UNITED STATES DISTRICT COURT

DISTRICT OF NEW JERSEY

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UNITED STATES OF AMERICA EX REL DR. HELENE Z. HILL,

Plaintiff,

-v- CASE NO. 03-4837(DMC)

UNIVERSITY OF MEDICINE & DENTISTRY OF NEW JERSEY, DR. ROGER W. HOWELL and 2DR. ANUPAM BISHAYEE,

Defendants.

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3635 Express Drive North
Islandia, New York

September 17, 2009
10:00 a.m.

DEPOSITION of LUDWIG E. FEINENDEGEN, M.D., a non-party witness herein, taken by the Plaintiff, pursuant to Notice, held at the above-noted time and place, before a Notary Public of the State of New York.

A P P E A R A N C E S:

BUCCERI & PINCUS, ESQS.
Attorneys for Plaintiff
1200 Route 46
Clifton, New Jersey 07013

BY: SHELDON H. PINCUS, ESQ.

McELROY, DEUTSCH, MULVANEY & CARPENTER, LLP
Attorneys for Defendants
1300 Mount Kemble Avenue
P.O. Box 2075
Morristown, New Jersey 07962

BY: JOHN P. LEONARD, ESQ.
SCOTT S. FLYNN, ESQ.

A L S O P R E S E N T:

DR. HELENE Z. HILL
DR. ROGER W. HOWELL

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S T I P U L A T I O N S

IT IS HEREBY STIPULATED by and between the Parties hereto through their respective counsel that all objections except as to the form of the question shall be reserved to the time of trial;

IT IS FURTHER STIPULATED by and between the parties hereto through their respective counsel that sealing, certification and filing shall be and the same are hereby waived;

IT IS FURTHER STIPULATED that the within examination may be signed and sworn to before any Notary Public with the same force and effect as if signed and sworn to before this Court.

LUDWIG E. FEINENDEGEN, M.D., the Witness herein, having been first duly sworn by James Pungello, a Notary Public in and for the State of New York, was examined, and testified as follows:

EXAMINATION BY

MR. PINCUS:

Q Would you please state your name for the record?

A Ludwig E. Feinendegen.

Q What is your business address?

A Brookhaven National Laboratories, Building 490, Medical Department, Upton, New York 11973.

Q Dr. Feinendegen, good morning.

A Good morning.

Q I know I met briefly with you when we both arrived here this morning but let me formally introduce myself, I'm Sheldon H. Pincus, I'm an attorney in the State of New Jersey, my firm is named Bucceri & Pincus located in Clifton, New Jersey, and I'm here to take your deposition today.

I know that you've been denoted an

expert witness on behalf of the Defendants in this matter and as you may well know this is a suit which was brought by Dr. Hill against the University of Medicine & Dentistry of New Jersey, Dr. Roger Howell and Dr. Anupam Bishayee. It is presently pending in the United States District Court for the District of New Jersey and we're here to take your deposition.

Have you ever had your deposition taken before?

A No.

Q Let me give you then some ground rules, if I may.

A Yeah.

Q Deposition is part of a process known as discovery, discovery is an activity which the attorneys representing the respective parties to a dispute engage in prior to trials or hearings where we have the opportunity to meet with witnesses whom we believe may possesses information relevant to the dispute.

In this case, as I indicated, you were denoted as an expert witness on behalf of the Defendants and I'm here to question you in regard

to the opinions and the facts that you set forth in the report, which we'll get to.

I want you to answer the questions that I ask you to today to the best of your ability. I realize, everyone realizes you may not have the answer to every question that I ask and you need simply tell me if you're unable to answer a question, that can happen for a number of reasons: A, you might not understand the question that I ask and if so I don't want you to hesitate to ask me for clarification or repetition, Jim, our reporter, will be happy to read something back, if necessary. I want you to listen very carefully to the question that I ask because I'm going to assume that if you respond to the question you understood it and you're capable of answering it fully and completely.

Do you understand that?

A Yeah.

Q As I say, if you need anything repeated or defined, please don't hesitate.

A May I ask questions too?

Q Generally, no. My 19 years of training afford me the luxury of asking the

questions and you get to answer them today, okay. But, obviously, if you have a question in terms of just my question, you know, let's just feel our way along and we'll guide you accordingly.

This is not, you know, any kind of marathon session, if you need a break, please don't hesitate.

A Yes.

Q You're not permitted to confer with Dr. Howell or counsel while the deposition is going on, okay.

A Right.

Q So this dialogue is going to occur essentially between yourself and I and when I'm done Mr. Leonard or Mr. Flynn will have the opportunity, if they desire, to ask you other questions.

You understand that?

A Yes.

Q During the course of the deposition there may be an occasion where Mr. Leonard or Mr. Flynn has an objection to a question that I ask, in the event that occurs, kindly hold your response giving them the opportunity to set forth

their objection on the record, they, in turn, will direct you whether to answer the question or not.

The most important instruction that I can give you is that if we don't want to get our reporter, Jim, upset, we have to afford him the opportunity to take down everything that I say and you say, consequently we can't speak over one another. Afford me the opportunity to set forth my question completely, I'll give you the courtesy of responding in like fashion, okay.

Also, because we're not being videotaped, sometimes we do videotape depositions, it's important that you give a verbal response, a nod or a gesture is sometimes difficult to interpret and if I remind you to give a verbal response, please don't take offense, it's just that it's important to all the parties that we have an accurate transcription of what went on here today, okay.

A Yes, I understand.

Q So you've indicated that you've never been deposed before?

A No.

Q Have you ever been retained as an

expert witness before?

A Not here, not here in this country.

Q What other country or countries?

A Germany.

Q What was the nature of the case or cases?

A I do not remember that.

Q When was that?

A Many years ago.

Q More than 10?

A Yes.

Q More than 20?

A More than 10 years ago, before I retired. I retired 16 years ago.

Q Am I correct that you have never been retained in a case alleging fabrication of data?

A No.

Q Let me ask the whole question, okay. We'll get into it, you'll see, this isn't a natural event and sometimes we just have to get into the rhythm. So let me ask the whole question.

Am I correct you've never been

retained in a case alleging fabrication of data which is then used or cited in support of a scientific research grant application?

A No, I have not been involved.

Q You were retained by Mr. Leonard in this case; is that correct?

A Yes.

Q Have you ever been retained by Mr. Leonard in any capacity prior to this case?

A No.

Q Have you ever been retained to serve in any capacity to the university of Medicine & Dentistry in New Jersey?

A No.

Q Have you ever been retained by Dr. Howell in any capacity?

A No.

Q By Dr. Bishayee?

A No.

Q Have there been occasions where you've spoken to Dr. Howell concerning this matter?

A That question is incomplete. Is it generalization, of course.

Q No, I said in regards to this case, have you ever conferred with Dr. Howell?

A Yes. I have been asked to make -- yes.

Q How many occasions did you speak with Dr. Howell about this case?

A Five times, four times, six times, along that. I mean, may I ask a question?

Q No, you answered my question. Do you recall when the last time was you conferred with Dr. Howell about this case?

A This morning.

Q This morning, okay.

A Well, you see, let me make it clear --

Q No, hold on. No, no, no.

MR. LEONARD: Let him finish his answer, Shelly.

A Your question implies contact but doesn't imply contact, there's a difference between numbers of contacts about what content. When I say this morning, he helped me putting this on the table, that's a contact, but you didn't mean that, of course.

I would like to have your questions be very specific so that I know what to answer. I do not want you to use general terms in order to get me into a position that is very difficult for me to answer truthfully. You want me to answer the truth.

Q Yes, I do. You did the right thing, if you don't understand my question, that's all you need tell me and I'll attempt to rephrase it.

So you did meet with Dr. Howell for purposes of reviewing materials and the preparation of your report; is that correct?

A No, I did not meet.

Q Did you speak with him for purposes of a review of materials and preparing your report?

A I think once or twice on the telephone.

Q Do you recall what you discussed in those one or two occasions that you spoke on the telephone with Dr. Howell?

A Yes. I was asked if I would be willing to be an expert witness and to look into this. I said yes.

Q Did you ever meet with Dr. Bishayee?

A No, I don't even know him.

Q Did you ever speak to him on the phone regarding this matter?

A No.

Q Did you speak to any representatives of the University of Medicine & Dentistry in regards to this matter?

A No.

Q As I understood today I believe your fees for testifying at this deposition are $400 an hour; is that correct?

A Yes.

Q Do you charge the same or a different fee structure for purposes of testifying in court?

A I haven't done that.

Q Have you established what your fee will be for testimony in court?

A Which court now, this one?

Q This proceeding, yes.

A No, I have not. Your question was whether I discussed the fee and if I decided on a fee, I have not decided on a fee.

Q So in the event and when this matter comes to trial, you've not established with the Defendants what your fee for testifying in court will be at this point?

A No.

Q You prepared a report in this matter, isn't that so?

A Yes.

Q There was no indication on that report what you charged for its preparation. Do you recall what you charged the Defendants for your report?

A I haven't charged anything yet.

Q Did you have any discussions insofar as whether your fee for the preparation of the report will be based on an hourly rate or a flat rate or any other method of compensation?

A I saw the respective remark in Dr. Robbins' report and so I followed suit because when I got the Dr. Robbins' report, it has his C.V. it says I charged that and that and that.

Q So you're guiding your fee structure by what Dr. Robbins was doing?

A Yes.

Q How many hours did you spend, do you know, preparing your report?

A Yes.

Q Can you tell me?

A Yeah. Up to yesterday was 36 hours and some half an hour or so.

Q So, insofar as any discussions that you may have had with counsel or Dr. Howell or a review of materials and the actual preparation of the report, if I understand you correctly, the sum total of time expended has been approximately 36 hours?

A No. On working on this report, not on discussions with others.

Q So it's 36 hours working on the report itself?

A My work on that report, no discussions.

Q Do you have any fee or billing arrangement that's contingent upon the outcome of this case?

A No.

Q You say that you read the Robbins' report, correct?

A Yes.

Q Do you recall when you did that?

A Yes, that was in mid June when I got it. I have it. Yeah, it was in mid June. I think it was mid June, yeah.

MR. PINCUS: Do you have any objection just for ease of marking that we call it Fein 1, F-e-i-n, all right?

MR. LEONARD: Yes.

MR. PINCUS: Mark that Fein 1.

(Whereupon, Dr. Robbins' report, Dr. Feinendegen's report, Dr. Feinendegen's C.V. and Pitt report were marked as Fein's Exhibits 1, 2, 3 and 4 respectively for identification, as of this date.)

Q So I just want to be clear, Dr. Feinendegen. I'm going to show you what we've marked for identification as Exhibit Fein 1. You'll see that we're putting a little sticker on the top.

A That's Dr. Robbins' report.

Q Let me ask the question again in fairness to you, sir.

A Yeah.

Q I want to be certain that when you were making reference to having reviewed Dr. Robbins' report, this is the copy of the document that you reviewed?

A Let me just check.

Q That's fine.

A Yes, it is.

Q Thank you. When you say you prepared your report, I'm going to show you what we've marked as Fein 2 for identification and I just want to be certain that that is a copy of what you understand to be your report?

A Yeah, that's my report.

Q When you reviewed the Robbins' report, other than your report, did you prepare any other reports or correspondence relating to Dr. Robbins' opinions?

A No, nothing.

Q There's another individual whose rendered a report in this matter by the name of Dr. Joel Pitt. Have you read Dr. Pitt's report?

A I don't know that report.

Q Let me just be certain. I'm going to show you what we've marked for identification

as Exhibit Fein 4 and I just want to be certain whether or not you've ever seen that document before?

A No, I have not seen that document.

Q To your knowledge, was this document shared with you by any of the Defendants or counsel?

A No.

Q My showing it to you here this morning is the first occasion you've had to see it?

A Correct.

Q Insofar as the preparation of your report, Fein 2, did you review any other documents that are not referenced or cited within your report for purposes of its preparation?

A Yes.

Q Can you tell me what else you've reviewed?

A Well, my book and other books and several publications which are not referenced here in this report and some research that was done and condenses down to that what is needed to substantiate my statements.

Q So let me see if I understand you correctly. I know that your report, if I go to page, I believe, 20 and 21 contain 29 enumerated references?

A Yes.

Q You're telling me that separate and apart from that you made reference to first your book?

A No, this is part of the reference. I consulted other publications in preparing the report and I took the references as relevant for this report, I selected those and I have 29 references that's relevant for my statements in this report but I analyzed many more reports.

Q I understand what you're saying.

A Yeah.

Q So separate from the references that you've cited --

A Yeah.

Q -- you reviewed others --

A Yes.

Q -- and based upon that review you determined that they were not relevant for purposes of your report; is that correct?

A No, I wouldn't say not relevant, not necessary.

Q Why were they not necessary?

A Because they were reports that I cited contained the information that was needed to substantiate my statements.

Q These other reports or these other references that you reviewed did not contain the information necessary to substantiate your opinions, is that what you're telling me?

A No, they were not necessary in the sense that I needed them. I can refer to data in the report and take several references, you see, which I did not put into the report. You can very easily, for example, use to write papers, you can easily come up with 150 references, but what is common in scientific literature is to give these references which are most relevant or most necessary, they are supporting and helpful references for background information.

This is not a black and white situation in such references, I selected those references which I believed are sufficient, clear, precise, reliable to substantiate my statements.

Q Did you maintain a list of all of the references that you reviewed but may not have cited in the report itself?

A Not all of them but a few.

Q Do you still have a copy of that list?

A Yes.

Q Do you have that with you?

A Yes.

Q Can I see it?

A It's in my computer.

Q I'm going to ask, I'll follow up on this, John, I'm going to ask that subsequent to the time when this deposition is completed that you do a printout of that list of other references that you may have given, give it to Mr. Leonard so that he can supply it to me, please.

*R(Document request)

A Do I have to comply with that? See, I am a scientist and I'm used to read a lot and if I give you the 50 or what references which I happen to have with me, this is an incomplete list, it would mislead other people.

MR. LEONARD: Let Shelly and I talk

about it. For now make the request and I'll deal with it.

MR. PINCUS: Right.

Q Let me say this: I take it that you're telling me that the list that you presently have in your computer is not a complete list of these other sources that you may have referenced, correct?

A No. I did not reference this, I referenced those which are in the report.

Q But you said that you looked at other materials?

A Knowledge building. I want to gain knowledge.

Q But you did review other materials?

A I read, I read, I'm a scientist, I read.

Q You read other materials for purposes of determining how you would go about preparing your report, correct?

A Not necessarily. I wanted first my scientific -- I'm a scientist and this is a scientific issue and there are statements here and there and I just see there -- this is science,

science is a very complicated network of individual facts, you cannot cite all the facts that come here.

If I come into a building, I don't count the bricks in the wall, I count not even the rooms, I may perhaps say that building is a good one or not a good one. You're leading me into --

Q It's very simple, Doctor, I'm titled to know what you reviewed or relied upon.

A My knowledge.

Q Let me ask the question.

A Okay.

Q I'm entitled to know what you reviewed or relied upon for purposes of preparing your report, whether you reference it or not.

A Okay.

Q So my request is very simple, I'm going ask, and I'll follow this up with Mr. Leonard, that you supply him a copy of the list that you identified that you maintain on your computer which are either articles or books or other references that are not cited within your report and then separate if you find, as you suggested to me, that that list that you have on

your computer is incomplete and you can recall other materials or literature that you read for purposes of gaining knowledge to prepare your report, similarly provide that to Mr. Leonard, okay. We'll follow that up and we'll move on.

*R(Document request)

A I want to make --

Q No, you're not permitted to make a statement.

MR. LEONARD: Let he and I discuss it, don't worry about it. Just go on to the next.

Q Did you meet with Mr. Leonard or Flynn to prepare for this deposition?

A No. Well, here, but not before.

Q Well, you met here for purposes of preparing?

A Yes.

Q Was that yesterday, today?

A Yes, yesterday, and we met once in order to get introduced so that what the report, the structure of the report.

Q How long did you meet with them for yesterday?

A Yesterday, the time?

Q Yes.

A An hour and a half, an hour.

Q The first occasion that you met with them, how long did you meet?

A Another hour, an hour and a half about.

Q Did you consult with any other experts to prepare for this deposition?

A No.

Q Did you speak to or communicate with anyone other than Mr. Leonard or Mr. Flynn to prepare for this deposition?

A No.

Q I'm going to show you what we've marked for Exhibit Fein 3. Am I correct that's a copy of your most recent curriculum vitae?

A Yeah, mostly, yes.

Q When was this prepared, sir?

A This late spring. It has no date on it.

Q That's why I ask.

A Still is as of May 2009. It is on it. It's on it. As of May 209.

Q Is there anything on this curriculum vitae that's inaccurate at this point?

A No.

Q Have you ever had your membership revoked or suspended in any professional association?

A No.

Q Have you ever had any applications for membership in a professional association denied to you?

A No.

Q Have you ever had your medical license suspended or revoked?

A No.

Q Have you ever had an application for a medical license refused?

A No.

Q When you were asked to prepare your report which we've marked as Exhibit Fein 2, did Mr. Flynn or Mr. Leonard write to you be it by a letter or e-mail describing what it is they wanted you to do?

A No. The form, not the content.

Q I understand. Did they communicate

in writing to you indicating what it was they wanted you to do?

A Yes.

MR. LEONARD: I'm just going to caution --

A The format, not the content.

MR. LEONARD: I'm just going to caution, you do not have to divulge anything that we say between ourselves. Go ahead.

MR. PINCUS: Well, hold on a second. John, if there's correspondence between you and he describing, you know, what has to do with what, that's discoverable, work product is discoverable in this proceeding.

Q You were starting to tell me about correspondence.

A Yes.

Q You said that there was correspondence insofar as the form of the report?

A Yes.

Q Do you have a copy of that letter?

A No. No, I don't know. I would have to search. I don't know. I don't think so.

Q You don't think you have that letter

anymore?

A No, I don't think I have a copy. I was told the format and I worked on it and they got it. Not the content, okay.

Q I understand you. To your recollection, was it a letter, was it an e-mail?

A I think it was an e-mail.

Q To your recollection, you did not maintain a copy of that?

A Well, I have to search, I can't say.

MR. PINCUS: I'll do a follow-up, John.

Q Did you prepare any drafts of what came to be marked as your report, Fein 2?

A Yes.

Q You did do drafts?

A Yes, I always draft.

Q Do you have copies of those drafts?

A No.

Q What did you do with them?

A I work on one draft after another improving my report. I don't have copies.

Q Each time you went over what was a draft of the report you just wrote over it?

A That's what I usually do.

Q You didn't save a copy?

A No.

Q Recopy it to a new file and then work on it as draft version 1, draft version 2, draft version 3?

A I did that but I don't keep that.

Q You did not maintain copies of your drafts?

A Yes, correct.

Q When you did these drafts, do you recall whether these were kept to yourself or did you supply them to Dr. Howell for his review?

A The first draft I communicated to Dr. Howell, yeah.

Q Did you supply a copy of your first draft to Mr. Leonard or Mr. Flynn?

A No, not that I remember.

Q So you recall supplying a copy of your first draft. How many drafts do you recall doing leading ultimately to what is your final report?

A At least five, I'm constantly improving my text.

Q After you did the first draft and you provided that to Dr. Howell, did you provide him any additional copies of subsequent drafts?

A No. I developed the report as I have it and one of these later drafts I shared with Dr. Howell so that I was sure that that was the right format, and I also wanted him to check on some facts which I had picked up in his papers because much of that stuff grows in his laboratories and I want to make sure that this is correct.

Q So you provided him at least two drafts that you've identified?

A I think it was only one.

Q Well, you said the first draft and then there was a later draft.

A No, no, no, that was the same. You over ask me, I don't know.

Q Take a moment to think because I understood you to tell me -- let me ask the question here so we're clear on this. That you prepared a first draft and you shared that with Dr. Howell?

A No, that's not true. The first

draft never. It was one of the advanced drafts which I wanted to check for accuracy and clarity in some of its factual contents related to the work that Dr. Howell did in the laboratory.

Q Did he communicate to you in writing in regards to your draft?

A Yes, by e-mail.

Q Is it correct he offered some suggestions for change?

A Not substantial. No substantial changes. No factual changes.

Q Regardless of whether they were substantial or factual, did he suggest some change or changes in your report?

A If this is a very general question, the answer is yes.

Q Did you maintain a copy of Dr. Howell's e-mail to you?

A No.

Q Do you recall whether in the course of that communication you responded to his e-mail?

A I said yes or no.

Q Did you respond in writing back by a reply e-mail?

A Yes, I did. These were short remarks regarding grammar, sentence structure, not factual things.

Q Did you maintain copies of those documents?

A No.

Q So, I understood you to say that one of the drafts was discussed or shared with Dr. Howell. Were any of these drafts supplied to Mr. Leonard or Mr. Flynn prior to the time when your final report issued?

A No.

Q Was any of this shared with Dr. Bishayee, to your knowledge?

A No.

MR. PINCUS: I'll do a follow-up on that one too, John, okay.

Q I want to turn your attention to your report now. I'm going to call it -- if you'd like, I'll give you the copy that we marked. I see that you have some writing on the copy that's in front of you.

A Yeah, that's my report which I still work on.

Q You're still working on your report. Are you amending your report?

A I'm preparing for this deposition.

Q I want to turn your attention to that portion of your report in which you discuss the thymidine pool?

A Yes.

Q Initially, am I correct that thymidine as it related to these experiments is recognized as a building block of DNA?

A Right.

Q When you refer to the thymidine pool, am I correct that you're referring to the fact that each cell has pools from which the cell is essentially siphoning out bricks to build a wall, in this case DNA?

A A pool contains the precursors for DNA.

Q I'd like to see if it would be fair for me to analogize this thymidine pool so I can understand in layperson's terms to a swimming pool for the moment.

Let's assume we have an olympic size swimming pool in which we throw a bucket of blue

dye and in doing so it's determined that the dye has no effect on the color of the water in the pool, you with me so far?

A No.

Q Let's assume we have an olympic size pool in which we throw a bucket of blue dye and we determine that in throwing that dye into the pool it has no noticeable effect on the color of the water in the pool, that's the assumption that I'm asking you to have, okay.

Now, let's further assume that if I throw that same bucket of dye into a children's waiting pool, we determine that it does have an effect on the color of the water, you with me so far?

A Yeah.

Q Would you agree with me that in this analogy the size of the pool needs to be known in order to determine the effect that the dye that was thrown into the pool had on the color of the water?

MR. LEONARD: Objection to form.

You can answer.

A Yes.

Q You answered yes?

A Yes.

Q So, if I apply this analogy to your report and specifically, I believe, it's reason one on page two of your report.

A Yeah.

Q I just want to be certain that I understand what you're asserting is that the amount of tritiated thymidine that Dr. Bishayee labeled the V79 cells with was so insignificant that it wouldn't affect the cell cycle that Dr. Robbins referred to in his report?

A May I --

Q Am I correct?

A No, I don't understand the question. Did you say the amount of thymidine or the amount of activity, what did you say?

Q Let me repeat the question, that's fine. I'm glad you asked me to do so. Is it fair to say that in reason one, page two of your report, you're asserting that the amount of tritiated thymidine that Dr. Bishayee labeled the V79 cells with was so insignificant that it wouldn't affect the cell cycle that Dr. Robbins

referred to in his report?

A The question does not apply because it is two questions. You said tritiated the thymidine, either you say thymidine or you say the tritium on the thymidine. Thymidine carries tritium, thymidine is a little fish and the tritium is a red dot on that fish.

Let's go to the swimming pool and you put into that swimming pool now fish that is molecules and if you ask the question, as you did, I have to know what you mean by tritiated thymidine because it contains two quantities, one is the amount of the molecule and the other is the amount of the activity, they are two different things, and if you ask me the question the amount of thymidine, I can answer you.

Q That's what I asked you.

A If you ask the question the amount of tritium, I can answer you, but if you say the amount of tritiated thymidine, I cannot answer you.

Q First answer it then -- let's answer it both ways, so you understand that. So if the question was the amount of thymidine, what would

be your answer?

A Yes.

Q Then your answer would be yes, it was so insignificant?

A Please repeat the question.

Q The question would be: Are you asserting that the amount of thymidine that Dr. Bishayee labeled the V79 cells with was so insignificant that it wouldn't effect the cell cycle as Dr. Robbins referred to in his report?

A That's correct.

Q Then if the question were: Are you asserting that the amount of tritium that was -- Dr. Bishayee labeled the V79 cells with was so insignificant that it wouldn't effect the cell cycle?

A That's no.

Q Can you explain to me why it's yes in the first instance then no in the second?

A Yes. The tritium is a radionuclide that emits beta particles or electrons at a certain rate, in order to have an effect these decays of the radionuclide must accumulate over time, so that's number one.

And then the tritium gets into the cell when the cell is synthesizing DNA, then it is fixed, and then that labeled DNA is carried on and as time goes on the tritium hits the cell and there's a certain number of decays accumulate, there is an effect, you see.

Here we ask the question the instantaneous blocking of the cell in the cycle by the amount of thymidine on one hand, that is an instantaneous affair and the amount of tritium that is a time-delayed affair, these are two different things. You know, you make --

Q I understood. Are you saying -- in other words, you're arguing that the thymidine pool in V79 cells is large and the amount of thymidine that was in the tritiated thymidine relatively small so that it wouldn't perturb the pool?

A That's correct.

Q As I understood your report, again acknowledging in layperson's terms, this is something that you referred to as a, quote, "true" tracer," unquote, correct?

A Yes.

Q Define for me, so I'm clear, what you meant by true tracer, please?

A A true tracer is an indicator that enters a complex network of metabolic reactions without changing these reactions at the moment the tracer is added to the system, and I say that as follows: Metabolic networks in cells are very sensitively reacting to relative changes of quantities, like in a balance.

So, for example, in this case here we're talking about, the DNA accepts thymidine and the other building blocks at fixed ratios, let's say two to one or one to one, let's call it one to one for simplicity, so if the cell senses that one of the amounts of tracers supposed to go into the DNA increases, says stop, to the providing supplier, I have enough, then he stops and then you have the problem.

This kind of adjustment of the metabolic reaction network to changes depends on the quantities of the building blocks that are there. Let me put it this way, let's go from a swimming to a pool to a hotel lobby. You have a hundred people in that hotel lobby and you have

two revolving doors and inside the chef waiting for the guests accepts two from each door at one time, there are a hundred people waiting, so if you add one flagged participant into one door there will be no relative change big enough for the system to notice that there is an addition, one percent or so, just to make the case.

So tracer means having a single given entity to a given component pool without changing the relevant quantities of that pool in regulating metabolic reactions.

Q Thank you. Am I correct that you didn't cite the size of the pool anywhere in your report?

A Yes, I did.

Q Can you show me where?

A I elaborated on that saying that particularly -- I show you. Let me just give you the -- particularly --

Q Tell me what page, please?

A On page nine. May I add that I have written in my book close to 17 pages on that topic.

Q I have your book but right now I'm

concerned with your report, Doctor. My question to you is that, am I correct that you don't cite the size of the pool anywhere in your report?

A Yes, I do, because on page nine --

Q Can you identify where that is?

A Figure one on page nine belonging to Fujikawa's work, on the left-hand side, you see these lines and there is an incubation time at the abscissa and then you can see. Here what we see is the effect of the pool giving an indirect evidence of the size of the pool.

Q Indirect evidence?

A Yes. Because the pool effect is expressed here by the cell number, that cell that develop, in other words, the pool is given here in this various lines from up-down thymidine concentration in micromole, from 10 to 5,100, zero, 500 and 1,000. You see that?

Q Are you telling me that, number one, so this figure one comes from that Fujikawa-Yamamoto reference?

A Yes, from the V79 cell.

Q You've told me the source and you've also now cited it to me, you know, that this

figure one is in micromole. Can you tell me the size of the pool in molar?

A Yes. A micromole is a thousandth of a mole, a micrometer is a thousandth of a meter -- millions of a meter, a millimeter, and then millimole, micromole, it's a millionth of a mole. The molecular rate of thymidine is something like 242, so if you take 242 grams of thymidine per liter, then you have one molar of solution and the micromole is a millionth of that, so one micromole is then 242 microgram per liter, that's very small, sir.

Q Can you cite it to me in molar?

A Which I just did.

Q 10 to the --

A I just did that.

Q What would it be in that nomenclature that I've I just described to you?

A A millionth of the mole, one micromole is a millionth of a mole.

Q That's what you say the size of the pool was, a millionth of a mole?

A No. It is here written in micromoles. If you read there are quite a few

different pool sizes used, actually it is indicated, it is indirect evidence because this is the material that has been, as you can see, adding, seeing the cells were exposed to thymidine to a final concentration and the cells were exposed to these numbers of thymidine molecules, and if the pool is saturated, there will be a change in metabolic reactions and the cells would suffer.

Now, you can see that it's a very important figure, in my opinion, that between zero and 100 micromole there is no effect of that added thymidine to the cell on cell function here expressed in the capability of the cells to survive -- to multiply and form other daughter cells.

But if you increase this amount of thymidine in the serum to 500 micromoles or even to 1,000 micromoles you see that then the cells get hurt because there is a disequilibrium establishing a metabolic reaction chain and so the cells don't divide anymore so well as they did before.

What I want to point out is that the

the cells having been used by Fujikawa, these cells here which have been used, there is no effect on cellar metabolism, there's a consequence of disturbing cellular kinetics or cell division up to 100 micromole.

Q Okay, thank you.

A If you stay then in the amount of thymidine added to the medium below that level where the system is being disturbed, then you talk about a tracer condition.

Q Doctor, are you familiar with a research paper written by individuals named J.E. Cleaver and R.M. Holford entitled The "Investigations into the Incorporation of Tritiated Thymidine into DNA in L-Strain Cells and the Formation of a Pool of Phosphorylated Derivatives During Pulse Labeling"?

A Yeah, I think -- I didn't cite that paper.

Q In fact, a few moments ago you got --

A I know Jim Cleaver very well and I know the paper.

Q In fact, a few moments ago when you

guided me to the top book on the stack of books that you brought with you here today, you called my attention to your book entitled "Tritium Labeled Molecules And Biology in Medicine."

A Yeah.

Q It's a fact that you cited this particular paper in your book?

A Yes, okay.

MR. PINCUS: Let's just mark this. This will be Fein 5.

(Whereupon, Article by J.E. Cleaver and R.M. Holford was marked as Fein's Exhibit 5 for identification, as of this date.)

Q So I'm going to show you -- you have your own copy there?

A Yes. I brought it, yeah.

Q So you do acknowledge that, in fact, you've cited this book in the text that I just identified?

A Yes.

Q Is there a basis on which you did not cite this article in your report?

A No, there is not --

MR. LEONARD: Excuse me, Shelly, did we get a copy?

MR. PINCUS: This is the market exhibit. Why don't you, Dr. Howell, do us the favor of taking back the one they gave you. I'll give him the one marked as the exhibit.

A What's the question?

Q So my question was: Is there a basis on which you did not cite this article in your report regarding this issue?

A My answer is I didn't need it.

Q Are you aware that the paper shows that 10 to the minus 9 mole or thymidine added to the L-cells causes detectable dilution of thymidine, 2.5 to the 10 to the minus 6 molar used for the five minute labeling, look at page 65?

A Okay.

Q On their --

A 565.

Q 665, Doctor.

A Yeah.

Q So you're clear.

A I know what you mean.

Q I'm calling your attention to where it says figure eight and then there is a section where it says that 10 to the minus 9 molar thymidine added to the L-cells caused detectable dilution of the tritiated tritium for use for five minute labeling?

A Yeah.

Q If I understand, that's to say that a 1/1000th full amount of nonradioactive thymidine was sufficient to perturb the pool in these cells, correct?

A Yes.

MR. PINCUS: Let's mark this as Fein 6, please.

(Whereupon, Article by Fujikawa-Yamamoto and Odashima was marked as Fein's Exhibit 6 for identification, as of this date.)

Q Dr. Feinendegen, are you ready, sir?

A Yes.

Q A few moments ago we mentioned the Fujikawa-Yamamoto paper.

A Yeah.

Q I'm happy to say that at this point

I can pronounce that name accurately in respect for this gentleman. But I'm going to show you what we've marked as Exhibit Fein 6 and that is a copy of that paper to which you made reference; is that correct?

A Yes.

Q I just want to be clear, am I correct -- and you cite this paper, I believe, on page nine of your report?

A Yes.

Q We were just looking at that, right?

A Yes.

Q Then when you were describing figure one a few moments ago you indicated to me that that graph comes from the body of the paper that we've just marked as Fein 6, correct?

A It's figure one in the paper, yes.

Q Am I correct that this paper deals with thymidine and not tritiated thymidine?

A Yes.

Q Are you aware of any other papers that show that low concentrations of tritiated thymidine perturb the cell cycle?

A Yes, and I cited this Beck's paper,

for example.

Q Which paper?

A Beck.

Q The Beck paper you say?

A Beck's, yeah.

Q Talking about reference 20 or 19, which one is it? What are you referring to, Doctor?

A Beck's paper reference 19 and 20.

Q What is it that you're referring to, Doctor?

A I made a table, that is my own stuff.

Q I understand it's your own stuff, but if you're going to be relying upon it --

MR. LEONARD: It's a table of contents for the book, that's all it is. He knows where things are.

A I don't need that. I know my report. It makes things easier.

Q Let me call your attention to page 21 of your report.

A Yes.

Q I see that if you look at reference

19 and 20 I see there are two papers by Beck. Are you referring to one or both of them?

A Yeah, let me just find out because my memory not bad but --

(Witness perusing document.)

A Yes, that is the reference 19.

Q 19, okay.

A Measures effect of tritium.

Q Do you know whether that paper deals with the issue of cell survivals?

A Yes and no.

Q How yes, how no?

A Sounds all too simple but it isn't that simple. It measures cell survival, yes, but not directly, by implication, by calculation.

Q So the paper didn't deal directly with the issue of cell survivals but you're telling me by looking at the paper and the data contained in there one can do calculations for the purposes of measuring cell survivals?

A Yes.

Q But the paper itself did not deal directly with the issue?

A Yes, it measured also cell survival

in order to -- I'll make a comment, you make things sound simple but they are not that simple. There are certain things that are simple but not that simple that measure cell survival, but it also measures the effect of tritium on the progression of the cells through the cycle after enough tritium decays have accumulated, and he measured that separately, and then he used that data to calculate the survival of those cells which have been affected by the tritium that has accumulated during the cell cycle. So the answer is a composite one.

Q I understand, thank you.

A I would like to come back to a previous question. May I do that?

Q Well, no. If Mr. Leonard needs to address that with you, right now let's move on to another area.

A Okay, it will come up later.

MR. PINCUS: Mark this as Fein 7.

(Whereupon, Article by Ehmann was marked as Fein's Exhibit 7 for identification, as of this date.)

Q Are you familiar, Dr. Feinendegen,

with a paper by Ehmann, et al, I believe his first initials are U.K. entitled "Perturbations in cell cycle progression from radioactive DNA precursors"?

A I don't cite it and I have to look at it. I have many of such information, I have to look to find out whether I know that paper or not.

Q My question is simply -- I'm going to show you a copy. My question is simply: Are you familiar with that paper?

A Oh, yes.

Q You are, okay.

A This effects of that paper. There are many of such papers.

Q But you did not cite this in your paper, correct?

A No.

Q I'll take that back.

MR. PINCUS: This will be Fein 8.

(Whereupon, Article by Alan Pollack was marked as Fein's Exhibit 8 for identification, as of this date.)

Q Are you familiar with a paper by an Alan Pollack, et al, entitled "Radiation from

tritiated thymidine perturbs the cell cycle progression of stimulated lymphocytes"?

A Yes.

Q You are.

A Yeah.

Q Just to make sure, I show you what I marked as Fein 8.

A There are enumerable reports all saying, and that is not disputed, that incorporated tritium may change the rate by which cells move through the cycle. There is no dispute on that. Tritiated thymidine once incorporated into the cell will lead to irradiating the cells at a low-dose rate, a high-dose rate, depending on how much tritium is incorporated, and as the tritium atoms decay they irradiate the cells and that irradiation then changes the rate of progression of cells.

There are enumerable papers and I know them and it is very well-known and that is not of any importance to our issue.

Q So, are you saying -- you know, if I ask -- let me ask the question.

A Sure.

Q So if my question becomes, is there a reason why you did not address this Pollack paper in your report, you're saying it's irrelevant?

A No. In fact, this is a very well known fact. In fact, the Burki here at the laboratory wants to study the effect of radiation on cell survival disturbing cell kinetics, this is not disputed at all.

Q Why did you not address --

A Because I cannot include a hundred different papers all showing the same thing, I have done it the same myself, many other papers, but there's a limit to citing papers.

Q Is your response the same in regards to the Ehmann paper?

A Yes.

Q Fine.

A That's not an issue.

MR. PINCUS: This will be 9, please.

(Whereupon, Article by C.A. Hoy, et al was marked as Fein's Exhibit 9 for identification, as of this date.)

Q Are you familiar with a paper by

C.A. Hoy, et al, entitled "Perturbation of DNA replication and cell cycle progression by commonly used tritiated thymidine."

A This is well-known.

Q Let me ask the question.

A Yes.

Q You're familiar with the paper, is that so?

A There are many. I said, you can go on and on and on, there are many of these papers and there is no question.

Q Based on your familiarity --

A Yes, I'm very familiar with this paper.

Q -- is there a reason you did not address this paper in your report?

A Yes.

Q What was that reason?

A The reason is the number of papers and to be cited there's a limit.

Q You don't feel that any of these three papers differ insofar as the opinion that you've been asserting?

A What you say?

Q You don't feel that any -- based on your knowledge, your expressed knowledge and familiarity with these papers, you do not believe that these papers distinguish and/or refute the opinion that you've been rendering in regard to the thymidine pool?

A That's correct.

Q That what I want to know.

MR. LEONARD: Let's go back. Which papers are we talking about, all of them?

MR. PINCUS: The last three.

MR. LEONARD: Could you just identify them.

MR. PINCUS: I was referring to the Ehmann paper, the Pollack paper and the Hoy paper.

A A few of many, many such papers all showing and nobody disputes that at all and Dr. Robbins is right in stating that that incorporated tritium harms the cell and changes the cell cycle, that is not disputed.

MR. PINCUS: Mark this as 10, please.

(Whereupon, Article by Valerie Hu

was marked as Fein's Exhibit 10 for identification, as of this date.)

Q Are you familiar with a paper by Valerie Hu entitled "Tritiated thymidine is a defective tool with which to measure rates of DNA synthesis?"

A Let me have a look at that.

(Witness perusing document.)

No, I'm not.

Q You're not familiar with this paper?

A I didn't -- I may have come across it but it's not relevant to our case.

Q If you're not familiar with it, how can you say it's relevant or not? Let's first establish, are you familiar with it?

MR. LEONARD: Let him answer that question. What's the basis for you're saying it's not relevant?

A It does not address this issue of Dr. Robbins' report there is -- I am familiar with the data and that is a big argument can be forward and back, that's one of the papers, I do not remember this paper having seen in the preparation of this report, but I didn't look for it because

it is not relevant to my report.

Q I know you said that but I'm still not clear whether you've actually read that paper or not?

A I'm familiar with the topic.

Q You're familiar with the topic but have you read the paper itself?

A I do not recall that I have read the paper. I read the literature very carefully but there is so much of that going on, I cannot answer that question properly.

Q Okay. Because if you hadn't read the paper that was what led me to question how you can indicate whether it's relevant or not, but you've answered the question, you don't have to say it again. I just wanted to know whether, in fact, you read the paper, that's fine.

A I'm familiar with the topic and the summary, yes.

Q At page 3 of your report, you state about in the second paragraph that you'll discuss on pages 4 and 13 the analysis of the pool in the V79 cells?

A Yeah.

Q Okay.

A Where are we, on page 2?

Q Page 3, second paragraph, Doctor.

A Yes. The pool has been analyzed, yeah.

Q Can you tell me where on page 4 that discussion takes place?

A I made a reference in the third paragraph, "As stated above, since high specific activity" --

Q In other words, you're saying it's the third paragraph on page 4?

A Under Robbins reason 3. Then 13 --

Q I just want to be clear before we go to page 13. You're saying that your discussion is the third -- the second full paragraph on page 4 beginning with the words, "Again, as stated above"?

A Your question is not quite clear.

Q Then let me rephrase it?

A You said full paragraph, I refer to it in the paragraph. I did not divulge the entire paragraph to that question.

Q That's what I wanted to know. Tell

me the exact words that within that paragraph that constitute your discussion of the analysis?

A "Since high specific activity thymidine provides for true tracer conditions of the experiment and no perturbation of the nucleotide pool of the cells, there is no need for cell synchronization. In fact, such synchronization always somehow interferes with normal cellular kinetics and would at least temporarily disturb cellular metabolism."

Q Would you do the same thing in reference to page 13, please?

A Yes.

Q First tell me where you're reading from and then I'll ask you to read the actual language.

A Reason 2, we come back to Reason 2. "It's contradicted first on theoretical grounds because Bishayee et al used high specific activity that delivers such small amount of thymidine molecules that the nucleotide pool is not perturbed. Also, there is experimental evidence contradicting reason 2 from the other laboratories, as well as from earlier published

work and unpublished work by Harapanhalli from the Howell laboratory. Deoxycytidine is only required when the thymidine concentration in the culture medium is sufficiently high for perturbing the nucleotide pool." These are the key.

Q Am I correct that you never state anywhere in your report what the magnitude of the thymidine nucleotide pool in V79 cells was?

A No, you're not correct.

Q Can you tell me where you do that, please?

A We just discussed it, figure one.

Q Figure one from the Fuji --

A Number one, and then there's a whole -- wait a minute, I come back to that. I lead you to page 8, under C, "Relatively large amounts of thymidine molecules," then comes the paragraph that begins the statement of Dr. Robbins, cites several articles. This entire article addresses the size of the pools from large papers on L-cells, lymphocytes, and on V79 cells and it also clarifies very importantly that these various cell systems have different sizes of pools differently sensitive to disturbance by the addition of

thymidine amount from the external medium into the cell.

Q Can you state the concentration in molar for me, please?

A Yeah, and since I knew that question was coming so I make myself here that table. So I give you now the whole thymidine. Reference 7, Fox works with lymphocytes which have a very small thymidine pool.

Q Can you state the concentration in molar for me?

A Yes, 10 micromole. Already, 10 micromole inhibit growth by 50 percent and Mortenson working with HL-cells, 50 micromole thymidine blocks 90 percent of the cells in S-phase.

Galavazi, reference 9, T cells, 7.5 minimole thymidine block cells. Galavazi, T cells, 2 to 7.5, minimole thymidine block cells. Sinclair using V79 cells, the same that Howell actually used, 7.5 minimole, block progression of the cells in the cycle. Hagan, using V79 cells, again use 7.5 micromole thymidine to block the cells.

Tobey, using Chinese hamster ovary cells, use 5 millimole to thymidine to block the cells. Morris, using L cells, now these are the L cells you referred to a little while ago, they have a very small pool, and Jim Cleaver works with these cells, and here again, as Jim Cleaver found, up to 10 micromole of thymidine was -- no, when the effect was above 10 micromole, that was a clear effect, you cited -- Jim Cleaver's paper that was just borderline significant with 1 micromole.

Wheather also using lymphocytes, they blocked the cells with 1.2 minimole of thymidine which we discussed already. Burki, that's my own paper, that was done in my lab, we used 10 micromole thymidine and in that paper 99 percent of the cells were then killed. And Panter used the same 10 micromole thymidine.

Why did I do this, because the lab of Howell uses .1 micromole of thymidine, I think that's correct, and I tried to summarize this very -- this kind of report, very important collection of information on page 8 to make clear that, first, different cell types have different pool

sizes, so different amounts of thymidine are needed to disturb the system. If you stay well below that amount that disturbs the system, there will be no system disturbance and you can get thymidine incorporated very well.

One more thing, these thymidine added molecules added to the cells immediately act on the spot, on the system, it's just like disturbing a network of interacting people by an unpleasant shout, everybody stops and wonders, that is an immediate action, whereas the tritium effect that we do not all discuss before, that doesn't have any -- no relevance here because everybody knows that incorporated thymidine, once it is in the cell, and then the activity accumulates, there is disturbance of the cell cycle, whereas the thymidine added to the cell will immediately disturb the system and will inhibit the tritium thymidine from becoming incorporated.

Now, the cell goes from one cell division to the next through resting phase building up all kinds of compounds and then comes the enzymes, then comes the so-called DNA

synthesis phase during which DNA is fabricated and takes the available precursors from the soluble pool in very precise ratios into the DNA, and then after six to ten hours, depending on cell type, they enter a second phrase preparing for cell division, that phase is called G2 phase.

Q We're going to talk about that. Can I see the document that you just marked.

MR. LEONARD: Let him finish his answer.

MR. PINCUS: I think he was going beyond the question that I had. We're going to talk about G2.

A I wanted to make one point, namely, it appears to me that, and that was the first thing, so I was very sorry that I saw that, but it happened and it's not a pleasure for me to criticize a colleague, but this issue of immediate disturbance of cellular metabolism by thymidine added to the medium and to the cells is quite different from the fact of disturbing the pool by the incorporated tritium, nobody argues that. That is all accepted and there's a huge literature on that and I could not cite all that.

What is important is, what I just tried to explain that various cell types have different pool sizes, so for each different cell type one has to be very careful in deciding what amount of thymidine one should use and the higher the specific activity is the lower is the chance to disturb that pool because for given amount of tritium the amount of thymidine is extremely small.

Q So I'm clear, can you tell me not in micromoles, just in molar do the calculation, the conversion for me, please, because I'll be the first to admit, I'm not a scientist.

Can you tell me what magnitude of the thymidine nucleated type pool in V79 cells is in molar?

A You have to multiply the data that are listed here on page 8 by one million.

Q Fine. Can you do that for me?

A Yeah.

Q Then give me the answer?

A Yeah, of course. 7.5 millimole, then you have to multiply it by a thousand to have it in mole. So this 7.5 mole, micromole means a

millionth of a mole, millimole means a thousandth of a mole, like milligram, microgram, so you just multiply that figure with a thousand if you want to convert from the milli to the full mole and you multiply it by a million if you want to express the data instead of in micromole, in mole, so it's a very simple trick.

Q So give me the number?

A They are written here, they are all there on page 8.

Q Okay.

MR. LEONARD: Can we take a break?

MR. PINCUS: That would be good. I'm going to shift gears. Let's take a few minutes.

(Whereupon, a short recess was taken.)

(Whereupon, Feinendegen chart was marked as Fein's Exhibit 11 for identification, as of this date.)

MR. LEONARD: I have just been handed what's been marked in this deposition as Fein 11 and for the record this is self-created by the deponent for purposes of

helping him find references throughout the various notebooks, no one is attesting to the accuracy of any information in here. Again, it's just really a makeshift table of contents for him.

MR. PINCUS: Thank you.

Q Let's go back on the record. Dr. Feinendegen, I want to turn your attention to the issue in reason 2 of your report relating to deoxycytidine?

A Yes.

Q As I understood on page 4 of your report, you state that no deoxycytidine needs to be present because of the tracer condition that prevailed in Howell's experiments, correct?

A Yes.

Q In support of that position you cited an article of which you co-authored by Burki, correct?

A Yes.

(Whereupon, Article by Burki was marked as Fein's Exhibit 12 for identification, as of this date.)

Q That was entitled "Inactivation of

Mammalian Cells After Disintegration of Tritiated Thymidine. Okay?

A Yeah.

Q Just so we're clear, that's what I've marked as Exhibit Fein 12 for identification.

That's the article that you cited, right?

A Yes.

Q Do you know for a fact that deoxycytidine was not present in this medium?

A Yes.

Q Can you tell me very briefly what your role in this study was?

A I was the principal investigator, I initiated that work, I invented the Auger effect that we were testing -- not I invented, I introduced the Auger effect in biology and this was done in order to compare the effect of the deoxycytidine and tritium and here we use again specific activity and we did not use deoxycytidine.

Q Page 364, under Section 2, over here, about halfway, do you see where I'm pointing, 364 I believe would be on the first

page, Doctor, this paragraph over here.

A Yes.

Q You see where my thumb is?

A Yeah.

Q You say that the medium for V79 was similar to that used by Sinclair in 1964, correct?

A Yeah. Yeah, I know that paper.

Q Hold on a second. Now I'm going to show you what I've marked -- do you know what medium Sinclair used?

A Let me just find where the reference is here. I have to search for that. Courtesy of Sinclair, the cells have --

Q Do we a favor, read to yourself so we don't have to copy if down.

A Yes, it says this medium is similar to that used, it's not equal, similar to that used, okay.

(Whereupon, Article by Sinclair was marked as Fein's Exhibit 13 for identification, as of this date.)

Q I'm showing you the Sinclair article, I just want to make sure that it's that article that your paper Fein 12 makes reference

to, that would be the "X-ray Induced Heritable Damage (Small-Colony Formation) in Cultured Mammalian Cells" that is the article you're referring to?

A Yes.

Q So that's the paper?

A Yeah.

Q Am I correct if you go to page 587 of the Sinclair article --

MR. LEONARD: Which exhibit number is that?

MR. PINCUS: This would be Fein 13.

Q If you go to the bottom paragraph, that makes reference to the medium as similar to HUT-15 of Elkind and Sutton?

A Yeah.

Q Am I correct?

A Well, I have to see it. Yes, I see it. Similar to the HUT, yeah, I saw that.

Q Do you know what the medium of HUT-15 consists of?

A I have to look it up.

Q But sitting here right now you don't know?

A No.

(Whereupon, Article by Elkind and Sutton was marked as Fein's Exhibit 14 for identification, as of this date.)

Q I'm now going to show you Fein 14. I want to turn your attention to page 5 -- first of all, you recognize this document Elkind and Sutton entitled "Radiation Response of Mammalian Cells Grown in Culture" --

A Yes.

Q -- as the article that Sinclair is referring to?

A Yes.

Q If you turn your attention to page 562 of that article.

A Yes.

Q If you go down again into the section materials and methods.

A Yeah.

Q The paragraph beginning "our growth medium."

A Yes.

Q You see where it refers to HU-15 consists of 4 percent Earle's NCTC-109?

A Yes.

Q Are you aware that NCTC-109 is a commercially available medium and contains 3.8 times 10 to the minus 5 mole of deoxycytidine?

A No.

Q You're not?

A I believe it.

Q You believe me?

A Yeah.

MR. PINCUS: Make this 15, I believe.

(Whereupon, Document "Technical Resources-Media Formulations was marked as Fein's Exhibit 15 for identification, as of this date.)

Q I'm going to show you what I've marked as Fein 15 entitled "Technical Resources-Media Formulations." If you go to page 3 of that document, do you see that it indicates that the medium does, in fact, contain Deoxycytidine?

A I'm still searching for that. Page 4 you said? Let me see. It may be.

Q It's the second entry on the top of

the third page.

A Yes. This is all irrelevant.

Q I didn't you ask whether it's irrelevant, but you do agree that NCTC-109 is a commercially available medium that contains deoxycytidine?

A Yes.

Q Is it still your contention that deoxycytidine was not contained in either the Sinclair or Elkind experiments?

A Let me answer, I refer to that what is published in the Burki paper, and this publication explicitly lists the components of the medium and since deoxycytidine is a very important component it would have been listed here if he would have used it. Similar doesn't mean equal.

Q You say on page 9 of your report in reference to the Burki experiment, you say that "No deoxycytidine was added," correct?

A Yeah.

Q On page 9 of your report?

A Yeah.

Q But based upon these three papers that I've cited to you, the Sinclair, the Elkind

and Sutton article, the media formulation, it appears that deoxycytidine was, in fact, present in the medium, while it may not have been added it was already present in the medium that you used?

A This is an -- that is a gesture of you but if it would have been used I'm pretty sure it would have been listed since it is important. So I cannot answer more than stick to that what has been published by our laboratory and not go back two to three papers where we say it's similar, it doesn't have to say that it's equal to.

Q I understand your position. If I understood your explanation here earlier this morning in terms of what you actually reviewed for purposes of preparing your report, am I correct that you didn't actually review the 20 plus experiments that are at issue in this case that Dr. Howell, Dr. Bishayee and Dr. Lenaryczyk performed?

A I read these papers, of course.

Q These papers. Did you read each one of the experiments that are at issue?

A What do you mean by that? Do you

mean that I would go and get the laboratory protocols?

Q Yes.

A No.

Q You did not do that, that's all I want to know.

A I read the paper applications.

Q What do you mean you read the paper applications?

A No, the publications.

Q Oh, you read the publications. But the underlining experiments --

A No.

Q -- which were used or some of which were used to prepare the publications that are at issue in this proceeding, you did not read those?

A In preparing this report I got access to that and I have seen some of that later, not when -- in preparing for this report I have seen that. I asked for some of it.

Q In preparing for this deposition you asked for it?

A Yeah. In preparing for the deposition, yes.

Q But for purposes of preparing your report you had not reviewed the underlying experiments and the protocols as you described them, correct?

A I relied on the accuracy of the published papers.

Q Fine. I got to go back here for a second, to this Burki paper.

MR. LEONARD: Is that 12. I don't think we have a copy of that.

MR. PINCUS: My apologies, John. That's what you're looking for, right?

Q Let me go back to 12 for a second.

A Yes.

Q If you go to figure 12 -- figure 2, I'm sorry, on page 368. Figure 2, page 368.

A Yeah, okay.

Q I'm correct that this is the V79 this shows the V79 survival curve, correct?

A Yes.

Q You cite to this, I believe, on page 10 of your report?

A Yes.

Q Am I right?

A Yes.

Q In fact, it's copied --

A Yes.

Q -- right in the body of your report?

A It's correct.

Q Am I correct that this survival curve has what is known as a shoulder?

A Yes.

Q Do you know whether the survival curves in the experiments that were performed in the Howell laboratory by either Dr. Howell, Dr. Lenaryczyk or Dr. Bishayee had shoulders?

A They had no shoulders.

Q They had no shoulders?

A Yeah.

Q Okay. If one set of experiments had shoulders and the others did not --

A Right.

Q -- would you agree that the kinetics of killing in the two types of experiments are not the same?

A Yes.

Q If I understand correctly in my layperson terms, a shouldered survival curve means

there may have been sublethal damage repair, correct?

A Correct.

Q In fact, there were sublethal damage repair in the experiments that you performed in this Burki article but, to your knowledge, there was none in the Howell experiments, correct?

A Yes.

Q How do you reconcile that fact?

A Because these various clones have different characteristics and there is -- and I refer to also in this report because this is a very important question to -- let me see where it is.

Q You're referring to your report now?

A Yes.

Q If you'd be kind enough when you find it to identify the page.

A I will. It's on page 18.

Q I'm there.

A Reference 29 from Fujikawa. He made an effort to see what was behind this strange behavior of such cells, sometimes they have a shoulder, sometimes they don't have a shoulder,

and that figure, figure 1 of their report I put in here to demonstrate the variability of these responses of these cells to being irradiated, and that expresses -- that's a science question, it expresses a behavior of cells under certain circumstances that can be documented, and he put that on the table, said, listen, we have to reconcile with. Why, I don't know. It may be instability, it may be even changes in the culture condition, sometimes small changes in the age or something, a similarity, temperatures, all these things very sensitively will influence cells into a certain behavior.

So, this is a collection of the Fujikawa paper that's reference 29 shows that there are quite a few variations. It's a scientific question, yeah.

Q You don't think that the differences are like comparing apples to oranges?

A No, not at all because there are many other papers, let's say, I have a figure here in my report, let me see. That is the reference 18, Panter's paper in Don cells which is another cell line where the shoulder is exponential

without -- the survival curve is exponential without a shoulder. Usually, it may happen, it's a science question.

Q I'm going to discuss the Panter article with you.

MR. LEONARD: Let him have his index and we'll get a copy.

Q Let's leave this here in case you need to use it. I didn't think you needed that for purposes of answering this particular question, but if you need it, feel free.

A Thank you.

Q You say there's lots of articles. I want ask if you're aware of certain ones, okay.

A This is a scientific question.

Q There's no question pending.

MR. PINCUS: Mark Exhibit 16.

(Whereupon, Article by Bedford was marked as Fein's Exhibit 16 for identification, as of this date.)

Q I'm going to show you what's been marked as Fein 16 for identification.

A Yes, I know that too.

Q Are you familiar with this paper?

A Familiar, I know the paper.

Q Would you agree that this paper shows exponential killing of V79 cells by tritiated thymidine?

A Yes. V79, yes.

Q Do you know that the medium contained deoxycytidine?

A I have to look it up. I believe what you say. It must be added somewhere.

Q I think if you go to page 534 you'll get your answer.

A 534. Where the deoxycytidine is listed?

Q Yes.

A Let's see where it is.

Q I think the table.

A Yes. Here it is, yeah.

Q It did contain deoxycytidine?

A Yes.

Q So you're familiar with this paper that there was exponential killing that contained deoxycytidine?

A Yes.

Q Is there a reason why you did not

comment on this paper in your report?

A There is no need for me to do that.

Q That's your answer, thank you. I'll take that.

A Okay.

MR. PINCUS: Marin will be 17, please.

(Whereupon, Article by Marin and Bender was marked as Fein's Exhibit 17 for identification, as of this date.)

Q Are you familiar with a paper by Marin and Bender entitled "A comparison of mammalian cell-killing by incorporated tritiated thymidine and tritiated uridine"?

A Yes, I know that paper.

Q You're not only familiar with it, I believe again going back to your book --

A I know that.

Q -- you cited it, right?

A Yes.

Q Do you know that in this paper which I'll show you that it shows exponential killing of Chinese hamsters cells by tritiated thymidine and that the medium contained deoxycytidine?

So that I can help you, look at page 236, I believe, in terms of the medium.

A I guess they edited because they needed to. That's not a question.

Q That's my question.

A My answer because the question is irrelevant. Where did you see that.

Q Fibroblast medium, do you understand that to contain deoxycytidine?

A Where is it?

Q 236, the materials and methods, under Section 2.1 cell-line.

A Yeah. It doesn't say that it contains deoxycytidine. It may, it may not, I don't know.

Q You don't know?

A It's not relevant.

Q My question is: Is there a reason why you did not cite this paper in your report?

A Yes, there are many, many such papers and I cannot cite a hundred papers, they all say the same thing and this is not the issue of my report.

Q I'll take that back.

MR. PINCUS: That will be 18.

(Whereupon, Article by Chan was marked as Fein's Exhibit 18 for identification, as of this date.)

Q Are you familiar with a paper by Chan, et al, entitled "Radiotoxicity of Iodine-125 in Mammalian Cells"?

A I initiated this study.

Q You're familiar with this one. I'm going show you Fein --

A Yeah, of course. Yes.

Q Turn your attention to page 335 and this paper shows that there was exponential killing of V79 cells with tritiated thymidine with the medium containing 4 percent NCTC-109, correct?

A Yes, I guess so. I don't see it. Where is it exactly, I want to confirm what you say.

Q The survivals were on 335, the medium is on 333. I'll point with my finger to assist you.

A Streptomycin, nonessential amino acids, stock cultures were grown as monolayers.

Q Over here, Doctor, where I'm

pointing in that paragraph, a little but further up.

A The NCTC medium and penicillin, yeah.

Q Earlier you agreed with me when I showed you the media formulation or NCTC-109, that it does, in fact, contain deoxycytidine?

A Yes.

Q The same question, why didn't you cite this paper in your report?

A I answer again, it's not relevant to the question and it's not relevant to my report. My report says -- addresses a different issue.

Q That issue is what?

A That issue is very simply, do we need the deoxycytidine at a high specific activity that provides the cell with trace amount of thymidine that is incapable of disturbing the pool. There's a lot of data available and I have cited that showing that the deoxycytidine is needed if that pool is disturbed and that is in this report and that is an issue.

Q I understand.

A If we do not need to add

deoxycytidine, we don't have to do it.

Deoxycytidine is there to balance the disturbed intracellular thymidine or nucleotide pool that has been caused by too much thymidine above the pool's capacity which I explain in my report.

Q I understand.

A Okay.

MR. PINCUS: Let's mark this one, please, 19.

(Whereupon, Article by Burki and Okada was marked as Fein's Exhibit 19 for identification, as of this date.)

Q Are you familiar with a paper by Burki and Okada entitled --

A Yes.

Q They wrote a lot of papers, let me give you the name it. -- Killing the Cultured Mammalian Cells by Radioactive Decay of Tritiated Thymidine at Minus 196."

A Another one of these papers.

Q I'll show it to you.

A What do you want to know? What is the issue?

Q On page 414 they state that "cells

were labeled 10 to the minus 6 mole thymidine containing thymidine. The survival curves were always biphasic and in order to overcome this difficulty the cells were labeled in the presence of, among other things, deoxycytidine." You see what I'm referring to?

A Yes.

Q Again, is there a reason why you didn't cite to this paper?

A It's not relevant because they used 10 to the minus for molar which is 10 micromole and that is a lot of thymidine. The experiment in the whole lab is .100 times less. This is not relevant. We are talking about things which are not relevant.

I like to make it clear that Dr. Robbins -- this is what I advised, Dr. Robbins bases his argument on the fact that they did not use deoxycytidine, not mentioning that it was not necessary to be used because -- and there's a lot of literature and I cited the relevant papers that deoxycytidine is used and must be used if the added amount of non-label thymidine -- the amount of molecules, not the tritium, the molecules of

thymidine is so large that the intracellular pool that varies between different cells is being disturbed.

This perturbation of the pool must be overcome by the deoxycytidine, it does not need to be used if you stay below the level of thymidine amount that disturbs the pool, and I showed you the pool sizes and what I understood and read with surprise when I went through all this, that the experiments done in Howell's laboratory used an amount of thymidine much, much below that level of the thymidine amount that is necessary to disturb the pool, and I must say the addition of deoxycytidine is an absolute necessity to overcome the disturbance, and I want to add that this particular situation has been extremely helpful to synchronize cells, they add so much thymidine in order to make the disturbance so strong that the cells stop in DNA synthesis, and then if you release the block, then they go off and then you have a synchronized cell culture.

So that is a method -- the disturbances of the thymidine pool is a method to synchronize cells into cycle which is a very

potent thing. Anybody who uses thymidine must know that there is a pool and the pool is of varying size and if you stay below the certain level you do not disturb the pool, and when you do not disturb the pool you do not disturb cellular kinetics, and if you do not disturb cellular kinetics all the cells that go through DNA synthesis will take out the trace of tritiated thymidine as it is offered as a tracer, and so eventually a hundred percent of the cells become labeled and if you then put them into a dish, label accumulates and, of course, as expected the tritiated damages and then you can do the study and then you get this monoexponential or shoulder exponential and you get a kill of 99 or more percent of the cells.

When I saw that to be the case, I realized suddenly there was no basis for the accusation of falsification of data.

Q Okay.

MR. PINCUS: Let me mark this, please.

A Did you get that?

Q I understand. I heard your

response. Thank you.

MR. PINCUS: You can mark that as 20, please.

(Whereupon, Article by Drew and Painter was marked as Fein's Exhibit 20 for identification, as of this date.)

Q Are you familiar a paper by Drew and Painter entitled --

A Yes.

Q What's it say?

A Well, I worked in their lab.

Q Let me ask the question again, please.

A Please, go ahead.

Q Are you familiar with that paper entitled "Action of Tritiated Thymidine on the Clonal Growth of Mammalian Cells"?

A Yes.

Q Are you aware that the paper shows biphasic killing of HeLa cells with no added deoxycytidine?

A These details I have to look up. I don't know what this had to do with this report but, nevertheless, I'd like to see --

Q The medium us page 535, Sato's medium. You're aware that that does not contain deoxycytidine?

A I worked in their lab and I used the same cells and I used the same medium.

Q Are you aware that Sato's medium does not contain deoxycytidine?

A I think so.

Q The survivals are shown on page 537?

A Yes.

Q Would you agree that those survivals are biphasic?

A Yes.

Q Is there a reason -- and, in fact, you've cited to this paper again in your book "Tritiated Labeled Molecules," et cetera?

A Yes.

Q Is there a reason why you elected not to comment on this paper in your report?

A I give the same answer.

Q If it's your same answer, you don't have to repeat it. We can move on by your it's the same answer.

A We can move on, it's the same

answer.

Q Fine, thank you.

MR. PINCUS: This will be 21, please.

(Whereupon, Article by Drew and Painter was marked as Fein's Exhibit 21 for identification, as of this date.)

Q I have another paper marked for identification as Fein 21 a Drew and Painter article entitled "Further Studies on the Clonal Growth." Are you aware you cited this in your book also?

A I guess so. I wrote that book 40 years ago.

Q I'll represent to you that you did, okay?

A Yes.

Q You're aware that again this paper shows biphasic killing of HeLa cells with no added deoxycytidine?

A I guess so. It's a scientific question which you don't have to get into.

Q Again, is there any -- your same response as to why you did not discuss this paper

in your report?

A It's irrelevant to the issue of accusation of fraud.

MR. PINCUS: That will be 22.

(Whereupon, Article by Keprtova and Minarova was marked as Fein's Exhibit 22 for identification, as of this date.)

Q Are you familiar with a paper by Keprtova and Minarova entitled "The Effect of Tritiated Thymidine on the Proliferation of in vitro Cultured Mammalian Cells"?

A I guess so. It's again a long time. What is your question?

Q First I want to know whether you're familiar with the paper?

A Familiar, I have to read it.

Q I'm not asking you to read it.

A Let me answer. Many, many such papers exist, you can continue until tonight to give me these papers, this is all fine and I do not doubt the accuracy of the papers, I do not now want to go into a scientific argument what is the reason for that.

My report addresses the issue if

there is suspicion of fraud in the papers that were put before me and the report by Dr. Robbins and I addressed that question.

Q So your position is that this paper is irrelevant to that issue is what I understand you to be telling me?

A Yeah, I can go on -- it's marginal, it's not in the center of interest. It's not totally irrelevant. Of course, all these data are relevant, it is not to the point, the point again is --

Q You don't have to repeat it.

MR. LEONARD: Let him finish.

A I'd like to make it clear because this is the crux of the issue and through this meeting we are always just deterred from that sense of focus, namely if the thymidine pool is not disturbed by the addition of thymidine to the medium, that means by using very high specific activity with a certain level of activity in the microcurie range, per milliliter range, then you do not disturb the pool, and if you do not disturb the pool you keep the cells as they are and you do not have to add a remedy to rectify the

disturbance of the pool.

The remedy to rectify the disturbance of the pool is deoxycytidine, and if you don't need a medicine to rectify this or you don't need it, you don't use it. So the experiment which I had the privilege or to see and to analyze on the basis of Dr. Robbins' report, I came to the conclusion that because of the high specific activity and the very low amount of thymidine given to the cells, far below the level that disturbs the pool, you don't need the remedy to add -- if you would have added you may have done something else with the cell, you don't need it so there is no basis for Dr. Robbins to say this is fraud because he says -- let me finish, please -- he says because deoxycytidine was not added that and that and that happened.

My contention is that you don't need to add deoxycytidine at the level below which you disturb the pool, and so the basic premise by Dr. Robbins of expressing doubt and even expressing the suspicion that is falsified data is unjustified, that's my point, only that everything else second to science, and I like to finish by

saying, I tried to summarize my impression in the conclusion.

The allegations put forward by Dr. Robbins may be viewed in two principal separate sections, the data by Bishayee are impossible and thus must have been fabricated. My statement is that they are possible because they used experimental conditions in which the pools were not disturbed and I tried to very elaborately explain that.

And my second thing is, the differences in these various experimental outcomes are really scientific questions and they are not of interest anymore once the center point is off the table, namely, there is no basis for being suspicious from what I see and have of fraud or falsification of data, because I again say, the experimental conditions and the experimental procedures and methods were such that you didn't -- they didn't have to need the need for giving deoxycytidine, they didn't have to need, so they got a hundred percent of the cells labeled and this undisturbed passage of the cells through the cell cycle in the presence of trace amounts of

thymidine led to the fact that hundred percent of the cells became labeled.

Now, this labeling intensity per individual cell is a lock shape curved, they are low labeled, high labeled, medium labeled, the majority of the cells have a medium label, and I remember very well discussing in Brookhaven Painter's and Drew's observation and we thought that the cells had enough radio resistance to overcome the low labeling in their experiments so that they survived. There were no further experiments, if I remember correctly, to analyze whether there was any DNA change or so.

Nevertheless, the points is that there is a focal question, is there fraud or not, by analyzing the data I have come to the conclusion that it is not a fraud because the experimental conditions were such that hundred percent of the labels are -- of the cells are expected to become labeled, so if enough thymidine permitted to accumulate what they carefully did over 10 hour storage and what is it, yeah, 10.5 degrees and then -- so there was a lot of accumulation of tritium to really disturb the

cells and kill them.

Q Could I ask you to confine yourself now to this Keprtova article?

A Yes.

Q I want to turn your attention to the second page of that, I guess page 82.

A Yes.

Q If you notice, there's a reference to thymidine in the section entitled "plating efficiency."

A Yes.

Q You see where it says thymidine-6-3H 980?

A Yeah.

Q Am I correct that that measurement is equivalent to 26 curies per millimole or approximately thereto?

A Well, I take your word for that. I have to calculate that.

Q Would you agree that that is --

A It's a high specific.

Q That's a high specific activity of tritiated thymidine, you agree with me?

A Yes.

Q Would you agree that that specific activity of tritiated thymidine was about one-third that used by Dr. Bishayee?

A I have to again calculate that, I cannot do that that quickly.

Q Assume that it was.

A Yeah. So what is the question?

Q So this paper which, you know, you indicated that you're not entirely familiar with shows biphasic killing of V79 cells with no added deoxycytidine, so given that this is high specific activity --

A Wait a minute. Where is that? That is a broad question, of course. Where is the control without the deoxycytidine?

Q The MEM. Again, it says MEM is where -- back where I guided you on the second page, plating efficiency.

A Yeah.

Q Do you understand that medium to contain or not to contain deoxycytidine?

MR. LEONARD: Why don't you give him a minute to look over the report.

A I don't see that. Where is that?

Q You say where it says "plating efficiency"?

A Yes.

Q "One thousand cells were plated on 10 milliliter MEM"?

A Yes.

Q You understood that that medium did not contain deoxycytidine?

A I have to look that up. I cannot say that offhand.

Q If I were to represent to you that it does not and given that you have indicated that this is high specific activity, it would appear that -- would you agree that this would have some relevance to the issue, this article?

MR. LEONARD: Objection to your hypothetical.

MR. PINCUS: You objected to the form.

A I mean, again, one of the many papers with or without -- it's beside the point. Of course, this is not irrelevant but it does not -- I am after explaining that we have a V79 cell with a relatively large pool and the amount of

thymidine used by the experimenter was so small as to not to disturb the pool and we know that no deoxycytidine is needed when that pool is not disturbed, that's the number one.

Number two is, the time of labeling is crucially important whether there's a flash label of 30 minutes or whether there's labeling for an hour, a day or two days or four days or a week, and as Burki accumulated the case under those conditions that minimize metabolism, they will freeze them at 96 degrees C or in 10.5 degrees, depending on what you want to do, but then depending on the time of the exposure of the cells to the tritiated thymidine, the cells become labeled in a certain range of values.

Usually it is a lock normal distribution of the thymidine, so you have some cells which have very little label, some cells which have very much label and some cells have a lot of label that is in the peak of this distribution curve.

The longer the labeling period of with the tritiated thymidine is, the more uniform becomes the label of the cell and the more

accurate, let's say, is the conclusion of the overall cellular response to the individual cell response, if you have a flash label only and you use the experimental condition where the thymidine pool is very small, the added thymidine amount is very small so not to disturb the pool, then you may have biphasic because there are some cells which survive that radiation, and the longer you label and the more activity you put in it, the more effective is the radiation.

Q I want to take you back to the HU paper that we were referring to earlier.

A To my paper?

Q No, the Hu paper.

MR. LEONARD: Which one did you hand him?

MR. PINCUS: I handed him Fein 10.

Q We excused this a little earlier, and again, on the first page, Doctor, over where it says chemicals.

A Yeah.

Q See where I'm referring to?

A Yeah.

Q There's a reference to tritiated

thymidine of approximately --

A High specific.

Q It's high specific and it says 80 curies per millimole, correct?

A Yes.

Q You acknowledge that that's high specific activity?

A Yes.

Q Are you aware that that's about the same specific activity that was used by Dr. Bishayee?

A Yes.

Q You acknowledge that?

A Yes.

Q So in this article or this piece of literature, this shows that there was biphasic killing of 3 T 3 cells using high specific activity tritiated thymidine, correct, you agree?

A Yes.

Q And that there was no deoxycytidine used, I think we -- so given those elements, why did you not comment on this paper in your report?

A Same answer.

Q Fine, that's all you need to say.

I'll take it back.

A I can use a whole library, of course. I have to restrict myself to what's essential to my claim in my report.

Q I understand you were looking to substantiate your claim.

A Yes, and to --

Q But you didn't cite an authority that differs?

A No, it's not a difference. It's not a difference. Not a difference.

Q Well --

A No, no, no, no.

Q Okay, you say no, that's fine.

A That's a scientific question. We are discussing now scientific questions and that has nothing to do with the argument here and I come back to my conclusion, we have two issues here.

Q You don't have to repeat them, we've been over them.

A We have the question and we have the accusation of fraud.

Q Got you. The last one I just want

to show you over here is --

MR. PINCUS: Mark that as 23, please.

(Whereupon, Article by Persaud was marked as Fein's Exhibit 23 for identification, as of this date.)

Q Are you familiar with Persaud's article "Assessment of Low Linear Energy Transfer of Radiation Induced Bystander Mutagenesis in a Three Dimensional Culture Model"?

A You mean Prescott?

Q No, Persaud.

A Persaud, yes.

Q "Assessment of Low Linear Energy Transfer of Radiation Induced Bystander Mutagenesis"?

A Yes.

Q You're familiar with this paper?

A Yeah, I know the content.

Q In fact, Dr. Robbins cited this in his report?

A Yes, so it is there.

Q This paper shows there that was biphasic killing of Chinese hamster cells with no

added deoxycytidine, correct?

A Yeah.

Q You did not discuss this in your report, this paper, did you?

A It's not to the point.

Q The answer was, did you or did you not?

A It's a scientific question and I restricted myself to analyzing the probability of fraud or not. I don't want to go into the science here in discussing the various responses of cells. I was asked to report on the question proposed by Dr. Robbins there is fraud, and is there fraud or is not fraud. I came to the conclusion that the probability of fraud is very low. There's no reason for accusing because Dr. Robbins failed to look at this thymidine pool issue.

Q So the papers that I have shown to you in the last few minutes showed that there's exponential survival --

A Oh, yes.

Q -- when deoxycytidine is present but biphasic survival when deoxycytidine is absent?

A No, that is not correct.

Q That's not correct in the papers that I showed you?

A In the papers you showed me --

Q That's what my question was.

A That may be misleading to somebody who is listening to us.

Q You said the one paper that you cited in which the survival was exponential and no deoxycytidine was added other than in the reports from the Howell lab was the Panter article, you mentioned this to me a little earlier?

A Yeah, that was one example.

Q Let's mark it first and then I'll ask you some questions, okay.

MR. PINCUS: Mark this as Exhibit 24.

(Whereupon, Article by Panter was marked as Fein's Exhibit 24 for identification, as of this date.)

Q When we're referring to the Panter article, am I correct that Fein 24 is that article, sir?

A That reference -- wait a minute, let me see. Okay.

Q Am I correct -- you're still looking, I'm sorry.

A I found it. Here, okay. I have that.

Q So you agree with me that what I've marked as Exhibit Fein 24 is the Panter article?

A Yes.

Q This notes, I believe, that Panter added 10 to the minus 5 mole thymidine to his incubations; is that correct?

A Yes.

Q In your knowledge and experience, is it possible that that could have perturbed the thymidine pool?

A 10 micro -- yes, if that is 10 micromole and 10 micromole is the limit, yeah.

Q It is possible?

A Yeah.

Q Is it possible that Panter forgot to mention that his medium contained deoxycytidine?

A Pardon me.

Q Is it possible Panter forgot to mention that the medium that he used contains deoxycytidine?

A No, I don't know what he thought. I cannot answer that question.

Q Other than the experiments in the Howell lab and this article, have you found any other -- in the literature in which there was exponential survival for tritiated thymidine without the addition of deoxycytidine?

A Many.

Q You didn't cite them?

MR. LEONARD: I object to form.

A Listen, if you go into a forest and you find flowers and somebody comes to you and says, there are no flowers in the forest and they find a flower, that's enough to show that there's flower in the forest. I don't have to have a library to substantiate, it's a question of principle.

Q Other than the one article, the Panter article --

A I cited several. No, that's not right. I cited several papers.

Q Which ones in the reference?

A The Burki paper, for example. The question is not the shoulder or not the shoulder,

that is a scientific question. The question is, how many cells are being killed and I wanted to show that the experiments done in the lab easily can kill 99.1 percent of the cells indicating that they all have become labeled, they all passed through the DNA synthesis phase.

That was the point my -- you can add many papers like that but if I have shown two or three papers I think this is enough. The Panter article is my own articles. The point is, and that is the essential point, is it likely or unlikely that under the experimental conditions in the Howell lab a hundred percent of the cells got labeled or not, and my answer is, likelihood of hundred percent labeling is high, very high, highly probable, probably certain.

Robbins has been really arguing and that was my point to show that he did not understand it, namely, that under the experimental conditions in the Howell lab only a fraction of the cells became labeled because no deoxycytidine was added. My argument is, you didn't need to add deoxycytidine to get hundred percent of the cells labeled, that is the single point.

If you once get hundred percent of the cells labeled, everything else becomes a scientific question, how the slope of the curve is, does it have a shoulder or not a shoulder, or if there is even a slight tail at the very end because, as I said, the labeling of each individual cells follows a possible distribution, means a lock normal distribution, and then you may have a few label cells that do not become irradiated enough to be killed, so you can get this kind of a show.

But the issue is, Robbins issue was, do you get all cells labeled under the conditions they have chosen in the laboratory, my answer is yes.

Q Can you tell me what G2 delay is?

A Yes. The cells are very sensitive to radiation, particularly in the G2 phase, so if you look at a cell in the cell cycle they are distributed randomly throughout the cell cycle, some cells are immediately after mitosis or having divided, then there is a period of biochemistry preparing the cell for function and DNA synthesis and then comes the DNA synthesis phase during

which again many different things happen in the cell, suddenly thymidine kinase is made available or phosphorylating the thymidine because the thymidine is only accepted and going into the cell if it has become phosphorylated and that means the DNA synthesis phase.

Then comes after that DNA phase arresting phase, that means with respect to the DNA synthesis, they do not synthesize anymore, but they get ready to divide and that phase is called G2 and that is a very radiation sensitive phase. So if you add thymidine to the cells, rather low amounts are already enough to partially block the cells in that G2 phase from which they are recovering very quickly depending on the dose they get.

I have a paper myself, it's also in the book, showing the recovery period of that G2 delay and then they go into mitosis and you can measure the G2 delay precisely by the so-called mitotic index, it means the number of cells --

Q So, if I understand you correctly, G2 delay can contribute to the biphasic nature of the survival curves because it would add to the

population of cells that don't enter S-phase during the incubation?

A No, that is not correct. G2 comes after the S-phase, and the cells move on and those who have picked up the thymidine during the S-phase move into G2 phase and then they are stopped temporarily preparing, if the irradiation is not too much, or they may be even held longer in that G2 phase, and then they overcome this shock of -- this equilibrium and then they go into mitosis again and continue.

That does not disturb the cells from moving into DNA synthesis, so the cells which are in the medium containing tritiated thymidine move from G1 to S to G2 phase. G2 phase make that block but the movement of the cells in G1 phase into S is not blocked. So if you do not disturb the pool, you don't need deoxycytidine, so they continue to move into the S-phase and eventually all the cells in the cycle become labeled.

Q You said that G2 delay can occur in very low concentrations?

A Yes.

Q Earlier I showed you the papers by

Ehmann, Pollack and Hoy, do you recall that?

A Yes.

Q Are you aware or did you review those papers for the issue relating to G2 delay?

A G2 delay is of no consequence here.

Q Okay, that's your position. That's why you chose not discuss that?

A The science. The question here is only one, the accusation was, these cells would not have become labeled a hundred percent, that was the statement.

Q Okay. You don't have to repeat it again, I've heard you a number of times.

A And I say that is not correct because of the pool problem. The pool was so small -- the pool was by the low amount of thymidine added not disturbed, so there was no need to add the deoxycytidine and the probability that all cells went through the cycle is in line with what other people have been observing. I have done studies myself on this.

MR. PINCUS: Would you mark that as 25.

A You understood what I mean.

Q Yes.

(Whereupon, Howell-Li experiment was marked as Fein's Exhibit 25 for identification, as of this date.)

MR. PINCUS: Let's take a lunch break.

(Whereupon, a luncheon recess was taken.)

MR. PINCUS: Let's go back on the record.

BY MR. PINCUS:

Q Before the lunch break, Dr. Feinendegen, I had marked what I'm going to show you as Fein 25. I believe you make reference to this on this being what I understand to be the Howell-Li experiment --

A Yeah, I saw that.

Q -- that you cite at page 11 of your report, are you with me?

A Yes.

Q You're familiar with this document?

A Yes.

Q You reviewed this?

A Yes, late but I did.

Q Would you agree that the protocol for the first three experiments that were done as shown on the first page and now I'm going to refer you, by the way, to the lower right-hand corner and we call that a Bates stamp number, so where I'm saying BO13447. You with me?

A Yes.

Q The pages which follow just go up in numerical order.

A Got it.

Q Am I correct that the protocol for the first three experiments are shown on this first page, 13447?

A I guess so.

Q The colony results, if you turn to BO455.

A Yeah. What is the question?

Q Those are the colony results; am I correct?

A It looks like colonies, yeah.

Q Do you agree that there are results but no protocols shown for experiments two and three?

A I don't know.

Q You said you relied upon this experiment in your report and you said you reviewed it and I have some questions about it.

So my question to you is: Is the protocol for the first experiment I pointed you on 447 along with the colony results on 455, but would you agree with me that there are no protocols shown for experiments two and three?

A What do you mean by protocol?

Q Protocol would be the description of the procedures that are going to be followed by the person conducting the experiments as is shown on page one.

A Yes.

Q This document shows a number of experiments, eight in number, and would you agree that within this document, I mean, I'm using the citations from your references in terms of what you relied upon and, you know, in fact, on page 11 you specifically cite to the pages that I've given to you.

A Yeah.

Q So my question is: Would you agree that there is no protocols for experiments two and

three?

A I relied on the data.

Q That's not my question. Would you agree that there are no protocols for experiments two and three?

A I would have to go through that what you just gave me carefully in order to find out if there are protocols or not, there's a lot of stuff, many, many pages and I cannot commit that I don't see protocols because I have to go through the whole thing, but for me, my citation in the report that's what counts is that these experiments were done to check the survival of these cells properly be labeled.

Q You can't answer that question for me sitting here right now you're telling me?

A Yes.

Q There's a graph shown on page 476.

A Yes, I see what you mean.

Q This graph relates to experiments six, seven and eight, am I correct?

A Six, seven, eight, correct.

Q There's further a notation that experiment five was dropped, is that correct, up

in the upper right-hand corner?

A Experiment five dropped, yeah.

Q Would you agree with me that there is no record at all in this packet which you cited to for experiment number four?

A I don't know. I cannot answer that question.

Q You can't glance through this quickly to determine that. If you can't, that's fine, but you tell me.

A I should now search the document for experiment four. Can you help me.

Q Well, I believe that is --

A Can you give it to me and then I'll check.

Q I believe that there's no record at all for experiment four, you want to accept that from me?

A When you say it, I believe you.

Q I'm going to represent to you that it appears to me that there's no protocols or raw data at all for experiments six, seven and eight contained in this packet, are you aware if that's the case?

A That may be. I believe what you say, but this is of no relevance to what I am after, what I am proposing. I am addressing a question and I take into my report the evidence that tells me that the experiments have been done carefully and they have been controlled, just this guy checked the relationship between tritium uptake and survival.

MR. PINCUS: This will be 26, please.

(Whereupon, Article by Howell and Goddu was marked as Fein's Exhibit 26 for identification, as of this date.)

Q I'm going to show you what you referred to, I believe, as your reference number 4 in your report, this article by Dr. Howell, Fein 26, entitled "Radioprotection against Lethal Damage Caused by Chronic Irradiation with Radionuclides In Vitro."

A Yes, I have that here. Yes.

Q You reviewed this?

A Yes.

Q Would you agree that there's no indication which, if any, of the experiments --

this discusses the Howell-Li experiment, this paper, does it not?

A My report does not discuss the Howell-Li experiment, I refer to it as an indication of what it shows on page -- on page 396, cellular uptakes versus survival.

Q I'm looking at page 11 of your report.

A Yeah.

Q You refer to the Howell-Li report there, correct?

A Yes. I guess so, yes.

Q See "experiments in the Howell laboratory"?

A Uh-hum.

Q In 1992 and 1996?

A Yes.

Q It's the Howell-Li experiment --

A Yes.

Q -- occurred in 1996?

A Yeah.

Q You identified for me the fact that you're familiar with this document, that you reviewed it, I'm not asking you for purposes but

you told me you reviewed it and you told me what you understood or didn't understand it to contain, and then you further cited, I believe, as reference number 4 in your report what we've marked now as the Howell paper Fein 26, correct?

A Yes.

Q In fact, in citing to that paper that paper discusses the Howell-Li experiment, correct?

A Yeah, I guess so.

Q Can you tell me which, if any, of the experiments that were represented in the graph in your paper were represented in these experiments?

MR. LEONARD: Objection to form.

A Yes. I have not seen this document, I've seen drafts giving a graphical display of the numbers showing the survival against the uptake and the point here is --

Q Hold on a second. You've answered my question. First you told me --

MR. LEONARD: Let him finish, Shelly.

A Then were are not on terms any more,

I'm sorry to say that.

Q No, no, hold on for one second and I'll let you respond. You told me two things now and let's clarify first. I first asked you whether you had seen and reviewed what we've marked as Exhibit Fein 25 and you answered yes, now you just said to me -- now you're telling me, no, I didn't, I saw something different.

Let's first establish what you saw.

A I saw the graphical display of the Harapanhalli data, so there's a lot of that and a lot of such pages, this page what you just gave me --

Q Fein 25.

A -- does not contain any of these graphs which I have and these graphs show that what is also shown in the paper by Howell on page 369 and that's not a key --

Q Page 369?

MR. LEONARD: 396.

A 396, I'm sorry. The point is that both the Harapanhalli as well as this report show cellular survival to be followed below one percent, that means 99 percent of cells being

killed, and that is the point indicating that these cells that were used in these experiments both in this paper as well as Harapanhalli must have incorporated tritiated thymidine throughout the cell cycle, otherwise there would not be a killing to below 99 percent. That means they go to one per mill or one percent, that is the key issue mainly.

That is again referring to Dr. Robbins' accusation. He says these data cannot be true because tritiated thymidine was not permitted to get into the cells, to all the cells because of that lack of deoxycytidine. Now, my analysis shows first that the thymidine pool is so small -- sorry, the thymidine added to the medium is so little that it did not disturb the pool and that these data are only understood by all cells or practically all cells have incorporated the tritiated thymidine. So there was no block in the cell cycle phase, otherwise these data could not have occurred.

Now, this is only one example here. We have of this example and that was all I was saying in Harapanhalli's data.

Q So you cannot tell me --

A I tell you a lot at the moment, you should listen to what I'm saying.

Q But you're not answering my question.

MR. LEONARD: Let him finish.

A I would like to make clear, I do not to be detracted from an argument by questions whether I saw that document. I have not seen your document, I have seen the data from Harapanhalli which here I have them. These are graphs and these graphs and I don't know whether they're identical.

Here, you see the graphs, okay, and these graphs show that what I am aiming to show, namely that the cell killing went below one percent and he just confirms what Howell has published in another paper and both data agree with each other and that's not only one graph, there's quite a few graphs, you don't have that graph in your -- -

Q You're right, we don't have it at all.

A But I have it.

Q We'll we're going to get it from you. That's my next question.

A Okay. And these graphs, these are the important points. See, these graphs the shoulders are different. I don't have your document. These graphs show quite clearly that the thymidine must have been incorporated into all cells.

Q Why don't we mark the graphs that you're referring to because I have questions about them.

A I have a few of these graphs.

Q Let me ask you some questions first and then we'll decide what we'll do.

A Okay.

Q So you're referring now to what your report page 11 described as the unpublished results of Dr. Harapanhalli, correct?

A That's not what I have.

Q My question, and I think you've just responded, that, in fact, you're in possession of the protocols and raw data from that experiment?

A The results of this data. I am in possession --

Q Did Dr. Howell or Dr. Harapanhalli or anyone else make these available to you?

A Yes.

Q Who?

A Dr. Howell.

MR. PINCUS: We requested copies of these.

MR. FLYNN: I'm pretty sure we produced this. These are Bates.

MR. PINCUS: Give me the Bates stamp numbers?

MR. FLYNN: Which ones are we referring to here?

THE WITNESS: All the graphs, there's quite a few, quite a few of these graphs.

MR. PINCUS: Let's go off the record.

(Whereupon, a discussion was held off the record.)

MR. PINCUS: Back on the record.

Q I just want to be clear in reference to the Harapanhalli results.

A Yes.

Q If I understand your statement to me a moment ago, the raw data that you were describing and the results are contained on documents which have been Bates stamped UMNJ004755 to 4847; is that correct?

A Yes, that's correct. 4826 going up to 4847, yes. I don't know how many of them there are. There's a large number, I was impressed by that.

Q Now I understand.

A Okay.

Q Insofar as Fein 25 was concerned and the graphs that you're referring to -- Fein 25.

A Yes.

Q Are you still counting, I don't want to go on until you're ready.

A I have eight of these data, they all show practically the same thing.

Q Which page numbers were you referring to?

A That's enough for me to see what I'm talking about.

Q Which page numbers?

A One is 4757, the other is 4759, the

next one is 4761, 4786. I hope I don't miss any because there are so many. 4800, 4842 and then 4843. So that is the collection of the data which I have.

Q Fair enough.

A I'm not through with answering my question.

Q You did, you gave me the citations to the specific one. Now I have another question of you, okay. I want to turn your attention back to Fein 25 as it relates to Dr. Howell's article that we cited --

A Yeah, okay.

Q -- as Fein 26. I'm looking at figure 6 now, that is on page --

A 396.

Q -- 396. You're with me on figure 6?

A Yes.

Q Those graphs that are set forth in figure 6, am I correct, you know, that you can't tell me which of the experiments in Fein 25 those graphs relate to?

MR. LEONARD: Objection to form.

A No, that's of no interest to me.

Q It's not a question of whether it's interest or not. You can't tell me, that's what you're telling me, right?

A I want to make something clear. I do not want to be led into stating that I did a bad job, okay. I read that stuff, I did it well, I know your terms, you must do that, this is your responsibility, but I tell you that I reviewed the stuff and I can see that -- now comes the key point -- all these experiments from that lab so far seen show that the survival goes below one percent after letting tritiated thymidine.

The details do not count, Robbins assertion that this has been based on the fact that the cells were not permitted to take up tritium thymidine throughout the cell cycle, all this data that is only a small portion of the other stuff, and I referred to that before noon, show that if the pool of thymidine in the cell permits radioactivity to enter as a tracer you get all cells labeled and these data are consistent with the assumption that all cells were labeled and all this contradicts the statement by Dr. Robbins that they cannot be true.

Q But that's not my question. My question is simple -- my questions, with all due respect to you, Doctor, doesn't afford you a platform to basically tell me what your report says, we're going to cover that.

A Okay.

Q But when I ask you a specific question I'm entitled, if you can answer it, to have you simply answer it. So my question was, it was very simple: You cannot tell me looking at figure 6 in Fein 26, Dr. Howell's report, which of the experiments in Fein 25 those graphs relate to, correct?

A It's not relevant to me. That's my answer.

Q It's not a question of whether it's relevant. You can't tell me; isn't that correct?

A I am not interested in that.

Q So you never took the opportunity to determine it?

A No.

Q You did not?

A No.

Q Thank you.

MR. PINCUS: Would you mark this as 27, please.

(Whereupon, Article by Bishayee was marked as Fein's Exhibit 27 for identification, as of this date.)

Q Dr. Feinendegen, I'm going show you what I've marked as Fein 27, it's the Bishayee article which you cite in your report.

A Yeah.

Q Do you recall that?

A Of course, yeah. Very good paper, by the way.

Q Since you cite this paper, is it fair for me to assume that you studied the protocol?

A Yes.

Q Obviously, did you cite the protocols associated with Dr. Howell's paper that we marked as Fein 26?

A Yes.

Q When you studied the protocols, did you determine whether the conditioning of the cells was the same?

MR. LEONARD: Objection to form.

A Wait a minute. You have to explain what you mean by conditioning.

Q What does it mean to you?

A To me the conditioning is a word that explains many things and if you ask me a question, it must be specifically defined what condition is meant to mean otherwise I can't answer it.

Q Let me ask you a different question.

A If I'm happy I'm conditioned, if I'm sad I'm also conditioned.

Q Do you know whether the overnight incubation in rollers in the presence of tritiated thymidine was the same in these two experiments?

A That I cannot check.

Q Was the medium in the two experiments the same?

A I did not check.

Q Was the washing of the cells comparable, if you know?

A Probably, yes.

Q Was the incubation in the cold for 72 hours the same in these experiments?

A I don't know. These are two

different papers referring to different issues.

Q You don't know. That's fine, if you don't know.

A I take the papers as they and check them for accuracy and reliability. Since you asked me about specific -- to answer your question about specific details of protocol, washing temperature, washing time, that is, I may say, a bit asked too much.

Q So you don't know?

A I have to go into this in detail. This is not the issue of my report, I do not --

Q You remember early on I said to you that you may not know the answer to every question, this is one of the times if you don't know simply tell me.

A If I say that as you just induce me to say, you induce me to say I was negligent and I do not like to hear that.

Q Did I suggest that word?

A No.

Q Then don't infer why I'm asking those questions.

A Yeah, but --

MR. PINCUS: Would you please have him instruct --

A What did you do, not do, you did not do, that makes me appear as someone who did -- who was negligent.

MR. PINCUS: John, I don't want this record to keep going on like this because it's nonresponsive.

MR. LEONARD: Why don't we all take a deep breath, okay.

A Let's be fair with each other.

MR. LEONARD: Agreed. Let's be fair with each other. Do you want to take a few minutes?

THE WITNESS: No, I'm fine. I just want to make the statement what is my job.

MR. PINCUS: It's not far for it to go on like this, John. Tell him to just answer the questions. I'd rather you take a minute and talk with him privately.

A I'm answering questions, I'm familiar with that.

Q In the Howell-Li experiment, am I correct that the experiments were carried out in

Falcon tubes?

A Yes, they were both using Falcon tubes.

Q The cells were suspended in 2 milliliters of medium?

A I have to look it up and see whether it's correct what you say. I believe you, so I take it.

Q In the Bishayee experiment, am I correct that the cells were transferred to Helena tubes?

A They were both Helena and Falcon tubes.

Q They were transferred to Helena tubes from Falcon tubes, correct?

A Yes.

Q In the Howell-Li experiment, am I correct that the tubes were in the cold were incubated on rollers which would aerate the cells and the medium?

A I answer that question by saying this is of no relevance to my report.

Q Do you know or don't you know is really the response that I'm looking to have from

you. It's not a question of whether you believe it's relevant or not, I'm asking what you know.

A I do not know these details as you just spelled out, whether 2 milliliters or 4 milliliters.

Q Fair enough. Are you aware that in the Bishayee experiment the cells in the Helena tubes remained stationary?

A Yes.

Q The dissolved air was consumed and not replaced, in other words, correct?

A What?

Q The dissolved air was consumed and not replaced; am I correct?

A That I do not know.

Q Do you consider that the differences between the Falcon tubes, the Helena tubes, the large volume of air versus no room for air, stationary pellets had any significance in these experiments, based on your experience?

A I have to ask a question. Am I always to say yes or no?

MR. LEONARD: No.

A That is what I mean. I am not

supposed to say yes or no and then being led into being painted as someone who did a sloppy job.

MR. LEONARD: No, answer the question, as best you can.

A Then I say, this is not relevant to my report.

Q You don't find any significance to those differences?

A This is not relevant to my report.

Q The question was not whether it was relevant, do you find any significance to those differences?

MR. LEONARD: Objection to the form.

Q Significance to the differences, Falcon tubes, the Helena tubes, the large volume of air, the rolling that I've just described to you, did you draw any significance whatsoever, yes or no?

A They have significance regarding the scientific issue but they have no significance regarding the accusation of falsification.

Q What was the significance in regard to the scientific issue?

A That I can give you an hour lecture.

Q No, I don't need an hour lecture.

A Of course, I know what I'm talking about.

Q Do you think that incubation and suspension in the Falcon tubes with aeration would likely produce a different response in the cells compared to incubation --

A Yes.

Q Let me ask the whole question. Do you think that incubation in suspension in the Falcon tubes with aeration would likely produce a different response in the cells compared to incubation in pellets in the Helena tubes with no aeration?

MR. LEONARD: Objection to form.

A Yes.

Q Were you surprised at all that the results of these two experiments were the same given your response?

A No, I'm not surprised.

Q I think I know the answer based on some of your earlier testimony, but did you examine the protocols of the Lenaryczyk and Howell experiments that failed to repeat Dr. Bishayee's

results?

A Yes, very much so.

Q You did examine each of those protocols?

A Yes, because I ask my question -- yes. This is a very important question and I'm glad you asked that question.

Q You answered it, you said yes, okay?

A In a way yes.

Q Were the protocols that Lenaryczyk and Howell followed in their attempts to repeat the results reported in Dr. Bishayee's paper significantly different from the Bishayee protocols?

A Yes.

MR. LEONARD: Objection to form.

Q They were. Do you acknowledge in your review of the Robbins' report that Dr. Robbins compared the protocols and results of Dr. Bishayee versus those of Dr. Lenaryczyk and concluded that the protocols were the same?

A That I cannot answer the question. I only know that this is a scientific question which is of great importance and it has nothing to

do with the accusation of falsification. It is of enormous importance scientifically, it's fascinating to see this differences coming up and I have come -- let me just add that, in my own career, similar situations where I just failed to reproduce data and I have paper here that I even cited that in my report, a slight change of conditioning now, it may be the page, it may be a similarity, it may be the concentration of buffer, it may be the type of buffer, all this influences an experimental outcome, and the lack of reproduction of the second group is a scientific question of great interest, but it has nothing to do with the accusation of falsification.

It's of great scientific interest but it does not refer to whether the first data were -- and that was the starting point of it all, was falsified or not. That is a very fascinating topic you are opening up here and it is a fascinating scientific issue and I spent, to finish my answer, to make you aware of what that means, I spent more than the whole year once in order to find out why I could in my own laboratory not reproduce data, and then after a whole year of

very precise efforts I found the conditions, what I called conditions, as you referred to that, and then we could reproduce and then we were off.

Q It was important for you to go through those steps to see if you could produce it?

A Yes, yes and that needs to be done as a scientific challenge, a real scientific challenge.

Q When you talk about the need to reproduce the data as a scientific challenge, that is one of the bedrocks of scientific research, correct, you agree?

A Yes.

Q I want to turn your attention to page 13 of your report and continuing on to page 15 in which you refer to --

A Let me just check.

Q The issue of hypoxia.

A Where are we now?

Q Page 13 to 15.

A Yes, I'm familiar with that. Here we have the same thing, yeah. Yes.

Q The first thing --

A This is a scientific issue.

Q In this regard you refer to what I'm going to mark as Fein 28.

(Whereupon, Bishayee report was marked as Fein's Exhibit 28 for identification, as of this date.)

Q I'm going to show you -- I just want to make certain that what I'm showing is Exhibit Fein --

A Okay.

Q In regards to your reference to the Bishayee 1999 experiment, this was the document, again, I realize it's somewhat small but the Bates stamp number B007891 appears down below.

A Yes.

Q Are you aware that this was the experiment that caused Dr. Hill's attention to possible fabrication of data by Dr. Bishayee?

MR. LEONARD: Objection to form.

A No.

Q You weren't aware of that fact?

A No.

Q Are you aware that the Office of Research Integrity analyzed Dr. Bishayee's coulter

counts for this experiment?

A No.

Q So are you aware that they found them highly significant for insignificant digits?

A Highly significant for insignificant digits.

Q Yeah, that's the quote.

A I'm sorry, this is something not familiar to me.

MR. PINCUS: Mark this, please, as Fein 29.

(Whereupon, Analysis of Data by DIO was marked as Fein's Exhibit 29 for identification, as of this date.)

Q I'm going to show you what we've marked as Exhibit Fein 29.

A Thank you.

Q Have you ever seen this portion of the ORI report?

A No.

Q And the second page --

MR. LEONARD: Shelly, let me just object. This is not the ORI report, this looks like an attachment to a report.

MR. PINCUS: Hold on.

MR. LEONARD: He's already testified that he knows nothing about the ORI report nor is he being offered as an expert in the this regard.

MR. PINCUS: But I'm entitled to ask him whether he saw anything or not.

MR. LEONARD: I understand.

Q The purpose of the terminology which you thought was comical was contained in the attachment to ORI's report which you've never seen?

A No.

Q If you've not seen this, you've never seen any portion of the report or any of the attachments?

A Of what report?

Q The ORI report that is relating to Dr. Howell?

A I don't know what ORI stands for.

Q You're not familiar with the Office of Research Integrity?

A Oh, I see, that's what you mean. No, I'm not familiar with that report. I didn't

see it.

Q So you don't know whether the --

A No.

Q Let me ask the question. You don't know whether the experiment which you cited in your report which we marked as Fein 28 --

A That I have.

Q -- you're not aware that that became the subject of scrutiny by ORI, are you?

MR. LEONARD: Objection to form. He's already testified now, Shelly, don't mischaracterize what it was.

A My 28 is Reddy, is that what you are talking about, Reddy.

MR. LEONARD: He's talking about a report that found no official misconduct twice.

A 28 is Reddy. What are we talking about?

Q You have not seen that report?

A What one?

Q The ORI report.

A No. But you are referring to 28 and that is Reddy. I'm not familiar with that.

Q You're not aware that this experiment was analyzed by ORI?

A No. I got Dr. Robbins' report and Dr. Robbins' report doesn't refer to that, so I didn't go into this. I didn't see any referral in Dr. Robbins' report to ORI.

MR. LEONARD: There was none.

A It didn't concern me.

Q It didn't concern you?

A Yeah.

Q Fair enough. I understand your response.

A Okay, thank you.

Q You cited in your report to a certain paper by Neti?

A Yes.

MR. PINCUS: Let me have this marked as 30.

(Whereupon, Article by Neti was marked as Fein's Exhibit 30 for identification, as of this date.)

Q Is there a difference between chronic and acute radiation?

A Very much so.

Q Am I correct that chronic doses delivered over a long period of time, perhaps days, yes?

You have to give a verbal response.

A I'm sorry.

Q Am I correct that a chronic dose might be delivered over a long period of time, perhaps days?

A Yes.

Q An acute dose would be delivered in a short period of time?

A Yes.

Q You agree that acute radiation is more lethal because the chronic has time to repair?

A Yes. Per unit does, right.

Q That's what I was referring to earlier when I asked you about sublethal damage repair, remember?

A Yes.

Q You agree with me?

A Yes.

Q Am I correct that this paper by Neti deals with chronic rather than acute radiation?

A That was given over 72 hours, that is chronic radiation, yes.

Q You agree with me, correct?

A Yes.

Q When we go back to Dr. Robbins' report that you said you reviewed which was Fein 1 and I want to turn your attention to -- that is his figure 7 which I believe is the last page of that document. I'm talking about Dr. Robbins' report. Go to the last page.

A Okay. The last page which is? Figure 7, yeah.

Q When you reviewed figure 7, was it your understanding that this figure dealt with acute rather than chronic radiation?

A I saw it, I read it and I realized that it is of no consequence to --

Q That's not answering my question, please. I really don't want to keep going through this exercise. I'm asking you a very simple question. Please try to confine yourself to responding to it.

Is it your understanding that figure 7 deals with acute rather than chronic radiation?

A I say both.

Q On what basis do you say both?

A I believe it is both, I have to check it again.

Q Please take the opportunity to do so.

A I divided Dr. Robbins' report into two issues, scientific one and the accusation of fraud. Figure 7. I remember very well when I read this, Elkind and all these people. The average does of a surviving --

Q Please try not to talk out loud because the reporter is going to take it down.

A I'm sorry. My answer to your question is there is no reference in Dr. Robbins' report whether it's chronic or --

Q So you don't know?

A No. There is no reference to that.

Q Can you distinguish for me in regards to the same cells for hypoxia between indirect and direct methods for doing so?

A I'm sorry.

Q Can you distinguish between indirect versus direct methods to assay cells for hypoxia?

A That's a scientific question that may have very many facets. That depends on the methods you choose on the staining technique, you apply the timing -- again, I'll answer this question.

Q Take your time --

A I cannot answer your question in one sentence.

Q In the addressing question of hypoxia in clusters, were you aware that Dr. Howell used indirect methods to assay the cells under conditions that he thought might demonstrate or refute hypoxia?

A Yes, and the measurements. Yes.

Q You were aware of that?

A Yes.

Q Are there any other methods that he might have employed to determine the oxygen concentration in the tubes?

A I cannot answer that question.

Q Do you know about --

A Probably yes.

Q Probably yes?

A Yes.

Q Are you aware of something known as dissolved oxygen electrode?

A Yes.

Q Have you ever employed the method itself?

A No, in our laboratory, of course. I didn't do it but my people did it.

Q At page 15 of your report, in regards to this hypoxia, down at the bottom, you make a statement that "it would take quite sometime before hypoxia sets in"?

A Yes, I'm very familiar with that.

Q Can you tell me how much time it would take?

A No, you cannot say that. Nobody can really say that. It depends when I ask that question a little more elaborately, it depends on the temperature, on the state of cellular metabolism, oxygen consumption rate which differs under different conditions of the media, so that's a very intricate thing to answer.

Q You're telling me that you have no actual evidence on which to determine whether it would take quite sometime before hypoxia set in?

MR. LEONARD: Objection to form.

A That questions is yes, it takes time but how much time, that is open. It takes time.

Q You don't have any actual evidence that allowed you to measure the amount of time or determine the amount of time, correct?

A Well, you could do it if you have the time and you set up a special laboratory for doing that.

Q You didn't do it?

A I didn't do that.

Q That's what I wanted to know. You answered me.

MR. PINCUS: Let's mark this as 31, please.

(Whereupon, Summary of Experiments was marked as Fein's Exhibit 31 for identification, as of this date.)

Q On page 16 of your report you have that little picture over here, see where I'm referring to?

A Yes. That's a very important one, yes, sir.

Q About the supplier of bottles and

vials?

A Yes.

Q To your knowledge, does that figure say anything about Falcon or Helena tubes?

A A lot.

Q It specifically references Falcon or Helena tubes?

A Generally.

Q Generally. It doesn't specifically mention Falcon or Helena tubes, that's all I want to know?

A It's the conditions of keeping track of cleanliness and properness of your tools and Falcon and Helena tubes are part of the tool set and that is a situation that is generally called the tool set, you need to keep the tools -- all you do in tissue culture cells, it's the same thing as with the timing, it is very variable, you can cut off here, you can cut off there, you can measure the timing and then you get different data depending on the condition of the cell, and here this supplier very definitely states what you must observe to get --

Q Clean Falcon and clean Helena tubes?

A Everything, yeah.

Q Your recollection is he specifically mentions Falcon and/or Helena tubes?

A I think so because it is a general -- part of the vials in general, the whole thing is --

Q Would it assist you if I gave you a blowup?

A It's included.

Q Your recollection in inserting this quote or this --

A I read it very carefully.

Q Your recollection is there was a specific reference to Falcon and/or Helena tubes?

MR. LEONARD: Objection to form.

A No, general vials and tubes, not specific, general vials and tubes.

Q Okay, you've answered my question.

A Okay.

Q You've said that there's all possible -- a lot of possible things can happen?

A Yes.

Q Do you have any evidence or were you presented any evidence that the methods that

Dr. Howell or Lenaryczyk used to clean their bottles were any different than the methods that were used by Dr. Bishayee to clean his bottles?

A No, I have not.

Q You have not?

A I have no idea.

Q I'm going show you what we marked as Fein 31. Have you seen that document?

A No, I haven't.

Q This was not shared with you?

A No, I don't have that. I don't even know what is in it.

MR. PINCUS: Mark this as 32, please.

(Whereupon, Feinendegen reference was marked as Fein's Exhibit 32 for identification, as of this date.)

Q I want to turn your attention to page 17 of your report and you were talking about the pH of the media?

A Yes.

Q I think it's up at the top.

A Yeah.

Q Where you say that pH changes of

only 0.1 of a unit --

A Yeah.

Q -- completely abrogated some experimental responses in your laboratory, correct?

A Yes.

Q You cite, in fact, to an article that you co-authored which I now show you which has been marked as Exhibit Fein 32?

A Yeah.

Q You're familiar with that "Acute and temporary inhibition of thymidine kinase in mouse bone marrow cells after low-dose exposure"?

A That's one of the papers I'm most proud of.

Q I want to turn your attention to page 206 in the article, I believe figure 1.

A Yes, correct.

Q This was what you were referring to, correct?

A Yeah.

Q Am I correct that this article shows that it was changes of 0.2 of a pH unit, not 0.1 unit led to a decrease of about 25 percent?

A We have here the pH value down at the abscissa and you can see that there are quite a few experiments and the statistical analysis was -- nevertheless, you see that the pH change from about 7.4 to 7.6 fully abolished the response of the cells.

Q There was a change of what you just described to me as 0.2, not 1?

A Yeah, but this in between, this is science, this is a scientific question.

Q I'm sorry, I have to ask you some scientific questions.

A I'm very familiar with science.

Q You're saying that this chart does, in fact, show a change of 0.2 of the pH unit, not 1?

A No. These are the data points and the data points are connected by curves and the process of linking these data points is called extrapolation, and by extrapolation you can clearly say that the changing from 7.4 to 7.6 you abolish.

Q Your position is this chart shows a complete abrogation, not a decrease of about 25

percent from 4,000 to 3,000?

A It's not the right way.

Q Explain it.

A The scientific effect lies in the difference between these two curves, the control and the irradiated, okay, and this irradiated curve which is the solid curve with the dot and the other one is the solid curve with a light dot, the upper curve is the control and the lower curve is the irradiated curve, so you abolish the radiation effect in that system by moving the pH from 7.5 to 7.6.

Q Would you agree that the effects that are described in this paper, Fein 32, have nothing to do with cellular survival after exposure to tritiated thymidine?

A I do not want to say that. I leave it open to interpretation, I only want to clearly state that minute changes -- now we come back to that word conditioning, that means a similarity buffer, pH, temperature, et cetera, et cetera, these slight changes may drastically alter an experimental outcome, that's my point.

Q But you would agree that this paper

does not discuss cellular survival after exposure?

A That was not the issue.

Q It didn't discuss it, correct, that's all you have to say?

A No, it discusses it, I'm sorry. It discusses the allegations by Dr. Robbins in his report.

Q No, I'm not talking about your report, I'm talking about this paper that we just marked. Am I correct that the effects described in the paper itself have nothing to do with cellular survival after exposure to tritiated thymidine?

A I cannot answer this question with yes or no, it is perhaps.

Q Perhaps, okay, I understand. Still on page 17, in that subsection C where you talk about level of trace elements in the water, wetting agents on filter apparatus, methods used to clean bottles, sodium bicarbonate product change.

A Yes.

Q For any of those four reasons, do you have any facts or data to support any of these

as being the reasons leading to the inability to replicate the experiments in question?

MR. LEONARD: Objection to form.

A This is a scientific question, I can't answer that.

Q You can't answer it?

A No. It's possible, it's likely. It's even likely.

Q Anything is possible.

A It's likely.

Q On what basis do you say it's likely?

A This is just an example of two of these conditions, the pH and sodium bicarbonate.

Q Did you do any investigation or analysis to determine whether the reasons had a basis in fact in this case?

MR. LEONARD: Objection to form.

A In what case?

Q In this particular case.

A It's a scientific question, it's a hypothesis. You know, hypothesis is the meat of science.

Q I understand you're stating a

hypothesis but do you have any facts to support the hypothesis?

A We have plenty of facts.

Q What facts do you have that led you to conclude that the level of trace elements in the water affected the ability or inability to replicate these experiments?

MR. LEONARD: Objection to form.

A That question is -- I don't know, that is out in the wood.

Q What facts do you have that led you to conclude that wetting agents on the filter apparatus contributed to the inability to replicate these experiments?

MR. LEONARD: Objection to form.

A You've asked the wrong question. You said contributed, I said there is a possibility that changes in the media condition may very seriously interfere with cellular behavior leading to different cellular data outcome.

Everyone who experiments, if you are not extremely careful in handling the cells, even if you breath on cells, so to say, they change

their behavior. I have in my book samples of slight changes with time, temperature, conditioning so they behave totaling different.

Q You measured those things, right, that's why it's in your book?

A Yes.

Q What data or what facts do you have to support that the wetting agents --

A Can do that.

Q Not can, did.

MR. LEONARD: Objection to form.

A I did not say that.

MR. LEONARD: You're mischaracterizing his testimony.

Q Do you have any facts, not whether it's possible, I'm saying, do you have any facts to support that the wetting agents, in fact, affected the ability to replicate these experiments?

MR. LEONARD: Objection to form.

A I did not do the work in the laboratory. This question is unanswerable.

Q Did Dr. Howell supply you any facts?

A No. That question is not

answerable.

Q Did he supply you any facts with regard to the sodium bicarbonate product?

A We are talking science, that has nothing to do with my report.

Q You don't have any actual facts or data on which to support that these four items that you've described on page 17 of your report were a basis on which the experiments could not be replicated?

MR. LEONARD: Objection to form.

A Cannot be answered.

Q You did no independent investigation or analysis?

A On what?

Q On these four questions.

A I did. I mean, in other condition circumstances.

Q No, not other. As to these circumstances?

A I did not do these experiments. I did not work in Howell's lab. I worked in a different lab and I had my own experiences and I know that if you work hard in the garden, you get

colors on your hands, okay, and when that happens to me it's likely to happen also to you and it's likely also to happen to you.

If you get into the sunshine and you are, let's say, brunette you get tanned, that happens to me even if I'm blue eyed, but it happens also to others. So that is a generalization which is totally valid to make.

If the earth shakes buildings break down, just not one building but other buildings too. If you ask me whether I had evidence that that particular building broke down, I cannot answer that question.

Q You've answered me.

A You agree with me, of course.

Q You cite on page 17 a link, the hyclone.com link, you see where I'm at?

A Where is it?

Q On page 17 of your report.

A Where is it?

Q Below those four items.

A Yeah.

Q Are you aware that that's a dead website?

A No.

Q Do you have a copy of the document?

A No, I did not look at that website. I cited it but I did not look at that website, I tried to but I didn't look at it. I thought it was not available anymore so I took it as it is and the document asks "actually supported by recommendations regarding the testing of disposable laboratory supplies." So this -- I took that to be expressed by this figure here.

Q You went to look at the link, when you looked at the link it was not available?

A Yeah. I should have crossed it out perhaps.

Q You don't have a copy of what those recommendations were that you allude to in your report, correct?

A What?

Q You don't have a copy of what those recommendations were that you cite in your report?

A No. Here we are, there is a general recommendation by every manufacturer, any manufacturer who supplies tissue culture tools, they all more or less say the same thing, it is

just like a -- let's say a recommendation how you cross street, you should first look, then look left, then right, then see if cars are coming or not, these are generally valid.

This what I put in here is only to fortify the need to be extremely careful in handling the conditions of culture. Now, inadvertently, and that you cannot avoid, that has nothing to do with falsification, we are talking science, there may be perhaps a change in temperature or a slight change in the ratio of oxygen to carbon dioxide in the medium which will flush on the tubes, all these little things are very well known to everyone who works with tissue culture cells, and inadvertently you cannot control that all the time perfectly, things may happen, even despite you being very careful it happens, and then some things come up which are totally unexpected.

This is what I wanted to point out, this is science, it has nothing to do with Dr. Robbins' statement that the data should be falsified, this is totally different things.

Q I just want to be clear, you never

actually had the opportunity to review --

A That website.

Q -- that website?

A Correct.

Q In regard to serum which you then refer to on page 17.

A Same thing.

Q What same thing?

A If you took the serum and you are not very careful about the amount of ATP in that serum you may get totally different results. It happened to me, it happened to others, you have to -- it's really a lot of work to find out why something comes out differently, that's a mystery, but it has nothing to do with falsification.

Q Do you have any evidence for any of the differential responses to Trypsin or serum in any experiments that were taken in the Howell lab?

A No.

Q Are you aware that Dr. Howell himself eliminated serum as a reason after he obtained the original serum used by Dr. Bishayee from the supplier?

A No. Now, this --

Q You answered my question.

A Okay.

MR. PINCUS: This will be 33.

(Whereupon, Article by Zyuzikov was marked as Fein's Exhibit 33 for identification, as of this date.)

Q Let me first establish what we've marked as Fein 33, that's the paper that we're referring to; is that correct?

A Yes.

Q You have your copy?

A Yes.

Q So, am I correct that this paper refers to survivals of different clones in V79 cells, correct?

A Yes.

Q Are you aware that Dr. Howell did not isolate clones that were, in fact, controlled for genetic drip by freezing down aliquots of cells to renew his cultures from time to time?

A I just don't know.

Q You don't know?

A No.

MR. LEONARD: Objection to form.

Q Assume that he did for purposes of my next question. Do you agree that that procedure would assure uniformity of cells that he used?

MR. LEONARD: Objection to form. You can answer, if you can.

A Well, no, it's unpredictable, period.

Q Why is it unpredictable?

A Because the cells make jumps without us knowing it and they do it, they make all kinds of -- they call that sometimes genomic instability, for example.

Q I'm sorry, give me the name?

A We call that genomic instability. To make sure that a cell does not change during an experimental procedure is very difficult, you assume it is and sometimes when it's lucky enough to have the same cell for five years and then otherwise the cells don't do it anymore, they have changed.

So cells are living systems and living systems are always subject to all kinds of environmental influences in the media and in the

physical environments, temperature, even a magnetic field may change cellular metabolism, I have measured that, and so there are certain -- cells are living things which behave sometimes very erratically without any reason, we don't know, and then it is -- if we do have the courage and the time to analyze these, great, but sometimes other questions are more urgent and go in a different direction.

My point again is, the question put to me, is there any evidence whether the data published by Bishayee in Dr. Robbins' report have been falsified or not. My conclusion is from all what I know, there is no evidence to maintain the accusation of falsification.

Q The question that was put to you --

MR. LEONARD: Excuse me.

(Pause.)

Q Who put that question to you?

A Which?

Q That you just cited to?

A That's Dr. Robbins' report. Dr. Robbins makes this claim, he states it very clearly in the beginning. He says, experiments

that were reported in two publications and used as permanent data have not and indeed cannot be replicated. Secondly, there's observations reported by Dr. Bishayee in the cause of performing Dr. Bishayee's experiments using a cell culturing, and then he goes on and says later on, cannot be true and that I picked up in my report.

You see, there's a very serious statement and from all what I know this -- the answer to that question that Dr. Robbins poses is, can cells in that laboratory under this condition be hundred percent labeled in order to get the thymidine in all cells so that all cells can be irradiated and all cells can be damaged except that they may be dead. The answer is yes because of the way the experiment was conducted, and I say it again, the amount of thymidine used in this experiments were far below the level of thymidine that was needed to disturb the pool. If that would not have been the case, I would agree with Dr. Robbins.

Q Are you aware that there were at least 22 experiments performed by Dr. Howell and Lenaryczyk did that did not reproduce the results?

A Yes. Fascinating, yes.

Q Let me ask the question.

A I'm sorry.

Q Are you familiar that there were at least 22 experiments performed by Dr. Howell and Lenaryczyk that did not reproduce the Bishayee results -- the results reported in the two papers in radiation research --

A Yes.

MR. LEONARD: Objection to form.

Q -- and which were cited as preliminary results in the original grant application and in the renewal application for the grant, you are aware of that?

MR. LEONARD: Objection to form.

A Yeah, I'm aware that these experiments were done and there is now a very great challenge.

Q All you had to do is say you're aware of the experiments?

A Yes.

Q Were you ever privy to a report that Dr. Howell gave to his supervisor in April of 2001 in which he did not disclose the fact that eleven

experiments had already been performed by Dr. Lenaryczyk?

MR. LEONARD: Objection to form.

Q You weren't aware of any such report?

A No.

Q Given your experiences, obviously you've worked in controlled labs for years, do you think that in the event there was an issue or a problem regarding reproducibility, Dr. Howell had an obligation to report it to his chairman?

A No. Here we come to the question of science. I put myself now in the position of Dr. Howell who I didn't know at that time. If that would happen to me, I get an experiment and then I try to repeat the experiment and don't succeed, an alarm bell goes off, why, there must be a reason, and this reason is a scientific question. What is the reason.

It could be -- I could name off not only just that we discussed the vials, cleanliness, it could be the composition of the culture medium unknown, it happened to me from the same supplier, suddenly our cells didn't respond

anymore as they used to do and we found out eventually the hard way it was a change in the media supplied by the same company, my lab, and so this -- and the search, as I understand, is still going on why is there a discrepancy but that is a scientific question.

Q As a group leader, would you expect your subordinates to report such problems to you?

A No, it's a scientific question. I mean, depending on to whom I report. If I am an independently working scientist, I'm responsible to the scientific community, that's not a question of reporting to the superior, it's a scientific question, what did we do, what is wrong.

Q If you had associates working on a grant with you in your lab and they had difficulties reproducing results, you would have no expectation that your subordinate would report that to you?

A That question is not quite complete in that it was in certain way reproducible because many other people saw the thing, same thing, and it was reproducible in a way, but suddenly it changed. It is not so as you now implied that

there was one experiment and then the others didn't follow, there was a number, a large -- I gave you the data before, I don't know how many, they all showed this exponential survival curve, so it was something strange and suddenly something that was reproducible becomes not reproducible anymore.

It was not one experiment that could not be reproduced, it was a whole series of experiments which were in line actually with observations other people have made, myself included.

Q Were you aware that by the time the University's First Committee on Scientific Misconduct adjourned that Dr. Howell or Lenaryczyk had performed 18 experiments that did not reproduce the Bishayee results?

MR. LEONARD: Objection to form.

A No.

MR. LEONARD: You can answer.

A I don't know anything.

Q Do you think he had an obligation to report that to the committee?

MR. LEONARD: Objection to form.

A What?

Q That they were unable to reproduce the results of Dr. Bishayee in those 18 experiments?

A No, it's a scientific question.

Q I'm asking you to answer it.

MR. LEONARD: He did, he said no.

Q Your answer is they had no obligation?

A To whom?

Q To the committee?

A Which committee?

Q The University Committee on Scientific Misconduct.

MR. LEONARD: How would he know their policy, Shelly.

A I don't know what the issue was.

Q You don't know?

A I don't know. I don't know the circumstances. I cannot answer this.

Q Have you ever submitted reports to the National Institute of Health regarding grants?

A No.

Q You never have?

A No, I work there.

Q Were you aware that he submitted annual reports to the NIH without ever mentioning the inability of members of his lab to reproduce the Bishayee results?

MR. LEONARD: Who?

Q Dr. Howell?

MR. LEONARD: Objection to form.

A I can't answer that question, it goes far beyond -- in order to answer that question honestly, I must know the details.

Q You don't know any details, is what you're telling me?

A No. I have the report by Dr. Robbins, okay, I examined the report by Dr. Robbins and I accept the probabilities.

Q You limited yourself to the Robbins' report, I understand what you're saying.

A Yes.

Q Let me ask you this question: Are you aware that the two papers by Bishayee that are in radiation research contain results that have been cited numerous times in the literature since then?

A Yes, because they weren't confirmed with other people's observations, it was nothing strange.

Q Do you believe that a scientist has an obligation to the scientific community to inform a journal that results in the papers could not be reproduced?

A No. I'm sorry. If you do an experiment, you do that in your own laboratory many times and they did that and they could reproduce it, it's not just one experiment that could not be reproduced, there's a whole series of experiments that you have to -- then they are ready.

Now the new experiment was done and different results come up and then you ask why, and now it's a question in subsequent publications to -- that is being done, why is that so.

Q Are you telling me that it's your understanding that Dr. Howell was able to reproduce the Bishayee results?

A Initially, yes. There was a whole series of experiments, they all showed the same data, and then suddenly it didn't work anymore, so

that is a scientific --

Q In other words, the experiments that you're referring to that all showed the same thing were the ones that Bishayee performed?

A No, Harapanhalli, for example.

Q I'm confining my question right now to the experiments that were done within the Howell lab itself, nothing external, you with me?

A Yeah. Harapanhalli was at this place. You see, it's not so -- I mean, as I understand that what was in front of me, right, I have no other further detail, I didn't visit the lab, I didn't ask people, I don't know, I didn't even ask you what really happened, I just got that what I have and my question was, is this accusation -- the suspicion of fraud justified and my conclusion is no, it is not, and that is the point, everything else is scientific, and it happens not rarely that people cannot reproduce initial data, even if initially they were reproducible.

Let's say you do it three, four, five times and they work, I think you've done it eight times, if I remember correctly, from the

data I have here, and they're all showing the indication that all cells, hundred percent cells have been labeled, that means they have gone through the cell cycle, there was no cell cycle block that had to be overcome by deoxycytidine.

Q Are you aware that Dr. Howell is a member of the Medical Internal Radiation Dose Committee?

A No. I guess he should be.

Q In the spring -- we're almost done here. In the spring of 2001, am I correct that yourself, Dr. Hill, Dr. Azzam, Dr. Howell, Dr. Hei of Columbia and a Dr. Dilmanian at Brookhaven were engaged in writing a grant application together?

A Yes, very much so.

Q That was ultimately submitted to the Department of Education?

A No, energy.

Q Energy, okay. You developed a friendly relationship with members of this group; is that fair to say?

A We became friends. I stayed at Lanie Hills house and enjoyed very much taking walks with the dogs in the morning.

Q In March of 2002 did Dr. Hill arrange for you to give a seminar at the New Jersey Medical --

A Yes, I enjoyed this very much.

Q Did you receive an honorarium for that seminar?

A I don't even know.

Q You've been a guest in the Hill house?

A Yes.

Q Did they take you to dinner?

A Yes.

Q Did they take you as a guest to the Explorers Club banquet?

A Yes, I enjoyed that.

Q Did they take you to the reception the next day?

A Did we? Lanie, what was it, did we go to the reception the next day? I think we went home that night.

Q Did you see any basis in those experiences to recuse yourself in this proceeding?

MR. LEONARD: We're done, right?

MR. PINCUS: Not quite.

A What?

Q Did you see any basis in which to recuse yourself from this proceeding based on your experiences?

A No, this is strict science, that has nothing to do with personal relationships or friendships. We are arguing here science and I got a report here that was a very interesting question and also a scientific question and I tried to do the best and I didn't see any -- I felt sorry that --

Q On page four --

MR. LEONARD: Let him finish his answer. He felt sorry what?

MR. PINCUS: He's giving the same speech over and over again.

MR. LEONARD: You felt sorry. You felt sorry about what?

A That our personal relationship was there but I thought I could clarify and help by going through that Robbins' report very carefully and did the best I could to come to some kind of an understanding for this happening.

Q Are you aware of the acronym of

which is IUPAC-IUB as it being an authority on biochemical acronyms?

A Would you spell that?

Q Sure. IUPAC-IUB.

A Yeah.

Q Do you recognize that as an authority on biochemical acronyms?

A Yeah.

Q Are you aware that that body abbreviates thymidine as T small d capital R?

A Listen --

Q Just answer my question.

A My answer is the following: There are many ways of acronyming thymidine. My point is and I think you are referring to that, I criticize as kind of a negligence to stick to one acronym, I don't care which one, in the report but don't use different acronyms in one report in order for those who are not familiar with it, I am familiar with it, I don't care, but it is just a slight oversight which I pointed out.

Q I wanted to understand the basis for your comment.

A Yes. I don't care whether you call

it TdR or ThR. If you write a report you should choose only one acronym in order to make yourself understood.

MR. PINCUS: I'm done. Thank you for your time. Unless you have any questions.

MR. LEONARD: No questions.

(Time noted: 3:25 p.m.)

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A C K N O W L E D G M E N T

STATE OF NEW YORK)
) ss:
COUNTY OF NASSAU)

I, LUDWIG E. FEINENDEGEN, M.D., hereby certify that I have read the transcript of my testimony taken under oath in my deposition of September 17, 2009; that the transcript is a true, complete and correct record of what was asked, answered and said during this deposition, and that the answers on the record as given by me are true and correct.

_____
LUDWIG E. FEINENDEGEN, M.D.

Subscribed and sworn to
before me this _____ day
of _____, 2009.

_____
NOTARY PUBLIC

I N D E X

E X H I B I T S

E X H I B I T S (Cont'd)

E X H I B I T S (Cont'd)

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C E R T I F I C A T E

STATE OF NEW YORK)
) ss:
COUNTY OF NASSAU)

I, JAMES PUNGELLO, a Shorthand Reporter and Notary Public in and for the State of New York, do hereby certify:

That the testimony of LUDWIG E. FEINENDEGEN, M.D. was held before me at the aforesaid time and place.

That said witness was duly sworn before the commencement of the testimony and that the testimony was taken stenographically by me and is a true and accurate transcription of my stenographic notes.

I further certify that I am not related to any of the parties to the proceeding by blood or marriage, and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 13th day of October, 2009.

_____

JAMES PUNGELLO

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E R R A T A S H E E T

DEPOSITION OF: LUDWIG E. FEINENDEGEN, M.D.
RE: UNITED STATES OF AMERICA EX REL. DR. HELENE Z.HILL vs. UNIVERSITY OF MEDICINE & DENTISTRY OF N.J., et al
DATE TAKEN: SEPTEMBER 17, 2009

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LUDWIG E. FEINENDEGEN, M.D.

Subscribed and sworn to before me this ____ day of _____, 2009.

_____
NOTARY PUBLIC