalizations improved and things of that nature, but we were still very concerned and very aware of the fact at that point that we were losing him as we sat there.

Q And now at this point you hadn't actually been able to get in to the autism clinic yet.

A No.

Q So it was a suggestion at that point from the audiology people that autism was something you had to look at, but he had not yet been diagnosed?

A Where we were was we were told get an appointment as soon as you can, which we did, we were told get into early intervention as soon as you can because you're going to need to go and see them, and we were told try this diet. We did all of those things immediately.

Early intervention signed us up for a meeting for what's called an IFSP, you know, basically an infant plan to get your kid into special education. At that point, which was early November, we went in to see them and William had lost all of his gross motor. He was unable to walk on a balance beam, he was nonverbal.

Their IQ testing my memory is it was at 55, which was five points above being so substantially retarded that any type of early intervention isn't warranted basically. And they told us that, excuse me, they told us that he was going to be institutionalized and that basically to expect that he'd never talk again.

They put him on a program which they offered

us and which we ended up working with them and ultimately went into private because they wouldn't offer him any real intervention. Anyway, at that point William had lost everything that he once had. Tori turned to me in early November and said to me that we need to videotape William as much as we possibly can.

I said well, why is that? And she said because we need to have something on him on videotape so that we remember what he was like.

Q If you need to take a minute.

A I'm okay. I hadn't really thought that much about this in a little bit. Okay. I'm fine. So we ended up on December 12, 2000, we went to OHSU and had an appointment with Dr. Gene Stubbs, and we told him basically what had happened with William, and we told him about the diet and how the diet seemed to be helping him.

He said that he had heard, he was the pediatric neurologist up at OHSU and the guy who runs the CDRC, the Child Development Research Center, and basically, William's official diagnosis was moderate autism, improving, which I thought was interesting at the time because, you know, autism, at least what they were telling me at that point, was that it was a

lifelong disease from which there is no recovery.

Q And excuse me. When you say they were telling you, the doctors there were telling you that there's no --

A Right. The doctors were telling us, the school district was telling us, our pediatrician who we no longer obviously saw after that point, was telling us that basically this was a neuro, this was an under, it was nobody understood this, that it was a mysterious condition for which there was no cure and that there was nothing that really could be done about it, and pay no attention to the fact that the diet seems to improve all of the symptoms.

That was a dialogue that I had with Dr. Stubbs. You know, it's kind of a where there's smoke there's fire, and that why is this kid's symptoms improving if he's on a diet and we're doing these interventions? He said well, I don't really know, I can't tell you that. But that, combined with what we were learning through Oasis, kind of caused us to move into looking into different things.

Q And what did you look at, and what did you find?

A Well, we looked at a number of things. The first thing that we did is there's this kind of

calculus that you go through in terms of, you know, Down syndrome, or it's like is this a genetic thing? Is this something where there's something in Tori's family or my family where, you know, my great uncle Everett, you know, he had?

And the answer is, you know, and I can say this after seven years of kind of looking at this, there has been nobody, to the best of my knowledge, in either side of our family that's ever had anything remotely like this. So we got rid of that idea.

Q Now, his older sister, Eleanor, does she have any developmental delays?

A No.

Q Anything? Speech delay? Anything at all that's ever --

A No. She's a very gregarious 11, soon to be 12 year old, and she's had a neurotypical development. She's done very well and is soon to be, you know, going into middle school, so she's doing great. So we kind of went through that. As part of this process, we ended up with Dr. John Green, who was then in Canby.

Q And when you say Dr. John Green, is he an M.D.?

A Oh, M.D., yeah. Tori used to refer to this

as falling down the rabbit hole and I think it's a really good description because everything that you kind of assume or thought you knew about a lot of stuff kind of just, you fall down the rabbit hole. So you start meeting new people, you start talking to people on the phone who are in the community.

At the Oasis conference Dr. Green had done a presentation. So we had the letter of introduction, we found a new pediatrician, Dr. Pang, and it was a big deal, and we finally got in to see Dr. Green. That was in January of 2001. What he did was he subjected William to a battery of tests: stool sample tests, blood tests, urine tests, provoked heavy metal challenge tests, metabolism tests.

What came out of this was shocking, frankly. What the tests, and you have them in front of you, but they showed that he had myelin basic protein antibodies, which means that his body was dissolving his own brain tissue, he had no IgM or IgA, he had no immune response. He was like an AIDS patient.

Basically, the first thing that came along could have killed him. He had massive yeast overgrowth from candida albicans, he had metabolic dysfunction and he had leaky gut syndrome, which means that his intestinal permeability was -- and this is

all in the tests there.

This was a kid who, in addition to all the neurological stuff that we were seeing outside, was an extraordinarily sick little boy. We started at that point in January to embark on the journey as far as the therapies that we've done for five and a half or six years. We started cautiously, cautiously, with chelation.

Chelation has a lot of spin on it. We started pulling the mercury out of William, and as I indicated, the first provoke challenge tests showed that William had seven times the reference range. A severely mercury-toxic kid. The thing that was really surprising to us is that Tori never had any fillings, we didn't live near a coal fire plant, we weren't, you know, smelting automobiles in the back of the backyard.

I mean, I'm trying to be a little levity, but it was a shocker to us. Absolutely shocking.

Q And, now, obviously, Mr. Mead, not as a doctor, but it sounds like you've done a lot of reading, sort of the educated layperson, the conclusions and the description of the test results, were those provided to you by Dr. Green?

A Absolutely.

Q I just want to make sure that what you're telling the Special Masters is what a medical professional has passed on to you.

A Dr. Green provided us copies of the tests. I'm a lawyer, not a doctor. I'm a dad. I'm obviously a little emotionally involved in this. Dr. Green was very good about sending the tests on, and after the first panel of tests came in he sat us down and it was kind of like what's this all about?

And so we did a number of things with Dr. Green's oversight, his treatment protocol, and that included chelation, it included transfer factor, it included zinc supplementation, we gave William a number of supplements, and ultimately, because William had what we suspected was gut disease, we were able fortuitously to secure an appointment to see Dr. Tim Buie at Harvard, at MGH.

Q Excuse me. MGH is?

A Massachusetts General Hospital. We made a trip from hell with William cross-country.

Q When you say a trip from hell, I'm assuming that's because William was not particularly able to travel well?

A Well, at that point I think he was three and a half. At that point he was severely affected. A

lot of his diarrhea and stuff had subsided because we were doing the casein- and gluten-free diet. But to sit on an airplane going cross-country is challenging, as I can tell you, for anyone, but to do it with an autistic child was very difficult.

Then we were in the motel for two and a half days waiting for this appointment. The most difficult part of it was that William needed to be thoroughly cleaned before they would do the endoscopy and in order to do that he had to take, it was calcium citrate or some awful blue stuff. And so for the last day that we were waiting there William was having diarrhea and just kind of clearing everything out.

Finally, he went in to see Dr. Buie and the results of that study were very important for us. The first is William came back again with lymphoid hyperplasia. There was clinical. We had the kodachrome color picture of William's lymphoid hyperplasia.

Dr. Buie had said that basically as long as he had the hood up, I think was the phrase that he used, would it be okay if we allowed him to do a pancreatic sufficiency study, meaning what are William's gut enzymes looking like? We said okay.

What it showed, because we got those tests

as well, is that basically before he provoked it William had almost no -- there were three enzymes that he didn't have.

Q And, again, Mr. Mead, I'm not going to ask you to get into the details of the medicine unless you know from the records, but the Special Masters will be hearing from Dr. Mumper and they've seen the medical records.

A Right. Okay. So bottom line is had no gut enzymes and then did a provoke test and they got pancreatic sufficiency, and it was a really kind of a dramatic thing for us as well. So we continued with that basically and have continued for the last five and a half years with chelation, supplementation.

We've used a variety of different antiinflammatories, including GABA, omega-3 fatty acids and low-dose naltrexone, which, again, Dr. Green prescribed. All of this is prescribed and it's part of his treatment protocol.

Q And during this course of time Dr. Green was providing the care for William?

A The whole time.

Q And to this day is he still providing medical care to William?

A The whole time. And, you know, kind of

where is William now?

Q Okay. That was going to be my next question. If you could describe, again, without breaking it down into exquisite detail, just describe William's general course moving forward to today?

A All right. Well, I will try and keep away from the exquisite detail. There was one thing I was going to say. We did have William taken in to have an MRI done because we were concerned that he had some kind of lesions or anything, and that was done by Dr. George Young and that came back clean as well.

So where is William now? Well, William talks, William plays with his sister, his language is emerging. He's 10 years old. He just celebrated his 10th birthday last week, and he went on a horse trip. He plays with his siblings. He's in second grade with an aid, he's reading at a first grade level, he's doing math at a first grade level.

His language, which is kind of the most noticeable thing if he were here, is utilitarian. It's about getting his needs met. I mean, he can tell you I'm happy; I'm sad; I'm hungry; I want an apple; no, I don't want orange, I want an apple.

He is emerging to the place where, you know, why did you do that, you know, I told you please don't

bounce the basketball. He loves to play basketball. It's like why did you do that? Because. So we're kind of at that point in his development where he's starting to have, you know, which is huge.

I think probably one of the things you could have knocked me over with a feather about over the course of the last five weeks, when I've been getting ready to go to bed and Willie's, you know, in the house, you know, the door will fly open and Willie will bring two books and we read together.

He reads and I read together. I think we're making some progress there.

Q Now, you mentioned like when he plays basketball.

A Right.

Q Apparently he's regained some of his gross motor skills.

A Thank you for asking about that. Over time, in terms of what we've done, we've chelated consistently, and it's important, the mercury has dropped to barely detectable levels. With that, a lot of the kind of stuff, William's healthy as a horse now. He doesn't get sick in the wintertime which is really interesting.

The rest of us get the flu, William doesn't

get the flu, except rarely. I won't say never, but rarely. With that, his gross motor has really returned. He runs, he plays basketball, he swims, he rides horses, he rides, you know, a jet Ski. We took him last summer. This is William in his jet Ski outfit. So he's definitely doing well. He's showing a lot of stuff that surprises us every day.

MR. POWERS: I have nothing further.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Mr. Matanoski?

MR. MATANOSKI: Thank you. Ms. Esposito will be doing the examination.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

CROSS-EXAMINATION

BY MS. ESPOSITO:

Q Good afternoon, Mr. Mead. My name is Katherine Esposito. I represent the government.

A Uh-huh.

Q I'm not sure if you heard my colleague for her opening statement the other day. She and I both share the sentiments that we would like to acknowledge the journey that you've been on.

We may disagree as to the cause of the autism, but we certainly have seen through the records and the videos that you have submitted that both you,

and William's mother and other family members as well are very concerned about him and love him very much.

A We do. Thank you.

Q Now, when you were speaking with Mr. Powers you started going through when you noticed some concerns with William's development and behavior. Can you walk me through some of those dates again?

A Well, can you be more specific about when you'd like me to start?

Q What was the very first thing that tipped you off as to William having some type of developmental problem?

A Developmental, as opposed to hearing problem?

Q Okay.

A Okay. I mean, I want to make the distinction, and I'm not being coy, that there's a big difference. For a long period of time we thought that what William had was a hearing problem, and until September of 2000 we were operating at least under the fact that if he was losing language and doing this stuff it might be because he had a hearing problem and we were taking steps to get that addressed.

So I wasn't concerned at that point, I don't think either one of us, that we were dealing with a

kid that was having a, you know, like Down syndrome, or autism, or something like that.

I think when I first really tumbled to the fact that he might be having a neurodevelopmental problem was probably at the audiology clinic, was when both of us knew that it was pretty serious, and that would have been September.

Q Right. So was there a speech delay that kind of went hand in hand with your noticing that or your suspicion that there was a hearing problem?

A Yeah. Again, speech delay, he didn't stop speaking. What he started doing was he started speaking less and then he started this verbal tick that I've described, and what I would say is that occurred some time around April or March of, I want to make sure I get the dates right, it would have been March of 2000.

Q March of 2000, okay. The records state, and you said, that William had up to 60 words at one point. You mentioned that he was saying mom, dad, Baxter, hungry.

A Uh-huh. Yeah.

Q Can you name some of the other words that he might have said, if you can recall?

A It's been a long time. I can't remember

specific. What I can tell you is things like bath time, bedtime, pajamas, breakfast, hungry. Stuff having to do with around the house. Dog, cat, farm, horse. All of that stuff was stuff that he had mastered and was actually evolving into, you know, look at the horsy. That kind of stuff was where he was.

Q And the first time that the concerns that you had about William's development were raised with the pediatrician was when?

A I don't recall that they were raised with the pediatrician. I recall that there was a concern that was raised -- there were two things that were going on at once. William, after May of 2000, got very, very sick and we were wrestling with that almost on a daily basis.

At the same time, there was this issue of his not talking, and I think his pediatrician even remarked about that at some point in her notes, but not directly to me at least.

So over that summer we're dealing with the getting William better in terms of his stomach and stuff and at the same time, and I think it's by midsummer, I don't remember the exact date, but somebody, Tori or I, had a conference and said you

need to make an appointment with OHSU, and we did.

Q And this is you were with the family in mid-July in the summer of 200 and someone in your family had mentioned something?

A My parents. My parents had come out from New York and we were at Gearhart, which is on the Oregon coast. They were with us for a week and they mentioned that, you know, something's not right, you need to take this and get this looked at. We knew, you know? It wasn't like I don't know what you're talking about.

It's like, yeah, we have some concerns as well, he's also been really sick, so we're going to get him in to OHSU. If this is July, the first time they could see us was in early September. So we got him in as soon as we could.

Q When did you first think that William's MMR vaccine might have caused his autism?

A I'm not sure that I ever developed an opinion medically about MMR. I know that William had an elevated MMR titer. One of the things, and I didn't mention it, was that when we took the tests, that William's titer showed that he was elevated, but I never developed an opinion.

I'm not a doctor. I didn't develop an

opinion about that. I think we gave William vitamin A in case he had the measles virus, but that wasn't something that we, you know, would say, wow, we think it's his MMR. We asked for his complete vaccine history and we wanted to know what he had gotten.

Q And at what point did you begin to think it was the thimerosal in his vaccines?

A Well, here's how that process went. We didn't identify thimerosal as the immediate villain because first of all, to be candid with you, we were being told that we were nuts for even thinking that there was some kind of a biomedical thing for doing this, so other than Dr. Green, we weren't getting a lot of medical information other than what we could do.

So we didn't automatically say well, this is it and this is why it's happening. When I knew that mercury was a problem for William was in January of 2001 because a kid who's two and a half years old who has seven times the reference range for the second most toxic substance on the planet, after plutonium, something's wrong.

I didn't say, well, you know, it's thimerosal, I said he's got mercury. The first order of business became at that point getting the mercury

out and that's what we started doing. The process of elimination, which is, you know, kind of going through where did it come from, we went through that as a family almost immediately.

As I've indicated, you know, his mom doesn't have any fillings. Again, there was no place for the mercury to come from other than the thimerosal, so it was a process of elimination for us.

Q Now, you said there were these lab results in January of 2001 with the seven times the mercury level?

A That's right.

Q Do you remember what lab that was from?

A I don't.

Q You don't know. Okay.

A There were actually two different labs I think taken. There were two different studies that were done and I don't remember who did them but they both showed extraordinarily high elevated levels of mercury.

Q I'd like to ask you a little bit about how William came under Dr. Green's care. Did you first find out about Dr. Green from the conference that William's mother attended?

A About his human existence, I think that was

the first time that we had learned that there was a man named Dr. Green.

No, Dr. Green came as a direct reference from Dr. Alvin Pang who was William's pediatrician of the Olson Pediatric Clinic who is one of the more mainstream pediatricians in the Portland area who actually had heard of Dr. Green's work and was not prepared to undertake it himself, not because he wouldn't, he said because he didn't feel qualified to, and he gave us a reference to Dr. Green.

Q And under Dr. Green's care William has been exposed to a number of different supplements? That's probably putting it mildly.

A Well, I wouldn't say exposed. He has taken a number of different supplements, all of which have been indicated -- one of the things we've done is we have kept track of William. I think you have a copy of William's chart.

Over time, William has shown metabolism imbalances, as I understand it, and as a result of that, Dr. Green has made recommendations like he needs more zinc, he needs less zinc, he's having trouble keeping zinc in, he has too much, he has high copper. And we've gone through that process, and with the yeast, if you go through his chart, we've battled

yeast for years because William had trouble kicking it.

So we not only did casein-free and gluten-free diet, but we also did the low carb diet and we were hauling Atkins for a while, which was good for some of us. That had the effect of helping Will kind of lose some of the yeast. So he has had a number of supplements, which is the short answer to your question.

Q In December of 2000, is it correct that William was undergoing 30 hours a week of ABA therapy?

A In the summer?

Q December 2000.

A You know, I couldn't say. The short answer is I know that he got ABA therapy almost immediately, and if that was December when we started with Building Bridges, then, yeah. I don't have the record in front of me. Intensive ABA he got almost immediately.

Q Okay. And is it correct that Dr. Green performed intravenous immunoglobulin therapy, IVIg, on William?

A He did, and he did it once, well, for two reasons. One, the IVIg was extraordinarily expensive. For one course of IVIg I want to say it was close to $500 and it wasn't covered. Two, getting an IV into a

three-and-a-half-year-old autistic boy is like trying to cannulate a Chinook salmon. It was a horrific experience.

So we all agreed that one course of IVIg and we'd do some other transfer factor and things and see if we could do it because we didn't want to put him -- the alternative to that particular thing would have been sedation, and we just talked about that. We said no, we didn't want to do that.

Q So he was never sedated for the IVIg?

A I can't remember the amount. He may have received some sedation but I don't remember how much he got. I know that it was a very, very awful, awful, awful thing that particular day.

Q And this was under Dr. Green's care?

A Right.

Q Okay. Was William also on secretin?

A He had taken secretin.

Q Secretin.

A No, it's okay. He took secretin I want to say twice. I don't have the record in front of me. Again, this was because we suspected, and ultimately Dr. Buie determined correctly, that William had pancreatic insufficiency. So one of the things that we thought would really help Will was secretin, and it

did. He became more alert and he became more talkative after he had the secretin.

Q And how many times did he have that?

A He had it at Harvard, which is when the Pavoke challenge (phonetic) happened. I think he had it at least once, maybe twice, with Dr. Green, but I don't remember specifically.

Q William was also chelated under Dr. Green, is that right?

A He was chelated.

Q And there were a number of different methods for the chelation. Can you describe some of those?

A Well, as to the best of my knowledge, William has had three chelators. He's had the DMSA, which he took orally, he's had DMPS, which he got intravenously, and he's had calcium EDTA.

He had problems with the DMSA because all chelators -- and, again, I'm not a chemist and I'm not a doctor, I'm just a guy that reads the internet, okay, and I can tell you because I know about this and from Dr. Green, that chelators are sulfur-based and yeast likes sulfur.

So when William was taking the oral chelators it was causing yeast overgrowth for him. So we'd get rid of the yeast and we'd chelate, and then

after we'd chelate he'd have yeast and we'd get rid of the yeast. Then finally, when William was capable of undergoing intravenous chelation, that's when we started with DMPS.

Q And what was the route for the EDTA, the calcium?

A Suppositories.

Q Okay. And was there a cream chelator, too?

A You know, I think at one point because we were trying to avoid -- Will's a kid that has had more than his fair share of invasive procedures. I think we'd all agree with that. So we were trying to find something that was not invasive, and so we tried transdermal DMSA, also to avoid the yeast.

I don't recall that worked very well. We did that for a very brief period of time I think. Also, we may have had transdermal glutathione as well. We tried transdermals, mostly transdermal glutathione.

Q Now, when William was under Dr. Green's care and you're trying various supplements and the different types of chelation, the IVIg, were you keeping careful track of what William was on and what he was off of? Did you keep a record of that?

A Yeah. The short answer is yes. We had a chart which we tried to keep track of which we'd mark

kind of the schedule according to what John Green would give us, and we'd go in and mark it off and make sure that he wasn't double dosing or, you know, getting too much of something.

Q And did Dr. Green also keep careful track of what William was on and off?

A As far as I know, yeah.

Q And there were times when he would go on a few different things and off a few other things at the same time?

A The short answer is it was more of an adjustment process. We didn't scrap stuff and just say let's just dump this.

What we would typically do is we would be on some type of a protocol for two to three months, William would make progress, we'd either have intravenous, usually, embolus. We'd get up in the middle of the night, we'd collect the urine, we'd put it in the thing and send it off. And we'd get back kind of where he was so we'd see what his metals looked like, we'd find out kind of what his supplementation looked like, and then we'd have an appointment with Dr. Green and we would adjust where we needed to be.

So there wasn't any kind of this scrapping

wholesale what we were doing. What it really was more like is when William's first tests came out he was basically starving to death, so we had to keep him going through massive amounts of supplements. As he recovered, we got rid of those.

So, you know, it was like, well, he doesn't need as much supplementation for zinc anymore, he doesn't need this anymore and why don't we try this and see if this will help.

Q What exactly do you mean by William was starving to death? Explain that a little more, please?

A Well, the studies that came back, and you have them, and, again, I'm not a doctor, but he was bloated and he had intestinal insufficiency, is what it appeared, malnutrition. He was not absorbing stuff.

Q The records at one point note that William had certain oral habits. What would those have been? Do you recall? Dr. Green was talking I think perhaps in regard to the pica that William had. Can you explain that a little more?

A He may have had pica at one point, you know?

MR. POWERS: Excuse me. I actually will request not so much as an objection, but if the

witness is going to be asked to comment on specific comments in a doctor's record that he be able to at least see the record if he's going to be questioned on what the record says.

SPECIAL MASTER CAMPBELL-SMITH: I think that's Exbibit -- and --

MS. ESPOSITO: The pica would be William Mead Exhibit 12 at 14.

SPECIAL MASTER CAMPBELL-SMITH: Do you have a copy for the witness?

MS. ESPOSITO: We could get that in just a minute.

SPECIAL MASTER CAMPBELL-SMITH: Before we do that, I would like to hear what he recalls from memory regarding pica.

THE WITNESS: I remember that in early January, around that period --

SPECIAL MASTER CAMPBELL-SMITH: January of what year, Mr. Mead?

THE WITNESS: Yeah, I'm sorry, January of 2001. So let me just think about this and make sure that I'm -- it was in the mid to late fall of 2000 into when we first started seeing John Green that William, I remember talking about pica. I can't remember what he was eating. I think he may have been

eating some marbles and stuff like that.

He wasn't eating -- well, the short answer is I think he had some pica. If you have a reference, I'd be delighted to look at it.

BY MS. ESPOSITO:

Q We're going to pull that up for you. Again, this is William Mead Exhibit 12 at page 14. We're highlighting the bottom of the left-hand side. The notation says pica in past.

A Well, okay. Let me just take a minute to look at this. This looks like it's dated May 8, 2002, which would have been almost -- it says past pica. Where is this record from?

Q The Pfeiffer Center.

A Okay. Pfeiffer Center was a trip that we took to Naperville just to have William looked at for -- what showed up was a copper/zinc imbalance. Along with the heavy metal problem that William had, his test showed that he had copper/zinc imbalance. The Pfeiffer Center we learned was doing stuff having to do, and Dr. Bill Walsh had done a lot of stuff, with the copper/zinc imbalance.

They were working on what was called we were told a metallothionein supplement. So we made a decision that we were going to travel out there, and

this would have been in May of 2002 when we made the trip. I guess by history somebody reported that he had pica in the past.

After William got sick he did have pica. He wasn't eating cadmium batteries. He was, you know, eating blocks, and gravel and stuff. That was not a big habit for him. That was not something William did every day. He did it in the past a few times.

Q Okay. Thank you. Is it correct that Dr. Green would first prescribe a treatment for William and then bill you for the treatment, like for a certain supplement? Did you get them from him?

A Part of the Evergreen Clinic, it's business, is it has a supplement. We got supplements from a number of different places: Kirkman Laboratories, we got them from Evergreen, we got them from Nature's Way and a number of different places. Some of the supplements we found were actually less expensive at the Evergreen Center, so we would order them from him, and he'd send them to us and he'd bill it for us.

Q There was a point in 2005 when William's mother stopped taking William to see Dr. Green, is that right?

A She and I were in the middle of a divorce and she made the decision, at least at that point,

that she would stop taking him, and he continued anyway and he continued being seen by Dr. Green. By the way, we're on exactly the same page as far as that. I think that's a period of about three weeks that that issue arose. So I started taking him, she stopped.

Q William's immunization record has been filed in his case as William Mead Exhibit 1 at 3. Pull that up for you.

A Uh-huh.

Q Does this record accurately reflect all of the immunizations that William received?

A You know, I'm going to have to defer on that one. What I can tell you is that as far as I know reviewing William's medical chart when it was provided to me and looking at this, there's not a shot that's reflected on here that he didn't get.

Q And before you had said there was another shot in April or May of 2000?

A Yeah. Again, I'm going to refer you back to the medical chart. What I remember is that he went in for another reason and that somebody made the decision, even though he had been inoculated within the prior I want to say six to eight weeks, they gave him a fifth DTaP in May of 2000.

Q Are you sure it was the DTaP?

A I'm not absolutely certain. I just know they gave him a fifth inoculation, and I think it's the DTaP. I don't have the charts, again, in front of me.

Q Do you know if there's any other record of that other shot in the records that have been filed in his case?

A I don't.

MS. ESPOSITO: Okay. Thank you very much. No further questions.

SPECIAL MASTER CAMPBELL-SMITH: Any redirect?

MR. POWERS: Yes, just very, very briefly, Special Master.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. I have a few questions as well, but please.

MR. POWERS: Okay.

REDIRECT EXAMINATION

BY MR. POWERS:

Q Mr. Mead, the care and treatment you received from Dr. Green, would you describe that as outside the mainstream of medicine?

A Not being a doctor myself I can't tell you whether it is or is not. What I can tell you is

having known Dr. Green and having known a number of other physicians that are following a similar protocol, that's got a variety of different nicknames to it. I know that he has personally, and they have received a lot of criticism for that and have been portrayed as being outside the mainstream.

What I will also tell you is that everything that has happened for William has been done, as far as I can tell, safely. So if he's gotten chelation, it's been applied safely and everything that's been done medically. I can say this as a former medical malpractice attorney, I'm not going to send my kid to a quack, I guess is the shorthand of that.

Q So then William never had an adverse reaction that you would attribute to any of the care and treatment provided by Dr. Green?

A Absolutely not. What I can tell you without overdramatizing it is we owe where William is today to John Green and to the doctors that were brave enough to do what they needed to do. John Green has personally taken a real beating.

He's practicing medicine, and he has over 1,000 patients at this point internationally, and he's received in other countries, like Italy, and all over the world, but, you know, a prophet is without honor

in his own land. He has really received a lot of very direct and adverse publicity, and even though he's done that, he's gone forward with it. We owe William to him. It's that simple.

Q Is William better off now than he was when he began treating with Dr. Green?

A The election question. Yeah. I'm being flip. My kid jumped into bed with me three weeks ago and asked to read a book with me and he's done it four times in the last four weeks. This is a kid that they said would never talk and would be in an institution. We've done all of this stuff, the low-dose naltrexone, the chelation, and all of it has without a doubt in my opinion contributed to where William is now.

MR. POWERS: All right. Thanks.

SPECIAL MASTER CAMPBELL-SMITH: Ms. Esposito?

MS. ESPOSITO: No recross.

SPECIAL MASTER CAMPBELL-SMITH: Thank you, Mr. Mead. Just a few questions that I have that are sort of follow-on -- points -- some of the questions that Ms. Esposito asked. I'd like to begin with did you generally accompany or who generally took William to his doctors' appointments and would have been the person to provide the medical history?

THE WITNESS: That's a very good question. I would say as far as Dr. Wittkopp is concerned, probably 80 percent of the time, his pediatrician, up until two years of age, his mom did the lion's share of that. I was there for a few. After William got sick and we embarked on this together, I think I was there 85 to 90 percent of the time.

We were there together with Dr. Green, we were there together with Dr. Walsh, Dr. Buie. We made those trips together because it was something that we felt pretty passionately about. So with that timeline, the early part of the medical history it's certainly coming mostly from his mom and then later on it's coming from either one or both of us.

SPECIAL MASTER CAMPBELL-SMITH: Early part of his history. Would you characterize that as less than two years?

THE WITNESS: I would say from the time obviously he was born, his early admissions and up through his well baby visits were something that his mom was doing, although interspersed with that, when we're going into Columbia Memorial, we're going into St. Vincent's for the Albuterol, I'm there for that and for a number of those admissions as well.

So for the first two years when he is going

to his standard well baby visits, his mom is doing that, and when he's having his coughing, his sickness, his ear stuff, I'm doing it, his mom may be going with me, we may be going back and forth.

SPECIAL MASTER CAMPBELL-SMITH: You mention, and this was one of my questions, his ear sicknesses and his medical records reflect that not only did he have a difficult time with this and was treated with a number of antibiotics, he experienced an eardrum that burst early on and ultimately was diagnosed with asthma.

THE WITNESS: The short answer is yes. I don't recall that there was a specific diagnosis of asthma. It was, frankly, one of my frustrations on a completely aside from what we're, that we were dancing around. It was called bronchiolitis, it was called persistent upper respiratory disease, and nobody was going to call it asthma.

I'm not sure why, but it had a lot of different names. We were treating it with Albuterol and he seemed to be chronically ill as far as his breathing was concerned.

SPECIAL MASTER CAMPBELL-SMITH: And I understand as well that William manifested an adverse reaction to steroid treatment.

THE WITNESS: Yes, I think he did.

SPECIAL MASTER CAMPBELL-SMITH: Okay. Some other questions that I had. Ms. Esposito asked you when you first noticed a problem in William, not characterizing what type of problem, when you began to suspect that something other than his upper respiratory problem might have been a problem, when would you date that?

You indicated that your first suspicion that something other than his upper respiratory illnesses was a problem with his hearing.

THE WITNESS: Right.

SPECIAL MASTER CAMPBELL-SMITH: What was it that caused you to believe he was having hearing? That was the change in the speech?

THE WITNESS: No, and thank you for asking the question. Not to qualify it, but you have to understand that going back on hindsight, 20/20, I have to kind of pull this out. What I would say is he stopped responding to us during that summer.

SPECIAL MASTER CAMPBELL-SMITH: Which summer?

THE WITNESS: The summer of 2000. In other words, up until his second birthday, and up until May of 2000, if you had said, hey, Willie, let's go

outside, he would have turned around and looked at you, which is classic, you know, that's how a kid reacts to you.

After his second birthday, after those shots and when he got sick, he wouldn't respond to his name, he wouldn't respond to people, you know, hey, William, or noises. He just kind of became focused. That's when we began to suspect that it was his hearing because he wasn't responding to his name in that time period.

SPECIAL MASTER CAMPBELL-SMITH: You also indicated, and the medical records do reflect, your complaint that William began to show gross motor problems. Do you recall about when you first began to notice the gross motor problems?

THE WITNESS: During that summer. During the summer of 2000.

SPECIAL MASTER CAMPBELL-SMITH: During the summer of 2000?

THE WITNESS: Yeah. He was walking by that point but he was stumbling. You know, hey, buddy, you're falling over a lot, you know? He'd stumble, he hit his head a couple of times. It wasn't something where I had turned to his mom and said I think he's experiencing gross motor problems. It was the wheels

were coming off is the best way I can explain it.

That he seemed to be stumbling, he wasn't answering and we were kind of like, what's going on here? The biggest problem for us was the hearing. That would have been that summer.

SPECIAL MASTER CAMPBELL-SMITH: You've indicated a couple of times during your testimony here that you would defer to the medical records generally for what has been written in the medical records at the time --

THE WITNESS: I would.

SPECIAL MASTER CAMPBELL-SMITH: -- that these events happened. I can draw your attention more specifically. Let me get just for the reference. Do you recall any instances when William was stumbling and falling that really required medical attention?

THE WITNESS: Two that I recall. Again, I'll defer to the medical records. There was one episode where I recall that he had fallen down and bumped his head, and,you know, in the kind of that's what happens to kids and kids get one of those. Eleanor has one under here.

I think that was someplace between the year and the year and a half is my memory that he fell and he bumped his head. Then there was another where he

had fallen down the stairs, and he cut his head and received stitches. I'm trying to remember when that was. It was 18 months, maybe a little bit after that. Again, I don't have the medical records.

SPECIAL MASTER CAMPBELL-SMITH: These instances to which you're referring, those are not part of the times that you would describe as in hindsight seeing William with altered gross motor skills?

THE WITNESS: No. Again, to me the before and after is William was a kid that was wrestling with his bronchial stuff, and his ear stuff, and was kind of motoring around and in hindsight had lost some of his language and skills before May of 2000. The kid that emerged over the course after May of 2000, as I said, the wheels came off.

He was stumbling around, he may have fallen down a couple of times beforehand, but, I mean, he was sitting down, rocking. I venture to say he almost wasn't even walking. He was spending a lot of time jumping and kind of rocking. That's what I would say, is after May and into early June and July is my memory is that's when the gross motor stopped.

It got worse as we went into the fall so that by the time we arrived in November of 2000 he was

having substantive problems walking on a beam and stuff like that.

SPECIAL MASTER CAMPBELL-SMITH: You indicated there came a period of time where William, the fruit bowl was one of his favorite things to eat, and notwithstanding the fact that he was eating quite a bit he was having diarrhea. Do you recall what his favorite foods other than the fruit bowl were that he was eating about this time, and would you remind me what time that was?

THE WITNESS: The episodes with the fruit bowl is really the end of the summer of 2000 into October, so August, September and October. Again, William, so he was getting the bloating and we would get these fruit bowls. The other thing he liked was he liked cereal a lot.

This is before we went on the casein and gluten-free diet. So eating Cheerios, I think he had a lot of Goldfish. He would eat, you know, hamburgers, hot dogs and things of that nature when he was not eating, but the fruit bowl was especially remarkable because it was something aside from meal time he was eating all of the time and going through that a lot. The hives was something that happened in that time period, too.

SPECIAL MASTER CAMPBELL-SMITH: During the later part of the summer?

THE WITNESS: Yeah.

SPECIAL MASTER CAMPBELL-SMITH: Mr. Mead, you indicated based on my questioning that William had stopped responding to his name and you began to notice differences in the way he would say a word and there would be some sort of babbling or nonsensical utterance in connection with the word.

You said there was no clear period of time, that you recall it was sort of a gradual fading away of language.

THE WITNESS: Right.

SPECIAL MASTER CAMPBELL-SMITH: Did you report this to the pediatrician or your or your family member report a loss of language or noticed difference in language to a pediatrician, and when might you have done that?

THE WITNESS: Well, and I think I know that there's a note in there that I do remember seeing that in May, and it was not me, I think it was his mother, reported that he was not talking. It was in May of 2000. The note says no language or he's not talking or no language.

I think that he, again, had some small

language but what was replacing it was the ta-ka-ta-ka-ta-ka-ta-ka-ta-ka thing. So the point is I think that we, we being me and probably Tori, reported that in May of 2000.

SPECIAL MASTER CAMPBELL-SMITH: Thank you. Mr. Mead, you indicated that there was a suggestion based on laboratory results that had come back that informed you and that made you suspect that William had these high mercury levels.

THE WITNESS: Uh-huh.

SPECIAL MASTER CAMPBELL-SMITH: Was there any time that perhaps you or your wife inquired independently and asked a question about -- well, let me back up. When was that Oasis conference? Was that in December?

THE WITNESS: No, that was in October.

SPECIAL MASTER CAMPBELL-SMITH: October of?

THE WITNESS: 2000.

SPECIAL MASTER CAMPBELL-SMITH: 2000, okay. And when did you receive the lab reports?

THE WITNESS: Late January of 2001.

SPECIAL MASTER CAMPBELL-SMITH: Was there any time prior to receiving those reports that you recall having expressed some concern about heavy metal toxicity or autism-related conditions to your

physician?

THE WITNESS: I'm thinking.

SPECIAL MASTER CAMPBELL-SMITH: All right. I understand.

THE WITNESS: I don't recall and the records may belie this, but I don't recall. I remember the coming back, that there had been a lot of discussion about mercury.

SPECIAL MASTER CAMPBELL-SMITH: I'm sorry, coming back from Oasis?

THE WITNESS: Oasis. That there had been a lot of discussion about that. What I also recall was that William's pediatrician's office candidly abandoned us basically. When we went to Dr. Wittkopp's office to try and get some real answers about what the shots had been, what was happening to William, why this was happening, we weren't getting answers.

So what we did in that period of time is we were in hyper mode. We got Dr. Pang onboard because he was a pediatrician who was willing to look at what was going on with William biomedically. I don't recall whether we actually raised the mercury issue with Dr. Pang before we had the panel done or not.

In other words, we may have said, well,

people have said that there's this mercury problem, but the first time that William, we actually looked at him for that, was the panel in January of 2001.

So I don't think we raised it with Dr. Wittkopp because I think Dr. Wittkopp was frankly really not interested in seeing us as a patient anymore. So we looked at Dr. Pang and went in there. I don't know whether we raised it with Dr. Pang until we got to see Dr. Green. I don't know.

SPECIAL MASTER CAMPBELL-SMITH: One additional question just in terms of getting this timeline straight. You indicated that your parents had drawn to your attention and you had begun to notice some things earlier in the summer, in July, and the medical records reflect, and you alluded to during your testimony, that there was some question at the mommy and me program about William fitting in to the program.

THE WITNESS: Uh-huh.

SPECIAL MASTER CAMPBELL-SMITH: When was that issue drawn to your attention, and what precipitated the beginning to focus on the Oasis material? I understand that it came in the mail and your former wife thought that might be a --

THE WITNESS: Okay. If I understand your

question correctly, how did we go from wondering about his hearing problem and looking at this in the summer to the Oasis conference and getting plugged into this thing.

SPECIAL MASTER CAMPBELL-SMITH: Yes.

THE WITNESS: The short answer is that it was a series of circumstance. When we went to the audiology clinic we were told that the diet would help, and we were given the names of a couple of people, one of whom was a woman named Meghan Paquin, who is the mother of an autistic child.

She took us under her wing for a period of about five weeks because she knew all about the diet. She said this is how you do the diet, this is what you eat. We said we're having a lot of trouble with Dr. Wittkopp, and we can't get answers from Wittkopp, and we're desperate, and we're scared because this is now into after the audiology clinic. This is in September.

She said, well, we go to Dr. Pang, and let me see if I can get you in to see Dr. Pang. So Meghan also I think was the one who told us about you need to go to the Oasis conference. My response was, you know, I don't want to do that. Tori said, well, I think we should do it, and she ended up going. So

Meghan was the one who got us in to see Dr. Pang, Dr. Pang made the referral to Dr. Green.

Meghan was the one who, you know, basically turned us on to the Oasis conference and put us onto the gluten-free, casein-free diet, and then promptly moved to Alaska, so it was like thanks a lot. That's how that happened.

SPECIAL MASTER CAMPBELL-SMITH: Thank you.

THE WITNESS: Thank you.

SPECIAL MASTER CAMPBELL-SMITH: Thank you very much. Have my questions precipitated any further questions from counsel?

MR. POWERS: No, they did not, Special Master.

MS. ESPOSITO: No. Thank you.

SPECIAL MASTER CAMPBELL-SMITH: I thank you very much, Mr. Mead.

THE WITNESS: Thank you.

SPECIAL MASTER CAMPBELL-SMITH: You're excused.

(Witness excused.)

SPECIAL MASTER CAMPBELL-SMITH: Well, it appears we're close to a full day today. My perhaps slightly fast indication is we're just a little bit shy of 5:00, and it is my understanding that we were

going to recess for the day and to return in the morning to hear from Petitioners' next witness. That would be a member of the King family, Ms. King?

MR. POWERS: We would still prefer to do that rather than risk yet again having people go out through the basement garage. We'd prefer to do that. Ms. King has made herself available tomorrow, Dr. Mumper is available tomorrow. If for some reason things did spill over, as you all know, we still have Friday available, too, with our witnesses.

SPECIAL MASTER CAMPBELL-SMITH: With that said, I think we are adjourned for the afternoon. Thank you.

ALL: Thank you.

(Whereupon, at 4:47 p.m., the hearing in the above-entitled matter was adjourned, to reconvene at 9:00 a.m. on Thursday, May 15, 2008.)

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REPORTER'S CERTIFICATE

DOCKET NO.: 03-584V and 03-215V

CASE TITLE: Claims for Vaccine Injuries

HEARING DATE: May 14, 2008

LOCATION: Washington, D.C.

I hereby certify that the proceedings and evidence are contained fully and accurately on the tapes and notes reported by me at the hearing in the above case before the United States Court of Federal Claims.

Date: May 14, 2008

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