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SUPERIOR COURT OF CALIFORNIA

COUNTY OF ALAMEDA

BEFORE THE HONORABLE WINIFRED Y. SMITH, JUDGE PRESIDING

DEPARTMENT NUMBER 21

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COORDINATION PROCEEDING)	
SPECIAL TITLE (RULE 3.550))	
)	
ROUNDUP PRODUCTS CASE)	JCCP No. 4953
)	
_____)	
THIS TRANSCRIPT RELATES TO:)	
)	
Pilliod, et al.)	Case No. RG17862702
vs.)	
Monsanto Company, et al.)	Pages 5055 - 5312
_____)	Volume 30

Reporter's Transcript of Proceedings

Monday, May 6, 2019

Reported by: Lori Stokes, CSR No. 12732, RPR
Stenographic Court Reporter



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APPEARANCES OF COUNSEL:

For Plaintiffs:

THE MILLER FIRM, LLC
108 Railroad Avenue
Orange, Virginia 22960
(540) 672-4224

BY: MICHAEL J. MILLER, ATTORNEY AT LAW
mmiller@millerfirmllc.com

BAUM HEDLUND ARISTEI & GOLDMAN PC
10940 Wilshire Boulevard, 17th Floor
Los Angeles, California 90024
(310) 207-3233

BY: R. BRENT WISNER, ATTORNEY AT LAW
rbwisner@baumhedlundlaw.com
PEDRAM ESFANDIARY, ATTORNEY AT LAW
pesfandiary@baumhedlundlaw.com

(APPEARANCES CONTINUED ON FOLLOWING PAGE)

1 **APPEARANCES:** (CONTINUED)

2 For Defendants:

3 EVANS FEARS & SCHUTTERT LLP
4 2300 W. Sahara Ave, Suite 950
5 Las Vegas, Nevada 89102
6 (702) 805-0290

7 **BY: KELLY A. EVANS, ATTORNEY AT LAW**
8 kevens@efstriallaw.com

9 HINSHAW
10 One California Street, 18th Floor
11 San Francisco, California 94111
12 (415) 362-6000

13 **BY: EUGENE BROWN JR., ATTORNEY AT LAW**
14 ebrown@hinshawlaw.com

15 GOLDMAN ISMAIL TOMASELLI BRENNAN & BAUM LLP
16 564 West Randolph Street, Suite 400
17 Chicago, Illinois 60661
18 (312) 681-6000

19 **BY: TAREK ISMAIL, ATTORNEY AT LAW**
20 tismail@goldmanismail.com

21 (Multiple other counsel present as reflected in the
22 minutes.)

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I N D E X

Monday, May 6, 2019

DEFENDANT'S WITNESSES

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LEVINE, ALEXANDRA

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1 Monday, May 6, 2019

8:50 a.m.

2 (The following proceedings were heard out of
3 the presence of the jury:)

4 **MR. MILLER:** Just a few small matters. I've
5 been handed a PowerPoint for the next witness, the last
6 witness for the defendants, Dr. Levine.

7 **THE COURT:** Uh-huh.

8 **MR. MILLER:** Well, we got a detailed report
9 from Dr. Levine. We took Dr. Levine's deposition.
10 Dr. Levine made it clear as a bell in her report and her
11 deposition she's not a -- she's not a geneticist and
12 wasn't going to give any opinions about that. But the
13 PowerPoint that I was provided is very detailed genetic
14 information about how this kind of cell runs into that
15 kind of cell, cells that are not mentioned in her
16 report, not mentioned in her deposition.

17 So I'm pretty good with her PowerPoint except
18 for that. It's right out of left field. It's nothing
19 that we've ever been able to prepare for, or we would
20 have.

21 And the other objection is this EPA report, I
22 guess you would call it, that came out last week by --
23 signed by Billy Mitchell. Apparently, Billy has a
24 bachelor's degree and --

25 **THE COURT:** I'm sorry. Who is Billy Mitchell?

1 **MR. MILLER:** He works at the EPA.

2 **THE COURT:** Is that the subject of the motion
3 that was filed at the end of the week?

4 **MR. MILLER:** It is.

5 **THE COURT:** Okay.

6 **MR. MILLER:** And the report is riddled with
7 violations to the motions in limine. They talk about
8 the EPA standard dose and how --

9 **THE COURT:** Well, let me stop you. Because
10 the reason I didn't even address that was because I was
11 waiting for plaintiffs to file an opposition. There's
12 really no way for me to review it and give it any
13 thought.

14 So are you going to file something, or is this
15 just going to be the subject of an oral motion, and/or
16 is this something that Dr. Levine is going to testify
17 to?

18 **MR. MILLER:** We have filed an opposition.

19 **THE COURT:** Okay. I just haven't seen it yet.

20 **MR. MILLER:** It was filed this morning.

21 **THE COURT:** Is Dr. Levine addressing --

22 **MR. ISMAIL:** Yes. We did intend to have
23 Dr. Levine address that issue. She has reviewed
24 regulatory documents up until this last filing by EPA,
25 and this obviously updates what she's already reviewed,

1 consistent with what other witnesses have done as things
2 have come out during trial and commented on it.

3 **THE COURT:** Let me just stop you there. I did
4 take a look at it briefly before I left. And my first
5 question was what's the relevance? Because the time
6 period that the plaintiffs used the product was 2017. I
7 sort of get that the science is current, so whatever
8 comes out with respect to what the state of the science
9 is would be considered.

10 But with respect to the state of what EPA
11 thinks or doesn't think or more importantly -- I'm
12 sorry -- what drove any corporate behavior on Monsanto's
13 part with respect to the plaintiffs, I don't understand
14 why anything coming out yesterday or last week would be
15 relevant to that.

16 **MR. ISMAIL:** Your Honor, the relevance is
17 because the plaintiffs, both in opening and through
18 their witnesses, have suggested that the EPA
19 determination is hanging in the balance, so to speak,
20 that it can change at any moment. And, therefore, they
21 should consider the evidence that has come in as being
22 equivocal or just preliminary and not final.

23 They had Dr. Benbrook make that assertion.
24 Mr. Wisner made that assertion in opening statements.
25 In fact, he even suggested that the outcome here may

1 have some sort of influence on the EPA's determination.

2 This here is a response to -- specifically
3 with Dr. Benbrook. Dr. Portier mentioned it is the OPP
4 report that's in evidence. It should be downgraded, I
5 guess, in significance because -- their characterization
6 that it's not final.

7 We have here reaffirmation of that position by
8 the EPA in 2019 considering public comment that has been
9 made. And, because of that, it is directly responsive
10 to questioning in evidence that the plaintiffs have put
11 in about the earlier report.

12 **MR. MILLER:** It's not a final. If it was a
13 final, then maybe we could consider it at some other
14 argument or level. But it's no more than one fella at
15 the EPA saying, "Here are my responses to some of the
16 things that have been raised in the public, and here's
17 what I think about them." But the registration process
18 will continue; the public comment process will continue.

19 It's nothing final in this document; it's
20 simply something that mysteriously appeared last week.
21 And it says the same stuff that the other two say. So I
22 think the dating issue is correct.

23 **THE COURT:** I'm going to just take a break and
24 take a look at it. Tentatively, I would say no. If
25 it's not a final decision by the EPA, then I don't see

1 the relevance of yet another -- I mean, I understand
2 that the EPA's decision is sort of ongoing. I don't
3 know. It seems to morph. I'm not sure what triggers
4 deciding -- issuing a particular report or making a
5 particular statement. My recollection about the
6 testimony, plaintiffs' witnesses were essentially -- you
7 know, whatever -- garbage in, garbage out kind of thing
8 with respect to the EPA.

9 So I don't know if it's hanging in the balance
10 so much as, whatever they're doing, is painted -- long
11 story, whatever, the witnesses have said. But there's
12 sort of a litany of that opinion as opposed to let's
13 just wait and see what the EPA says.

14 **MR. EVANS:** Your Honor, we've discussed this
15 with you before. But the official act requirement of
16 452 does not require a final decision. And Your Honor,
17 in addressing the earlier EPA documents, had allowed
18 those in --

19 **THE COURT:** I have done that. And,
20 technically, that would be true. But that's -- first of
21 all, it's discretionary. And, second of all, it has to
22 have some relevance. So there are a combination of
23 things, most of which is just exercising my discretion
24 over what I think is appropriate to bring in beyond what
25 may technically meet the requirements of 1280. I would

1 say it probably does.

2 **MR. EVANS:** So, in addition to addressing
3 the -- not only implications but actual statements from
4 plaintiffs' counsel and witnesses regarding that this is
5 somehow the EPA is going to revisit this whole issue.
6 And this is the next affirmation of the prior
7 assessments. And the scientific assessment that's
8 contained within this is evidence of causation, just as
9 much as, for example, the IARC assessment is.

10 So it's not just responding to them; it's
11 actually affirmative evidence --

12 **THE COURT:** No, I disagree with that. I think
13 that a statement of the EPA with regard to glyphosate --
14 and, as you recall, when he made that argument in the
15 first instance, it was, well, we're entitled to
16 demonstrate what we knew and when we knew it and
17 independent influences of -- among other things,
18 potentially, punitive damages. And it drove perhaps
19 corporate behavior.

20 I specifically only allowed the statements in
21 because the underlying science was hearsay and not
22 admitted for just that reason, which is it is not
23 analysis of the science. At least I didn't think that
24 the underlying science is admissible because it is
25 hearsay.

1 So the statement regarding what EPA thinks is,
2 I think, potentially fine under 1280. Whether or not
3 it's otherwise admissible or relevant is another story.
4 But, no, I don't think that the underlying -- put it
5 this way: It's based on all the same science. I mean,
6 all the same studies have been shown. They've been
7 reviewed and rereviewed by a number of bodies.

8 But, with respect to the underlying science of
9 these other foreign documents and the EPA documents
10 specifically, I eliminated all of that. Because the
11 statement of the EPA and the extent to which Monsanto
12 relied on it, I do think is relevant. But looking at
13 that to assess causation, I disagree that it's
14 admissible for that purpose, which is why I wouldn't
15 admit it.

16 **MR. EVANS:** Again, Your Honor, we've had
17 several long discussions about this. If you want to
18 take a look at the briefs again, we can talk about it.

19 **THE COURT:** I'll take a peek at it. I haven't
20 seen plaintiffs' brief. The reason I wanted to know if
21 it related to Dr. Levine is because she'll be on this
22 morning talking about this, and I haven't really had a
23 chance to look at the briefs. So let me take a peek
24 before we get the jury in here.

25 **MR. ISMAIL:** Mr. Miller said he had additional

1 objections, and I just wanted to make sure we had a
2 chance to address them before the witness takes the
3 stand.

4 **MR. MILLER:** They are PowerPoint Slides 16
5 through 20 --

6 **THE COURT:** I don't have a copy of it.

7 **MR. ISMAIL:** I gave mine to Chris.

8 **MR. MILLER:** 23.

9 16 to 23, Your Honor.

10 **THE COURT:** Okay.

11 **MR. MILLER:** Nowhere in Dr. Levine's report
12 does she talk about macrophages killing TB germs,
13 nowhere in her deposition. Nowhere in her deposition
14 did she talk about natural killer cell recognizing and
15 killing cancer cells. It's simply not in her report.

16 18, "Dendritic Cell Gives Messages to T
17 Cells." If I had seen that in her report or she had
18 mentioned it in her deposition, I would have researched
19 it, and I would know what a dendritic cell is. But I
20 stand here now two minutes before she takes the stand
21 clueless about what they're talking about. And that was
22 the plan, I'm afraid.

23 "Cytotoxic T8 Cells," not in her report, not in
24 her deposition.

25 "Genetically Engineered CAR-T Cells Attacking

1 Cancer Cells," did not talk about it.

2 "Rituximab Immunotherapy" attacking or
3 attaching to a cancer cell through CD20, that -- just
4 wasn't in her report. And it's not in her deposition.

5 And that ends up with 23 -- at page 23, these
6 are just all new subjects that she didn't put in her
7 report, didn't put in her deposition.

8 **MR. ISMAIL:** She produced these slides at her
9 deposition. They had ample notice. We produced these
10 at her deposition, same pictures.

11 **THE COURT:** Maybe you guys need to talk first.

12 **MR. MILLER:** Yeah.

13 **THE COURT:** Why don't you have that
14 conversation.

15 **MR. MILLER:** We'll have that conversation.

16 Your Honor, one last thing, unrelated minor
17 request. I've had permission from defense counsel. My
18 wife, who is an attorney who has not been admitted in
19 this case, would like permission to sit at counsel table
20 for one witness. She's organized the binder. She won't
21 speak, just hand me documents on cross-examination.

22 **MR. ISMAIL:** No objection.

23 **THE COURT:** Okay.

24 **MR. MILLER:** We'll talk to counsel. If they
25 were there, then I owe them an apology. But I wasn't

1 there; Curtis was. But we'll talk.

2 **THE COURT:** Okay.

3 (Recess taken from 9:01 a.m. to 9:11 a.m.)

4 **MR. MILLER:** I've spoken to Mr. Ismail. We
5 were not provided those. However, apparently, she
6 brought a big pile of documents with her. They were in
7 that pile of documents. They never got looked at or
8 reviewed. That's okay. I accept her at her word.

9 What we've agreed to do to keep this moving is
10 those exhibits that we referenced, they don't magically
11 relate somehow to Mr. Pilliod; he's using them in the
12 general sense and not specific as to Mr. Pilliod, and
13 that's fine.

14 **THE COURT:** Okay.

15 **MR. ISMAIL:** The pictures, Your Honor, are how
16 the immune system interacts with cancer surveillance and
17 suppression. She's going to describe it in the general
18 sense. Obviously, her opinion is Mr. Pilliod does have
19 a compromised immune system. She's not going to put up
20 a picture and say "This is his T-cell" or "I think this
21 is what his T-cell looked like." It's demonstrative of
22 the system. And I think we have an accord. And they
23 were provided.

24 **THE COURT:** Thank you. I have had a chance to
25 take a look at this. And I am going to exclude it for a

1 couple of reasons.

2 First of all, this isn't really a decision;
3 this is really a comment on comments. And, to the
4 extent there's a conclusion, it's, well, the comments
5 haven't really changed our mind yet, so the process is
6 going to keep going.

7 Correct me if I'm wrong.

8 So, to the extent that it doesn't really
9 represent a decision of EPA in the sense of what I think
10 requires compliance with 1280, that's one reason. The
11 other is the nature of this really does focus on
12 comments which comment on the analysis, the scientific
13 analysis.

14 To introduce this now, I would have to allow
15 the plaintiffs to come back and rebut this in some
16 fashion. It's actually more open-ended than the
17 documents I did allow in because they were sort of
18 closed-end decisions based on a specific analysis.

19 This goes through and says, well, human
20 incidence in epidemiology, and then they talk about the
21 literature. They go through. And, at the end of the
22 day, they don't really draw any conclusions. They have
23 lots of subsections, which they're sort of regurgitating
24 a lot of science.

25 But, at the end of the day, it doesn't really

1 come to a conclusion about anything other than we're
2 going to still continue to look at this. So I don't
3 believe this really even qualifies under 1280.

4 I also think exercising my discretion at this
5 point, after the close of plaintiffs' case, allowing
6 this document to come in, which I don't think represents
7 a decision that falls within 1280 of the evidence code,
8 would be unduly prejudicial.

9 And then I have to let the plaintiffs come in
10 and rebut this in some fashion. I just don't think, at
11 this stage in this litigation, it's going to add to the
12 body of evidence that the jury is going to consider.

13 I mean, the current decision -- official
14 decision is glyphosate doesn't cause cancer. The
15 decision is glyphosate doesn't cause cancer.

16 So -- I mean, to the extent that that's the
17 EPA's position, it's still the EPA's position. So,
18 anyway, the request by defendant is denied.

19 So let me get the jury in.

20 (Recess taken from 9:14 a.m. to 9:20 a.m.)

21 (The following proceedings were heard in the
22 presence of the jury:)

23 **THE COURT:** Good morning, ladies and
24 gentlemen. We're ready to keep going this morning, and
25 Mr. Ismail will present the defendants' next witness.

1 **MR. ISMAIL:** Thank you, Your Honor.

2 Good morning, everyone.

3 Defense calls Dr. Alexandra Levine to the
4 stand as the final witness in the trial.

5 **ALEXANDRA LEVINE,**

6 called as a witness for the Defendant, having been duly
7 sworn, testified as follows:

8 **THE CLERK:** Would you please state and spell
9 your name for the record.

10 **THE WITNESS:** My name is Alexandra Levine;
11 A-L-E-X-A-N-D-R-A, last name L-E-V-I-N-E.

12 **THE COURT:** So, Dr. Levine, you're going to
13 have to speak way up for this crowd.

14 **THE WITNESS:** Will do.

15 **THE COURT:** Into the mic, because the reporter
16 has to take down everything, and we want the jurors to
17 hear everything you're saying.

18 **THE WITNESS:** Will do. Thank you.

19 **MR. ISMAIL:** May I proceed, Your Honor?

20 **THE COURT:** Yes, you may.

21 **MR. ISMAIL:** May I approach with a binder for
22 the witness?

23 **THE COURT:** Yes.

24 **DIRECT EXAMINATION**

25 ///

1 **BY MR. ISMAIL:**

2 **Q.** I am handing you a binder of some exhibits
3 we're going to go through today.

4 I've provided a copy to counsel, and Your
5 Honor has a copy as well.

6 Good morning, Doctor.

7 **A.** Good morning.

8 **Q.** Can you please introduce yourself to the
9 ladies and gentlemen of the jury and tell the folks what
10 you do for a living.

11 **A.** My name is Alexandra Levine. I am an
12 oncologist. That means that I take care of patients who
13 have cancer. I work at the City of Hope National Cancer
14 Center. That is in Duarte outside of Los Angeles. It
15 is a comprehensive cancer center that is supported by
16 the National Cancer Institute.

17 **Q.** And, Dr. Levine, do you have a particular area
18 of focus within the field of oncology?

19 **A.** Yes. My specialty is non-Hodgkin's lymphoma
20 and Hodgkin's lymphoma as well.

21 **Q.** And, Doctor, have we asked you to look at the
22 medical records with respect to Mr. Pilliod and some
23 scientific information regarding Roundup to form an
24 opinion as to whether or not Roundup played any role in
25 his development of non-Hodgkin's lymphoma?

1 **A.** Yes, you did.

2 **Q.** And are you prepared today to discuss with the
3 jury your opinions and your findings on those questions?

4 **A.** I am.

5 **Q.** And before we get to your opinions, Doctor, I
6 would like to give folks a little bit better sense of
7 your professional experience and background.

8 And I notice, Doctor, you have a CV that is
9 over a hundred pages long. And rather than walking
10 through the CV, have you helped us put together some
11 slides to summarize your professional experience?

12 **A.** Yes, I did.

13 **Q.** So they're in the binder there in the front,
14 but I'll also show them on the screen here for you.

15 Can you please tell us -- let's start with
16 your education and early professional medical training.

17 **A.** First, undergraduate, I went to UC Berkeley,
18 right close to here.

19 After that, I went to University of Southern
20 California, USC, for medical school.

21 After medical school, you are an intern.
22 You're still being trained as an intern and then what's
23 called a resident. So I was an intern and a resident in
24 internal medicine at the big Los Angeles County USC
25 Medical Center, the big county hospital for the County

1 of Los Angeles.

2 After that, if you want to specialize more
3 within the field of medicine, you take a fellowship.
4 And that allows, again, more sophisticated training.

5 I became a fellow in hematology and oncology
6 at Emory University in Atlanta, in Georgia. And, after
7 that, I came back to Los Angeles, came back to the big
8 county hospital. And I was a fellow in clinical
9 research in hematology, specifically cancers of the
10 blood system. And that was at the county hospital
11 again.

12 Q. So, Doctor, what sparked your interest in
13 oncology?

14 A. It's a long question -- a long answer, I
15 guess. Basically, I've always been challenged by
16 people, patients who have complicated illnesses who are
17 a challenge. It's something that is interesting to me,
18 the challenge of significant illness.

19 The second thing I learned earlier in my
20 training was that, if somebody was really ill, somebody
21 with cancer, as an example, and you had the time or
22 wanted to take the time just to sit at the bedside and
23 hear, you could hear all of life. You could hear what
24 was important, what isn't important.

25 And so the human aspect was very moving to me,

1 and the challenge of difficult disease was moving to me.
2 And I think those were the two main things that got me
3 into oncology.

4 Q. And did you begin -- at that point in your
5 fellowship back at Emory and probably even your earlier
6 training, beginning caring for patients with cancer in
7 the manner that you just described?

8 A. Yes. So I -- the county hospital is big. It
9 was 2,000 beds at that time. I had a tremendous amount
10 of experience with cancer patients even before I took
11 the fellowship. That's what told me that I wanted to go
12 in that direction.

13 Q. So let's talk about your clinical experience,
14 Doctor.

15 After your fellowship, did you continue your
16 practice in caring for patients with cancer?

17 A. Yes, I did.

18 Q. Can you walk us through the clinical positions
19 you've held and your experience at those hospitals?

20 A. First of all, at the county hospital, I became
21 the clinical director of the adult hematologic neoplasia
22 service. What that means is I was in charge of the care
23 of the patients, all of the patients who had cancers of
24 the blood system: leukemias, lymphoma, multiple
25 myeloma, diseases such as that.

1 And that was many years. That was from 1997
2 until I left USC at the end of 2006.

3 In time, I became the interim chief of the
4 division of medical oncology. That really was not my
5 field. They were recruiting for a director, and I
6 agreed to be the interim for that year.

7 What I really did, from 1991 through 2006, I
8 became chief of the division of hematology. I was in
9 charge of the whole area of hematology at USC.

10 Then -- in 1983, USC opened their first
11 private hospital, a cancer hospital, USC Norris Cancer
12 Hospital. And at first I was the deputy clinical
13 director of the cancer center in general, and then I
14 became the medical director of USC Norris Cancer
15 Hospital. And I did that from '96 to 2006, when I left
16 USC.

17 I left at the end of 2006 and I went to City
18 of Hope. I was asked to be the chief medical officer at
19 City of Hope. And at the end of 2016, I -- at 12/31/16,
20 I retired from the administrative positions, could never
21 really retire from being a doctor. So I continue to
22 take care of my patients, even though I'm no longer the
23 medical director of the cancer center there at the
24 hospital there.

25 Q. So as you've described your clinical

1 experience here on this slide from 1977 to the present,
2 throughout that entire time, did you continue your
3 clinical practice caring for patients with cancer?

4 **A.** I really couldn't do what I do if I wasn't a
5 doctor. And, as an example, when I was chief of the
6 division of hematology, I was in charge of making the
7 schedules for all the doctors. The hardest schedule
8 would be to be an attending physician at the county
9 hospital. And I specifically made myself the attending
10 for six months out of the year. I love taking care of
11 patients. I've always taken care of patients. And I
12 still take care of patients.

13 **Q.** That was going to be my next question. Even
14 though you have stepped down as the chief medical
15 officer at City of Hope, do you continue to this day
16 being a clinical physician in oncology?

17 **A.** Absolutely. The last time I got a call from a
18 patient was last night.

19 **Q.** And when are you next going to be in clinic or
20 in the hospital taking care of patients?

21 **A.** Tomorrow, my first appointment at 7:00 a.m.

22 **Q.** And throughout this time, Doctor, this
23 40-plus-year career you've had as an oncologist, what
24 has been your area of clinical specialty?

25 **A.** My clinical specialty is non-Hodgkin's

1 lymphoma. That's what I do.

2 Q. And this is probably a difficult question to
3 answer, but, as you look back over your four-plus
4 decades as a clinician, can you give us a sense of the
5 number of patients with non-Hodgkin's lymphoma that you
6 have seen and cared for?

7 A. I don't know exactly. It is thousands. It is
8 literally thousands, starting from the county hospital,
9 being ultimately in charge of all of those patients who
10 had non-Hodgkin's lymphoma. The interns, the residents,
11 the fellows, the other attendings would come to me. I
12 knew those patients over time.

13 So it is literally tens of thousands of
14 patients.

15 Q. Now, the jury has had an opportunity to meet
16 another physician at City of Hope named Dennis
17 Weisenburger.

18 Do you know Dr. Weisenburger?

19 A. I certainly do.

20 Q. How do you know Dr. Weisenburger?

21 A. I know him as a colleague, as a pathologist.
22 I know him also because I was in charge of recruiting
23 all the physicians, the quality of their work and so
24 forth, and I recruited Dr. Weisenburger to be chief of
25 pathology at City of Hope.

1 **Q.** So you, in essence, hired Dr. Weisenburger?

2 **A.** I certainly did.

3 **Q.** And as chief medical officer at City of Hope,
4 were you responsible for all the physicians at that
5 hospital?

6 **A.** Yes. The physicians reported to me. I was
7 responsible for the clinical care that they delivered.
8 I was responsible for the quality of their care. I was
9 responsible for the research that they did. I was
10 responsible for assuring that they were abiding by all
11 the rules and regulation and so forth.

12 **Q.** Do you respect Dr. Weisenburger as a
13 pathologist?

14 **A.** I absolutely respect Dr. Weisenburger as a
15 pathologist.

16 **Q.** Now, at City of Hope do the pathologists
17 become involved in diagnosing the cause -- assessing the
18 clinical risk factors of a patient and diagnosing the
19 cause of those patients' non-Hodgkin's lymphoma?

20 **A.** No. It is not the role of the pathologist to
21 diagnose a cause of an illness. The role of the
22 pathologist is to diagnose the illness in the first
23 place by looking under the microscope, by looking at
24 laboratory tests and so forth, and diagnosing what that
25 patient has. That's what a pathologist is supposed to

1 do and does.

2 Q. Is that true for Dr. Weisenburger as well in
3 your experience --

4 A. Yes, it is. And that's why he was hired.

5 Q. And at City of Hope, what is the group of
6 physicians who do become involved in assessing a
7 patient's clinical presentation and trying to understand
8 what's going on with their cancer?

9 A. That would be the oncologist. That would be
10 the clinician who talks to the patient, who understands
11 what the patient's history has been, medical history and
12 so forth, and tries to put it all together in a way that
13 will be helpful.

14 Q. And is that an area in which you've worked in
15 for the nearly last 50 years?

16 A. Yes.

17 Q. Do you also have roles as a teacher?

18 A. Yes, absolutely.

19 Q. Can you walk us through your teaching
20 positions and the areas in which you were instructing
21 young medical students and doctors?

22 A. Yes. First of all, I love to teach. I always
23 teach. As it turns out, the word "doctor" comes from
24 the Latin which means teacher. So that's part of my
25 job, and it's always been part of my job to me,

1 important to me.

2 At USC, first I was an assistant processor and
3 then an associate and then a professor. And in 1977 I
4 was designated as a distinguished professor of medicine.
5 That's an honorary kind of degree.

6 Right now, since I've left USC, I'm called a
7 distinguished professor emeritus. In 2010 I also became
8 an adjunct processor at Claremont Graduate University.
9 That means I'm not fully employed there, but I teach
10 there and work in some sense there.

11 In 2007, when I started at City of Hope, I
12 became a professor of hematology, oncology, and
13 hematopoietic cell transplantation. That means like
14 bone marrow transplant.

15 Then in 2012 I was given another honorary
16 degree or honorary title, Melinda and Norman Payson
17 Professor of Medicine.

18 So those are the titles that speak to the fact
19 that I have been a teacher over those many years.

20 **Q.** And who is it that you teach?

21 **A.** I teach everybody. I teach the community. I
22 teach patients. I teach the families of patients. I
23 teach undergrad students. I teach medical students
24 extensively. I teach interns, residents, fellows. I
25 teach other physicians quite regularly, actually, in

1 community settings or in big national or international
2 conferences. I teach a lot.

3 Q. And has your teaching experience also focused
4 in the area of lymphomas and blood-related cancers?

5 A. Yes, it has.

6 Q. Tomorrow morning, when you are seeing your
7 patients, will you have residents or fellows with you?

8 A. Usually I'll have a fellow with me. I don't
9 know exactly who's assigned tomorrow.

10 Q. In addition to your clinical experience you've
11 described, your teaching experience you've just
12 described, have you also been involved in research?

13 A. Yes, I have.

14 Q. Can you tell us what has been your focus in
15 your areas of research?

16 A. My general focus in research is non-Hodgkin's
17 lymphoma. As time went on, I became involved in the
18 area of what causes lymphoma in terms of various germs,
19 various viruses and organisms.

20 Q. Have you published your work in the
21 peer-reviewed medical literature?

22 A. Yes, I have.

23 Q. Let's just break this down.

24 How many peer-reviewed articles have you
25 published in the literature?

1 **A.** About 325, 326.

2 **Q.** And have you also published -- contributed
3 book chapters to textbooks in medicine?

4 **A.** Yes, I have.

5 **Q.** Can you give us a sense of that order of
6 magnitude?

7 **A.** 70 of those. I get requests to do that. It
8 takes a long time to write a chapter, and at a certain
9 point in my career, I decided that I would only write
10 one chapter a year. So that was limited to 70.

11 **Q.** Have you also published abstracts in medical
12 journals?

13 **A.** Multiple, multiple abstracts in medical
14 journals, yes.

15 **Q.** Can you give us a sense of the order of
16 magnitude of that contribution?

17 **A.** At a certain point, I didn't even put them on
18 my CV. There were too many of them. Every paper I
19 wrote would have started with abstracts, beginning of
20 the information, beginning to understand, publishing
21 those preliminary data and then eventually the whole
22 publication. I will say it's probably in the order of
23 900 or 1,000, perhaps, abstracts.

24 **Q.** So, in total, looking at how published is
25 Dr. Levine in the medical literature, can you give us a

1 sense of peer-reviewed journal articles, abstracts, book
2 chapters?

3 A. Well over a thousand publications,
4 peer-reviewed.

5 Q. Have you -- has your work publications
6 appeared in some well-known medical journals like the
7 New England Journal of Medicine and Journal of American
8 Medical Association?

9 A. Yes, they have.

10 Q. Have you served as an editor for any of the
11 journals the jury may have heard about during this
12 trial?

13 A. Yes, I have.

14 Q. For example?

15 A. Oncology.

16 Q. The jury has heard about the peer-reviewed
17 process and how articles are sent out for comment by
18 experts in the field.

19 Have you had an opportunity to do that as
20 well?

21 A. Yes. I do that very, very regularly. The
22 last paper I was asked to review was last week. So
23 many, many, many. Hundreds of thousands, I would
24 think -- not hundreds of thousands, but perhaps a
25 thousand of those reviews over 40 years.

1 **Q.** Have you -- I think you mentioned as well that
2 you have presented on your areas of expertise to other
3 physicians?

4 **A.** That's correct.

5 **Q.** And you've been asked to speak at conferences
6 about non-Hodgkin's lymphoma?

7 **A.** Yes, conferences both nationally and
8 internationally.

9 **Q.** In your speaking experience, has the topic of
10 pesticides come up? Speaking generally.

11 **A.** No.

12 **Q.** Have you ever told a group of physicians that
13 Roundup causes non-Hodgkin's lymphoma?

14 **A.** No, I have not.

15 **Q.** Why not?

16 **A.** I believe that the majority of the data are
17 clear in terms of the fact that Roundup does not cause
18 lymphoma.

19 **Q.** Now, Dr. Levine, your CV has many awards
20 listed on it.

21 I'd like to ask you, of all the awards that
22 are listed on your CV, which are the most meaningful and
23 significant to you?

24 **A.** I guess, first related to teaching, the
25 Outstanding Clinical Professor Award. So there aren't

1 nominations; the students just pick whatever name they
2 want to pick and vote. And at a certain point, the
3 school made a decision that I was not allowed to receive
4 this more than every five years. But then, when I was
5 going to leave, they allowed that to occur. And that
6 was important to me because teaching is important to me.

7 I was chosen by President Clinton to be a
8 member of his advisory committee on HIV/AIDS and was
9 chosen to be the chairman of the research committee, of
10 that AIDS advisory committee. That was important to me.

11 I was elected a master of the American College
12 of Physicians. And that was important to me because it
13 spoke to my care of patients and the full -- what I did
14 in my career.

15 And I guess the most recent one was in March
16 of this year, the Margaret Kripke. It was called the
17 Legend Award for Promotion of Women in Cancer Medicine
18 and Cancer Science. And that was important for me
19 because I really do think it's important for women to be
20 involved in these fields.

21 In a certain kind of a way, I guess everyone
22 believes that nurses should be women because they are
23 kind and compassionate. Well, women should be doctors
24 too, and women should be scientists too. So that was
25 important to me that I was recognized for doing that.

1 Q. In addition to your work and your speaking,
2 have you also been asked to consult with health
3 ministries outside the United States?

4 A. Yes, I have.

5 Q. And we're showing here some of that work that
6 you have done?

7 A. Yes.

8 Q. Can you describe in general what that work is
9 and what you did in these points?

10 A. Early in the AIDS epidemic, I began to see
11 young men with very, very unusual non-Hodgkin's
12 lymphomas. And that was the beginning of my interest in
13 AIDS-related lymphomas. I eventually defined that these
14 lymphomas were going to be part of the AIDS epidemic,
15 and they were.

16 And as I got involved in the malignancies and
17 the cancer related to AIDS, you couldn't just get
18 involved in that; you had to look at the whole big
19 epidemic. And I became involved in the big epidemic.
20 And that meant that it was important to me to do
21 whatever else I could do to try to help any other
22 country, any other group to prevent that disease from
23 getting into that country in the first place.

24 So I very much was wanting to do these
25 consultantships in the various countries when I was

1 asked to do so. I went to Mexico. I went to Chile. I
2 was asked to speak to the health minister in India. I
3 went to Russia. I went several times to China. That
4 was very interesting to me because I believed that, if
5 there was any one country in the world that might have
6 had the capability of stopping that epidemic from
7 occurring, it would have been China. But I failed. It
8 didn't work. I tried.

9 Q. And, Doctor, how is it or why is it that a
10 lymphoma specialist and cancer researcher, such as you,
11 became so involved in understanding the AIDS epidemic
12 and working on that as a public health issue?

13 A. Well, it started with my patient care. I saw
14 patients, and it just took one or two to realize that I
15 was seeing lymphomas that were very, very different than
16 any of the cases I had seen before.

17 That led me, after two or three cases, to look
18 at population-based data. Was that just me at the
19 county hospital seeing something funny, or was this
20 really happening on a larger scale?

21 And I worked with some of the epidemiologists
22 at USC. Leslie Bernstein, for example, was in charge of
23 the SEER registry, which is a population-based cancer
24 registry. If any doctor diagnoses cancer in my
25 practice, it turns out that's a reportable disease to

1 the government. The government needs to track cases of
2 cancer. And you can see in a quick look whether there
3 are changes. Is something happening to the incidence of
4 one kind of cancer or another?

5 So I looked at the SEER data, I looked at what
6 the CDC was also discussing, and realized that it wasn't
7 just my hospital; this was happening.

8 I started -- that was my beginning. So
9 starting with my own patients, realizing something
10 different, going to a larger dataset to see it wasn't
11 just me, and at that point trying to figure out what was
12 this? What was the emerging epidemic of a very, very
13 unusual lymphoma?

14 And, again, as I said, it was very difficult.
15 It was such a difficult epidemic, such a difficult time
16 in the history of these people and in my life also. You
17 couldn't just be involved in a little section of
18 lymphoma and not get involved in the entire epidemic,
19 what was causing all of these infections and so forth.

20 **Q.** Did this emerging issue, as you saw the
21 first -- the leading edge of it with respect to
22 lymphoma, did that even have a name at the time?

23 **A.** No. At first it had no name at all.
24 Eventually it was called GRID, gay-related immune
25 deficiency. And it turned out that it had nothing

1 really to do with gay; it was just a sexually
2 transmitted disease or by blood to blood.

3 Eventually the name was changed to AIDS or
4 became AIDS, acquired immune deficiency disease. In
5 time it was found to be caused by a virus, and that
6 virus was called the human immunodeficiency virus, HIV.

7 I actually wrote a letter to several people at
8 the NIH and CDC suggesting that the name of this virus
9 really should be HIV because, first of all, human, the
10 only animal, if you will, that is infected by this virus
11 is people, is humans. Immunodeficiency. Immune is our
12 immune system, our defense system. This is a virus that
13 causes deficiency of the immune system in humans. And I
14 thought that HIV was probably a pretty good name for it.

15 I wrote the letter, and subsequent to that, I
16 got a note from the Library of Congress asking if they
17 could put that letter into the Library of Congress, and
18 I said yes.

19 **Q.** Doctor, we're going to talk today with the
20 jury about the role of the immune system in cancer
21 surveillance and cancer protection; is that correct?

22 **A.** Yes.

23 **Q.** Is that issue of the immune system how the HIV
24 and AIDS conditions affect the risk of a patient
25 developing lymphoma?

1 **A.** Yes. It turns out that our defense system,
2 our immune system, is responsible for recognizing things
3 that are foreign to us.

4 So, first of all, germs. It's your immune
5 system that will recognize that you have an infection,
6 see that it's foreign to you, and try to kill it for
7 you. And usually it will work in one way or another.

8 But it turns out that a cancer cell is also
9 foreign to you. There's been a change in that cell so
10 that it doesn't look like self anymore, doesn't look
11 like me anymore. The immune system should be able to
12 recognize that, that that cell is foreign, and destroy
13 it.

14 And that's why people who have deficiencies or
15 abnormalities of the immune system are so at risk for
16 these various cancers.

17 **Q.** Doctor, is it fair to say that you have over
18 40 years of experience assessing patients and
19 recognizing whether or not their immune system puts them
20 at risk of developing non-Hodgkin's lymphoma?

21 **A.** Yes, I have.

22 **Q.** Doctor, are you being compensated for your
23 time?

24 **A.** Yes, I am.

25 **Q.** At what rate?

1 **A.** \$500 an hour.

2 **Q.** In terms of the materials that you reviewed to
3 arrive at your opinions you're going to talk about
4 today, first with respect to Mr. Pilliod, did you
5 receive and review the medical records that were
6 provided?

7 **MR. MILLER:** Excuse me, Counselor. Are you
8 done with voir dire?

9 **MR. ISMAIL:** No. I'm establishing her
10 materials that she reviewed. I will tender the witness.

11 **MR. MILLER:** Okay.

12 **MR. ISMAIL:** May I continue, Your Honor?

13 **THE COURT:** Yes.

14 **BY MR. ISMAIL:**

15 **Q.** So, Doctor, my question, just so you have it
16 in mind, as part of your review in this case, were you
17 provided and did you review Mr. Pilliod's medical
18 records?

19 **A.** Yes, I did. They came at various time
20 intervals. And I looked at them at various time
21 intervals when I received them.

22 **Q.** Did you also look at his testing results as
23 they were contained in his medical records?

24 **A.** Yes, I did.

25 **Q.** Did you review the depositions of Mr. Pilliod

1 and that of Mrs. Pilliod?

2 A. Yes, I did.

3 Q. Did you review the depositions of physicians
4 for Mr. Pilliod?

5 A. I'm not sure I got all of them, but I think I
6 did, yes.

7 Q. And did you review the reports and depositions
8 of the experts that the plaintiffs have --

9 A. Yes, I did.

10 Q. -- tendered?

11 A. Yes, I did.

12 Q. Did you also review the scientific literature
13 and other information regarding glyphosate-based
14 products like Roundup?

15 A. I did.

16 Q. Did you also review some of the regulatory
17 organization reviews around the issue of whether
18 products like Roundup are related in any way to
19 non-Hodgkin's lymphoma?

20 A. Yes, I did.

21 Q. Did you review the IARC monograph as part of
22 your review?

23 A. Yes, I did.

24 Q. Did you also, Doctor, rely on your education,
25 training, and experience that you described for the jury

1 this morning in arriving at your opinions?

2 A. I did.

3 Q. Did you have an opportunity to speak with
4 Mr. Pilliod directly?

5 A. No, I didn't.

6 Q. And do you believe that in any way limits your
7 ability to comment about his medical history and his
8 non-Hodgkin's lymphoma?

9 A. No, I don't think that at all. I was able to
10 go through his deposition carefully, and I certainly
11 take him at his word with everything he said there.

12 Q. And did his medical records provide you the
13 information you needed about his diagnoses and other
14 related conditions over the years to form your opinions
15 in this case?

16 A. It certainly did.

17 Q. Doctor, all the opinions you're going to offer
18 today will be to a reasonable degree of medical
19 certainty?

20 A. Yes.

21 Q. And with respect to the opinions you have
22 formed and that you will share with us today, did you
23 apply the same standards as you would with your own
24 patients, your own students, your own colleagues when
25 you are a practicing oncologist and researcher?

1 **A.** Yes, I did.

2 **Q.** Doctor, are you familiar with the term
3 "evidence-based medicine"?

4 **A.** Yes.

5 **Q.** What is that term?

6 **A.** It means that, when we are making decisions
7 related to people, related to patients -- treatment
8 decisions, prognosis decisions -- we can't just think
9 that we -- I think I want to do this; I think I want to
10 do that. It has to be based on evidence. Somebody's
11 life is going to depend on you. And you need real data,
12 scientifically valid data.

13 And that's what "evidence-based" means. It's
14 not something I just think; it's something I know
15 because the science is there behind it.

16 **Q.** And do you teach and practice the principles
17 of evidence-based medicine in your roles that you
18 described for us?

19 **A.** Without question. That is the basis of
20 medical education. It is based upon scientific fact.
21 Has to be.

22 **Q.** And have you followed those concepts of
23 evidence-based medicine in your review and forming your
24 opinions here?

25 **A.** Yes, I have.

1 **MR. ISMAIL:** Your Honor, at this time I would
2 tender Dr. Levine in as an expert in lymphoma, its
3 diagnosis, treatment, causes generally, and Mr. Pilliod
4 specifically.

5 **THE COURT:** Voir dire.

6 **MR. MILLER:** Yes, Your Honor. Thank you.

7 **VOIR DIRE EXAMINATION**

8 **BY MR. MILLER:**

9 **Q.** Thank you. Good morning, Doctor.

10 **A.** Good morning.

11 **Q.** I'm Michael Miller. We haven't met.

12 **A.** Hello.

13 **Q.** Hi. This is my wife and law partner, Nancy
14 Miller. She's going to help me a little bit. Okay?

15 **A.** Sure.

16 **Q.** You're the last witness, and we're going to be
17 done. And I just want to ask you a few follow-up.

18 Now, first of all, I want to thank you for
19 everybody who has HIV or AIDS for your remarkable work
20 in that area.

21 **A.** Thank you for saying that.

22 **Q.** That's serious.

23 You agree that Al Pilliod does not have HIV or
24 AIDS, right?

25 **A.** Mr. Pilliod does not have HIV and does not

1 have AIDS. You're right.

2 Q. So you and I agree that the patients you see
3 generally have a known cause for their non-Hodgkin's
4 lymphoma. Isn't that true?

5 A. No, I would disagree with that.

6 Q. Do you remember us taking your deposition in
7 March, ma'am?

8 MR. ISMAIL: Your Honor, is this going beyond
9 the qualifications at this point?

10 THE COURT: Let's talk about qualifications
11 first. You may want to do that portion on
12 cross-examination.

13 MR. MILLER: All right.

14 BY MR. MILLER:

15 Q. Have you testified for Monsanto before?

16 A. Yes, I have.

17 Q. And when you testified for Monsanto, I believe
18 March 11th in San Francisco, right?

19 A. I'd have to look at the document to assure you
20 of the date.

21 Q. But in March, whatever the exact date, do you
22 remember saying that most of your patients had a known
23 cause of NHL, either HIV, Hepatitis B, or Hepatitis C?

24 A. If you'll show me the document, I can confirm
25 what I said.

1 Q. That's fair. And I think the Court wants me
2 to do that after, when I start cross-examination.

3 **THE COURT:** Just voir dire on qualifications.

4 **MR. MILLER:** I will move on.

5 **BY MR. MILLER:**

6 Q. Now, there are scientists in the world of
7 non-Hodgkin's lymphoma who research the issue of
8 pesticides and non-Hodgkin's lymphoma. That's fair,
9 isn't it?

10 A. Yes, it is.

11 Q. And in your 48 years, you have never
12 researched the relationship between pesticides and
13 non-Hodgkin's lymphoma.

14 A. That's --

15 Q. Right, ma'am?

16 A. That is correct.

17 Q. I didn't want to interrupt you.

18 So in 48 years, you've never published
19 anything on the relationship between pesticides and
20 non-Hodgkin's lymphoma. That's also true.

21 A. That is correct.

22 Q. All right. So you've never done any bench
23 work on the issue of Roundup and non-Hodgkin's lymphoma?

24 A. That is correct.

25 Q. And you never published anything on the issue

1 of Roundup and non-Hodgkin's lymphoma?

2 A. That's correct.

3 Q. Okay. You mentioned Dr. Weisenburger is an
4 excellent physician there at the same hospital, City of
5 Hope.

6 A. I mentioned he was an excellent pathologist --
7 and he is -- at the City of Hope.

8 Q. And I think he thinks highly of you as well.
9 It's interesting. We have two very good physicians,
10 both at City of Hope hospital, right?

11 A. Correct.

12 Q. Who have come to, frankly, different
13 conclusions on whether or not Roundup was a substantial
14 contributing factor in causing Mr. Pilliod's
15 non-Hodgkin's lymphoma?

16 A. We have different opinions, correct.

17 Q. Yes. And I think it's good for the whole
18 country. We can disagree without being disagreeable,
19 can't we?

20 A. That's nice. Yes.

21 Q. In fairness, between the two of you, if the
22 jury was like, hmm, which one has more experience with
23 pesticides and its relationship to non-Hodgkin's
24 lymphoma, the truth is it would be Dr. Weisenburger?

25 **MR. ISMAIL:** Objection, Your Honor.

1 **THE COURT:** Counsel, let's just stick with
2 qualifications to render any opinion, and then we'll
3 talk later about whether or not you want to challenge
4 the opinion and on what basis.

5 **MR. MILLER:** All right. Very well.

6 **BY MR. MILLER:**

7 **Q.** But just to close up that topic, then, you do
8 not consider yourself an expert in the relationship of
9 pesticides and non-Hodgkin's lymphoma, having not
10 researched it for the last 48 years?

11 **A.** I do not consider myself an expert on
12 pesticides. On the other hand, I've read a great deal
13 of scientific data about pesticides and the relationship
14 to lymphoma.

15 **Q.** Since Monsanto hired you?

16 **A.** Since Monsanto hired me and a bit before as
17 well.

18 **Q.** Can you name one article that you read before?

19 **A.** I would have to think and go back into my list
20 of articles -- or my files. I can't list you an article
21 right now.

22 **Q.** All right. You're not a toxicologist, right?

23 **A.** I'm not a toxicologist.

24 **Q.** And there is, within the field of medicine,
25 something called infectious disease specialists, right?

1 **A.** That is true.

2 **Q.** And they can get boarded in that specialty,
3 right?

4 **A.** That's true.

5 **Q.** And you're not a boarded specialist in
6 infectious disease, right?

7 **A.** I'm not a boarded specialist in infectious
8 disease, but I am deeply experienced in the care of
9 patients with all kinds of infections. Patients with
10 cancer have an increased risk of infections, all kinds
11 of regular infections, all kinds of what is called
12 opportunistic infections, such as those that occur in
13 HIV.

14 So I am not board-certified in infectious
15 disease; I know a good deal and have had a massive
16 experience in dealing with patients who have all kinds
17 of infectious diseases.

18 **Q.** And that's fair. HIV and AIDS is an
19 infectious process, right?

20 **A.** Yes, it is.

21 **Q.** And you've spent a lot of your life studying
22 those areas, right?

23 **A.** I did. And one of the things that the AIDS
24 patients get are all of these various infections, which
25 come to my attention because I have to take care of

1 patients who have them.

2 Q. And you're not an epidemiologist, right?

3 A. No, I'm not an epidemiologist, but I have
4 spent a tremendous amount of my scientific time looking
5 at epidemiology. My colleagues have been
6 epidemiologists. My papers have dealt with epidemiology
7 of lymphoma, what causes lymphoma, based initially on
8 data, on population base, what is happening
9 epidemiologically.

10 So I'm not an expert, but I have spent 40
11 years in dealing with epidemiology and how it relates to
12 non-Hodgkin's lymphoma.

13 Q. The last time you testified, you didn't want
14 to testify about epidemiology for Monsanto, right?

15 MR. ISMAIL: Objection, Your Honor.

16 THE COURT: Sustained.

17 MR. MILLER: All right. We'll go back to that
18 later.

19 BY MR. MILLER:

20 Q. Now, you have, you told us, about 325
21 publications on your CV?

22 A. Correct.

23 Q. About 200 of them deal with AIDS, right?

24 A. I'd have to count them. Many of them do.

25 Q. And both of your books deal with AIDS-related

1 cancers?

2 A. They do.

3 Q. Okay. Of your 12 internet publications on
4 your CV, we counted 11 of them dealt with AIDS and HIV.

5 A. I'd have to count them to assure that that is
6 true, but I will accept that.

7 Q. And I think we can probably agree, Doctor,
8 skin cancer, for the skin, there is a specialty called
9 dermatology?

10 A. That is correct.

11 Q. And you don't hold yourself out as a
12 dermatologist?

13 A. No, I don't, but patients with cancer,
14 patients with HIV as well, develop all kinds of problems
15 with their skin. I am well versed in dealing with
16 problems with the skin and cancers of the skin.

17 Q. And I looked at your CV last night. Of your
18 325 articles in your CV, none of them dealt with skin
19 cancer, right?

20 A. That is correct.

21 Q. Not an area of specialty of yours?

22 A. It is not my specialty; it is non-Hodgkin's
23 lymphoma.

24 Q. You had 249 book chapters, which is, again,
25 very impressive. 170 of them dealt with AIDS and HIV,

1 right?

2 A. I have 70 book chapters.

3 Q. Oh, excuse me. All right. And how many of
4 them deal with AIDS and HIV?

5 A. I'd have to count. I just don't know. If you
6 want to give me the CV, I can count them for you.

7 Q. Well, how about this. How about we just agree
8 that a significant number of them deal with HIV and
9 AIDS?

10 A. That's probably true.

11 Q. Okay. And you were first retained by Monsanto
12 when, ma'am?

13 A. It was around November -- October or November
14 of 2018.

15 Q. You wrote your first report for Monsanto on
16 November 26th. Does that ring a bell?

17 A. I would have to look at the date, but I will
18 accept that for the moment.

19 Q. It was not this case, another case --

20 A. Yes.

21 Q. So you must have been working for them for a
22 few months before then.

23 A. I'm not sure. I need the dates, and then I
24 can tell you exactly when I started. And I can go into
25 my book and my calendar as well.

1 **Q.** And you wrote a report in that case, and we'll
2 talk about that more later. And then you've done this
3 case.

4 Do you have a third case coming up soon?

5 **MR. ISMAIL:** Objection, Your Honor.

6 **THE COURT:** Sustained.

7 **MR. MILLER:** We'll talk about it later.

8 **THE COURT:** Qualifications.

9 **MR. MILLER:** Well, we talked about money on
10 the direct. I was just going to --

11 **BY MR. MILLER:**

12 **Q.** So you have 500 an hour on this case and 500
13 an hour on the other case as well?

14 **A.** That's correct.

15 **Q.** Do you want to tell us how much you've earned
16 so far for the two cases?

17 **A.** I don't know about this case. The other case,
18 it was probably about \$80,000.

19 **Q.** Okay. And that money goes to you; it doesn't
20 go to City of Hope, right?

21 **A.** That is correct.

22 **Q.** Okay. I think you told us you semi-retired at
23 the end of 2016?

24 **A.** I retired from my administrative jobs but
25 continued my clinical work.

1 **Q.** Now, when you were first hired and went to
2 work for Monsanto, as late as March, when you testified
3 in that first proceeding, you didn't know Roundup was a
4 pesticide.

5 Do you remember that?

6 **A.** Do you want to show me what you were referring
7 to?

8 **Q.** Sure. 1654 from Hardeman. And we have copies
9 if you want.

10 **THE REPORTER:** Counsel, did you say Hardeman?

11 **MR. ISMAIL:** Objection, Your Honor.

12 **THE COURT:** Counsel, approach.

13 (Sidebar discussion not reported.)

14 **BY MR. MILLER:**

15 **Q.** Doctor, this is from a proceeding on
16 March 11th, 2019. And we're at page 1654. And I'm
17 starting at line 7.

18 **THE COURT:** No. Allow her to refresh her
19 recollection --

20 **MR. MILLER:** Absolutely.

21 **THE COURT:** -- and ask her the question. Do
22 not read from the transcript.

23 **MR. MILLER:** I understand, Your Honor. Thank
24 you.

25 **THE COURT:** Okay.

1 **BY MR. MILLER:**

2 **Q.** If you'd read, please, from line 7 through
3 line 11, the questions you were asked and the answers
4 you gave.

5 Does that refresh your recollection that you
6 did not know Roundup was a pesticide on March 11th?

7 **A.** Yes. It clarifies my language.

8 **Q.** Okay.

9 **A.** Do you want me to read it?

10 **THE COURT:** No.

11 **BY MR. MILLER:**

12 **Q.** I don't think the Court does. Thank you.

13 But you do know now that Roundup is a
14 pesticide?

15 **A.** Roundup is an herbicide. Herbicides are under
16 the classification of pesticides, so it's really both.

17 **MR. MILLER:** You can keep that up there. I
18 might be using that later.

19 Let me just look and see if I'm done here.

20 **BY MR. MILLER:**

21 **Q.** So that was March 11th. You wrote your report
22 in this case in January, the case we're on here today,
23 right?

24 **A.** I'll look at the date. If you can give me a
25 copy of my report, I can tell you what the date was.

1 Here it is. The date is not listed.

2 Do you have a copy that says the date on it?

3 **Q.** I do. I'm just going to approach with the
4 Court's permission. I'm going to have a copy for you
5 later.

6 **A.** I'm so sorry. It's on the last page. It was
7 written January 24th -- it was signed off, final,
8 January 24th of 2019.

9 **MR. MILLER:** Subject to the points raised, I
10 don't object to the doctor as an expert in non-Hodgkin's
11 lymphoma; but, as to its relationship to pesticides, I
12 do object.

13 **THE COURT:** Okay. Overruled.

14 You may resume.

15 **MR. ISMAIL:** Thank you, Your Honor.

16 **DIRECT EXAMINATION (resumed)**

17 **BY MR. ISMAIL:**

18 **Q.** So, Dr. Levine, I want to give an overview for
19 the jury about the topics we're going to cover and just
20 sort of give the headline of your opinions, and then
21 we're going to go back and explain how you got there.
22 Okay?

23 **A.** Sure.

24 **Q.** So are we showing here a summary of what we're
25 going to talk about today?

1 **A.** Yes, we are.

2 **Q.** And did you look at Mr. Pilliod's medical
3 records to identify whether he has any risk factors for
4 the development of his diffuse large B-cell lymphoma?

5 **A.** Yes, I did.

6 **Q.** And did you identify whether he had it?

7 **A.** Yes, I did. He had a very prominent risk
8 factor for his non-Hodgkin's lymphoma.

9 **Q.** And what was that?

10 **A.** That was a fully abnormal immune system, an
11 immune system that was not normal.

12 **Q.** And was his abnormal immune system, as you
13 identified it, an identifiable risk factor for his
14 non-Hodgkin's lymphoma?

15 **A.** Perhaps the most important risk factor for
16 non-Hodgkin's lymphoma is an abnormal immune system, the
17 inability of the immune system to recognize that first
18 cell as cancerous and foreign and get rid of it.

19 **Q.** Did that increase his risk for developing the
20 condition he eventually received?

21 **A.** That would absolutely increase his risk of
22 having developed diffuse large B-cell lymphoma.

23 **Q.** And, Doctor, based on your review of both
24 Mr. Pilliod's records and the other information you
25 described, do you have an opinion as to whether or not

1 Roundup played any role in Mr. Pilliod's development of
2 cancer?

3 **A.** Yes. The bulk of the data from valid
4 scientific studies indicate that the Roundup did not
5 cause Mr. Pilliod's diffuse large B-cell lymphoma.

6 **Q.** Now, let's go back and talk about -- you
7 described the immune system and its role in cancer
8 surveillance and protection just generally. And we're
9 going to go in and describe some of that more fully.

10 One second, Doctor.

11 So if we can advance the slide.

12 Doctor, let's start with a description of
13 non-Hodgkin's lymphoma, and then we're going to get into
14 how it relates to the immune system.

15 **A.** Okay.

16 **Q.** So if you would, please explain sort of
17 generally non-Hodgkin's lymphoma, as you would to a
18 patient or a family member.

19 **A.** Non-Hodgkin's lymphoma is actually a cancer of
20 the immune system itself. And these can be cancers
21 either of B lymphocytes or T lymphocytes. There are
22 many different components of the immune system, but two
23 of those components are B or T lymphocytes.

24 B-cells make a protein called an antibody
25 against the germ, and that's what kills the germ or the

1 foreign cancer cell. T lymphocytes directly recognize
2 that germ or cancer cell and directly kill it.

3 So this non-Hodgkin's lymphoma is actually a
4 cancer of these very important components of the immune
5 system itself. But it turns out that non-Hodgkin's
6 lymphoma is not one disease at all. At this point,
7 there are over 60 different types of non-Hodgkin's
8 lymphoma.

9 And it's really important to understand that
10 because these are different diseases. They have
11 different presentation, the way the patient first comes
12 to you. They have different causes. They have
13 different treatments. They have different prognosis,
14 how likely you are to do well or not. These are totally
15 different diseases.

16 If you're talking about diffuse large B-cell
17 lymphoma in Mr. Pilliod, you need to talk about diffuse
18 large B-cell. It's not the same as non-Hodgkin's
19 lymphoma overall.

20 Usually, these malignancies, the non-Hodgkin's
21 lymphoma, begin in the lymph glands. But lymphocytes,
22 B-cells or T-cells, have to be all over the body all the
23 time because they're always looking for foreign germs or
24 foreign cells.

25 So those cells travel very quickly into other

1 areas of the body. When they do, that's called
2 metastatic, or spreading, of that cancer. And it's very
3 common for lymphoma to spread in that way simply because
4 normal B or T lymphocytes spread in that way and always
5 are moving throughout the body.

6 Q. And if you look at all subtypes of
7 non-Hodgkin's lymphoma, how prevalent or common of a
8 cancer is that?

9 A. It's about 2 to 4 percent of all cancers.
10 It's not the most common, but it's not rare either.

11 Q. And when we talk about how cancer develops,
12 let's talk about it from the cellular level.

13 A. Okay.

14 Q. Can you help teach us how a cell progresses
15 and -- or what the evolution or journey is to becoming a
16 cancer?

17 A. Actually, it's a long journey. There are
18 several steps that are required to actually get a
19 cancer.

20 First of all, one needs something that's
21 called a driver mutation in the DNA, an accident in the
22 DNA of a given B or T lymphocyte in this example. The
23 errors -- there are all kinds of errors that can occur
24 in the DNA, accidents.

25 But your body has a way to deal with that. We

1 have these DNA repair mechanisms. So you're always
2 making little errors in the DNA, and your repair
3 mechanisms take care of that for you.

4 The mutation that occurs that causes a cancer
5 eventually has to be what we call a driver mutation.
6 That's very specific. It's not just an abnormality;
7 it's a very specific abnormality, a mutation in the DNA,
8 that is then taken forward into every single cell that
9 divides from that cell.

10 So the one cell will divide. Both of them
11 have the same driver mutation. Those two cells divide.
12 Now all four of them have the same driver mutation. So
13 it is a permanent mutation, a very specific mutation in
14 a specific area of the DNA that controls how cells
15 divide and how they die.

16 And that driver mutation is going to say to
17 that cell, "Divide, divide, divide, and never stop."
18 And it's also going to say to the cell, "And don't die
19 either."

20 So first you need a driver mutation. Not any
21 old error, not only any old abnormality, you need a
22 driver mutation.

23 The second thing you need for a real cancer to
24 develop is some problem with the repair mechanism. So
25 the person's ability to repair damage to the DNA has

1 been impaired, faulty in some way.

2 And then the third thing that you need is an
3 abnormal immune system. Because even if you have a
4 driver mutation, even if you don't have an ability to
5 repair it, you still have an immune system.

6 And the immune system should see that cell and
7 get rid of it. So, really, you need a very specific
8 driver mutation. You need the inability to correct
9 that. And then you need an immune system that was also
10 abnormal and unable to recognize that abnormal cell.

11 **Q.** So let's make sure that I understand this.

12 Is any DNA damage -- is that necessarily a
13 driver mutation?

14 **A.** No. A driver mutation is very specific. It
15 is a mutation that is heritable. It passes on through
16 all the generations of those cells. It doesn't die,
17 doesn't cause death of the cell. And specifically says
18 to the cell, "Divide, divide, divide, divide, and do not
19 die."

20 **Q.** Are there mutations that can occur even if
21 they're passed on to daughter cells that are not one of
22 these driver mutations that is necessary for the
23 development of cancer?

24 **A.** Would you repeat that? I'm not sure.

25 **Q.** Sure.

1 Are there other mutations that are not driver
2 mutations?

3 **A.** Yes, there are.

4 **Q.** What do we call those in medicine?

5 **A.** They're called passenger mutations. It's kind
6 of interesting, because 90 to 99 percent of all of the
7 mutations are really passenger. They're irrelevant.
8 They don't really matter to the person or to that cell.

9 So it's a very specific kind of mutation that
10 will eventually lead to cancer if those other factors
11 are present as well.

12 **Q.** Does glyphosate, or Roundup, cause mutations?

13 **A.** No study has shown that glyphosate causes
14 mutations in those cells.

15 **Q.** And you said the second part -- and we're
16 going to talk about that a bit this morning -- is, for a
17 cancer to develop, the immune system failed in some way
18 to detect or destroy that cancer; is that correct?

19 **A.** That is correct.

20 **Q.** Now, the jury has heard this term
21 "genotoxicity." Obviously, you've heard that in your
22 40-plus years as an oncologist?

23 **A.** Yes, I have.

24 **Q.** Is genotoxicity the same thing as cancer?

25 **A.** No. Genotoxicity is a nonspecific word. It

1 just means some abnormality at that DNA, some problem.
2 But it doesn't mean anything more than that.

3 Q. And did you help us put together this
4 explanation, and can you tell us what you're
5 communicating here with this slide?

6 A. Yes. I just wanted to explain what
7 genotoxicity really meant.

8 And, again, it's a very nonspecific term. It
9 just means any kind of DNA damage. It is not -- it
10 doesn't mean driver mutation, by any means. So it's a
11 nonspecific term. It is not the same as a mutation, and
12 it's not the same as a driver mutation.

13 Q. So you have some examples that you put here,
14 double-strand breaks or single-strand breaks.

15 What are those examples of?

16 A. Those are examples of nonspecific DNA damage.
17 We get one bit of our DNA, half from your mother and
18 half from your father. So one strand from your mother,
19 one strand from the father. And both strands could
20 break, a single strand could break. That's what it
21 means. And those are nonspecific examples of DNA
22 damage.

23 Q. And does double-strand break or single-strand
24 break, does that mean the same thing as a mutation or a
25 driver mutation?

1 **A.** No, it doesn't.

2 **Q.** Now, we have -- the next bullet you put here
3 were tests. And these are some tests that the jury may
4 have seen earlier in this trial.

5 Do those tests that are described here testing
6 for mutations?

7 **A.** No. Those tests -- comet assays and
8 binucleated micronuclei -- big words -- those are not
9 tests of mutations at all; those are tests of
10 nonspecific genotoxicity.

11 **Q.** Now, the jury has heard about a couple of
12 studies that involve aerial spraying of formulated
13 glyphosate in areas of Ecuador, the border of Ecuador, I
14 believe?

15 **A.** Yes.

16 **Q.** And the study authors were Paz-y-Mino and
17 Bolognesi.

18 Have you read those articles as well?

19 **A.** Yes, I have.

20 **Q.** And the jury has seen them several times.
21 We're not going to walk through them yet again. But, in
22 your review and opinion, Doctor, do they show that
23 formulated glyphosate causes driver mutations, first of
24 all?

25 **A.** Neither of those studies show that glyphosate

1 causes driver mutations. They do not show that.

2 Q. Can you even read those articles to conclude
3 that glyphosate-based formulations cause specific
4 genetic damage?

5 A. The papers were interesting to me. The
6 Bolognesi article was careful to look at individuals who
7 were exposed to glyphosate and those who were not
8 exposed. And there was no difference at all in these
9 nonspecific changes that they described between those
10 who were exposed and those who were not exposed to
11 glyphosate.; i.e., it did not show me that the
12 patients -- the individuals in the city -- one was in
13 Columbia -- the Bolognesi was in Columbia. The other,
14 Paz-y-Mino, was in Ecuador, I believe -- so the
15 populations there.

16 Q. And in the Paz-y-Mino study, after the initial
17 tests, did those researchers go back to those
18 communities and do additional genetic testing of the
19 citizens there?

20 A. Their first testing was done somewhere between
21 two weeks and two months from the time that the spraying
22 was done. We have no idea what else those individuals
23 might have been exposed to during those two weeks to two
24 months. It did not show statistical evidence of any
25 chromosomal mutations, no mutations, and no nonspecific

1 DNA damage. When they went back two years later, there
2 was nothing there at all.

3 Q. So have you also heard the term "oxidative
4 stress"?

5 A. Yes, I have.

6 Q. Is oxidative stress the same thing as cancer?

7 A. No, oxidative stress is not the same thing as
8 cancer.

9 Q. Is oxidative stress even the same thing as
10 mutation?

11 A. No, oxidative stress is not the same thing as
12 a mutation.

13 Q. Is oxidative stress something that is
14 happening in our bodies even without exposure to any
15 chemicals?

16 A. Yes. We're always making these oxygen
17 radicals, they're called, and we have mechanisms to
18 suppress them, to get rid of them. And there's a
19 balance of what we make and what we destroy.

20 It's happening all the time in our bodies.
21 When you have a cold, the oxygen radicals will go up.
22 When you run a marathon, the oxygen radicals will go up.
23 So it happens quite commonly in all of us.

24 Q. Does that mean having a cold causes cancer?

25 A. No, having a cold does not cause cancer,

1 thankfully.

2 **Q.** So can oxidative stress lead to genotoxicity?

3 **A.** Yes, it can lead to nonspecific DNA damage.

4 **Q.** As you described for us, is that the same
5 thing as having one of these important necessary
6 mutations that is part of cancer development?

7 **A.** It is not at all the same thing.

8 **Q.** And now I just want to sort of summarize this
9 part of your testimony here, Doctor.

10 So with respect to these concepts of
11 genotoxicity and oxidative stress, is genotoxicity
12 cancer?

13 **A.** No, it is not.

14 **Q.** Is genotoxicity the same thing as a driver
15 mutation?

16 **A.** No, it is not.

17 **Q.** Is oxidative stress cancer?

18 **A.** No, it is not.

19 **Q.** And is oxidative stress the same thing as a
20 driver mutation?

21 **A.** No, it is not.

22 **Q.** You described that the necessary step in
23 cancer development is this important mutation.

24 Do you need to have exposure to something like
25 a chemical for one of these driver mutations to occur?

1 **A.** No, not at all.

2 **Q.** And can you explain why that is.

3 **A.** Maybe I'll use an example with Mr. Pilliod.

4 Mr. Pilliod had something called ulcerative colitis, and
5 that means that his immune system is abnormal and sees
6 his own colon cells, his own gut cells, as foreign to
7 him. And because of that, his own cells are trying to
8 knock off his own internal colon cells all of the time.
9 That's all internal. He doesn't need any other external
10 force to allow this to occur. His immune system is
11 seeing something foreign all the time and reacting
12 against it.

13 **Q.** And as those lymphocytes react to that
14 inflammation or, in his case, inability to recognize his
15 own tissue as cell for foreign, what are the lymphocytes
16 doing as they're stimulating?

17 **A.** So as those lymphocytes are stimulated all the
18 time, they're dividing over and over and over. And as
19 they divide over and over, every time they have the
20 opportunity for an error to occur, in that, before the
21 cell can divide, the DNA, the whole DNA has to divide.

22 And if those cells are dividing over and over
23 and over again, there is an increased chance that there
24 will be an error at that DNA as it's trying to divide
25 itself, and one of those errors could certainly be a

1 driver mutation.

2 Q. This process of stimulation of the lymphocytes
3 in response to either an autoimmune disease or a virus,
4 does that have a name?

5 A. It's called chronic antigenic stimulation. So
6 something foreign to you would be an antigen, a foreign
7 protein, something foreign.

8 So chronic stimulation by something -- an
9 abnormal protein, something foreign to you -- allows
10 those lymphocytes, forces the normal ones to divide over
11 and over to try to knock off that foreign thing, be it
12 your own cell or be it another.

13 Q. This concept of product antigen stimulation
14 that you've told us about, is this something that you
15 teach medical students and something that you've looked
16 at yourself outside this courtroom?

17 A. Yes, I have. It is well known, for example,
18 that inflammation is one of the risk factors related to
19 non-Hodgkin's lymphoma. Chronic antigenic stimulation
20 is anything internal or external that will cause those
21 immune cells, B- and C-cells, to divide over and over,
22 makes them divide over and over and increases the risk
23 that a mutation, a true driver mutation, could occur.

24 Q. So thus far, Doctor, you've talked about the
25 first side of the equation, the necessary step of a

1 mutation.

2 You also mentioned that the immune system is
3 also part of this development of cancer. I want to turn
4 to that discussion now.

5 **A.** Okay.

6 **Q.** Okay. So when you -- before I get to the
7 picture, let's just talk about the immune system
8 generally.

9 I think everyone has a general understanding
10 of what the immune system is supposed to do, but can you
11 talk to us about what the cells are in the body that go
12 about identifying foreign cells and their response to
13 it?

14 **THE COURT:** Excuse me, Mr. Ismail. We have to
15 take a morning break. So maybe before you launch into
16 your next topic, we'll take a ten-minute break.

17 All right, ladies and gentlemen. We're going
18 to take a break for ten minutes. We'll come back at 25
19 of the hour and resume. Thank you.

20 (Recess taken from 10:25 a.m. to 10:40 a.m.)

21 (The following proceedings were heard out of
22 the presence of the jury:)

23 **MR. EVANS:** Your Honor, I believe what was
24 raised at sidebar, Mr. Miller, both with Dr. Mucci when
25 examining her, referenced the, quote, Johnson case and

1 her prior testimony in the Johnson case. And we
2 objected and said you should not use the name of prior
3 testimony in prior trials. And then this morning he did
4 the same thing with this witness with the Hardeman case.

5 And they obviously are trying to tie both
6 witnesses to prior trials that the jury has heard about.
7 We know that from voir dire. And we think it's
8 completely improper, prejudicial, violates motions in
9 limine exactly on this that Your Honor has ordered, and
10 we believe it is subject to and should result in a
11 mistrial.

12 **MR. WISNER:** Your Honor --

13 **MR. MILLER:** Let me respond.

14 **MR. WISNER:** Get the witness.

15 **THE COURT:** You may step down, Dr. Levine.
16 Thank you, Dr. Levine.

17 **MR. MILLER:** Your Honor, it was very clear,
18 and we agreed the last with Dr. Mucci, don't say the
19 word "trial" anymore.

20 **THE COURT:** No, don't say the word "trial" or
21 Hardeman or whatever.

22 **MR. MILLER:** I haven't since, Your Honor,
23 sidebar. I have not said the word Hardeman.

24 **THE COURT:** I know. But you weren't supposed
25 to say it in the first place.

1 **MR. MILLER:** Well, I apologize, but I thought
2 the admonition was to not say "trial."

3 **THE COURT:** No. But you know the admonition
4 was to not reference those particular trials. I mean, I
5 was very clear about not only trials, but you were only
6 supposed to obliquely reference to prior proceedings.

7 **MR. MILLER:** I have to be very -- I can't --

8 **THE COURT:** You can't mention a prior trial
9 that has taken place. Come on. You know I've said that
10 more than once.

11 **MR. MILLER:** I understand, Your Honor. And I
12 want to follow the Court's instructions. That's why
13 I've been able to say -- have the privilege of
14 practicing law for 40 years. I truly want to follow the
15 Court's instructions.

16 I thought we agreed don't mention the word
17 "trial." Now, at sidebar, Your Honor said -- and I've
18 been following it since sidebar -- don't mention
19 Mr. Hardeman's name. But I have to use the testimony
20 from -- I'll call it a proceeding; I'll call it a
21 sworn -- whatever the Court wants me to call it is what
22 I'm going to call it.

23 **THE COURT:** I was fine with "proceeding." I
24 said that last Thursday or Wednesday or Tuesday. I just
25 have to remind you because, really, the objection was do

1 not specifically reference the trials by name. So we
2 came up with "proceeding" so it doesn't actually
3 reference trial.

4 **MR. EVANS:** And the date.

5 **THE COURT:** But the issue we talked about was
6 you can't say Johnson, you can't say Hardeman because it
7 does bring up trials that they are aware of. So
8 "proceeding" was secondary to not mentioning
9 specifically the Johnson trial, the Hardeman trial,
10 which all of the jurors are aware of.

11 **MR. MILLER:** I understand. And that's the way
12 we're going to do it.

13 **MR. WISNER:** Your Honor, just to clarify for
14 the record, though, Mr. Miller specifically said the
15 proceeding in March. She said, "What are you talking
16 about?" He gave her the date. She still was confused.

17 **THE COURT:** Well, let her be confused. But
18 don't mention --

19 **MR. WISNER:** No, I understand. I'm just
20 saying. And he then said it was a proceeding in
21 San Francisco. She again didn't understand, and he went
22 to the Hardeman case, hoping that would refresh her
23 recollection. It won't happen again, but the witness
24 really drew that out. It wasn't Mr. Miller trying --

25 **THE COURT:** You're all skilled, very skilled.

1 You know how to figure that out, including having the
2 jurors leave if you need to have them leave so that
3 they're unaware of what's going on. That's fine too.

4 But no more Johnson, no more Hardeman.
5 Absolutely. Mistrial denied, but -- we're at the end.
6 Let's get there.

7 **MR. MILLER:** I understand.

8 **MR. WISNER:** Yes, Your Honor.

9 **THE COURT:** Let's just get there.

10 All right. We've going to have the jurors
11 come back in.

12 (The following proceedings were heard in the
13 presence of the jury:)

14 **MR. ISMAIL:** May I proceed, Your Honor?

15 **THE COURT:** You may.

16 **MR. ISMAIL:** Thank you.

17 **BY MR. ISMAIL:**

18 Q. Dr. Levine, I had just two quick follow-up
19 questions for you before we turn to the subject of the
20 immune system.

21 You mentioned that you were -- your clinical
22 and research interest was piqued back in the early '80s
23 when you saw this sort of unusual presentation of
24 lymphomas in your clinical practice, and you described
25 then your work to understand and help with that AIDS

1 epidemic crisis.

2 What was it about the presentation of those
3 early patients before you even had a name for the
4 condition that prompted your interest?

5 A. There were several things. First of all,
6 lymphoma usually occurs in people who are older, in
7 their 60s and so forth, and these people coming in were
8 young men. And right away, that got my attention.

9 The second was that the lymphomas were widely
10 disseminated, involving many, many, many organs in the
11 body, widely disseminated.

12 I guess the next thing was it wasn't just that
13 they had the lymphomas, these unusual, widely
14 disseminated, fast-growing lymphomas; but they also had
15 all kinds of interesting or difficult infections at the
16 same time.

17 So it was all of those things that said to me
18 what is this? Something is different here.

19 Q. Did the presentation of these patients with
20 these infections on top of the lymphomas or concurrent
21 with the lymphomas connect with your training in
22 oncology that there might be an immune-related
23 connection between what you were seeing?

24 A. Yes.

25 MR. MILLER: Your Honor, I would object.

1 Leading.

2 **THE COURT:** Overruled.

3 Go ahead. Finish your answer.

4 **THE WITNESS:** Yes. The infections and no real
5 control over those lymphomas spreading so quickly and
6 rapidly said to me is there something wrong with the
7 immune system of these people? And I started to look at
8 it.

9 **BY MR. ISMAIL:**

10 **Q.** Now, the second question I wanted to ask you
11 from a prior discussion relates to this concept of
12 driver mutations that you told us about.

13 And you told us -- well, let me ask it this
14 way: Does showing genotoxicity, can that -- does that
15 genotoxicity in a cell become a driver mutation?

16 **A.** No. The abnormality in the cell is a driver
17 mutation or something else. One error doesn't lead to
18 the other. One accident or aberration doesn't lead to a
19 driver mutation. The mutation occurred or it didn't.

20 **Q.** So if you can't -- if all you're showing is
21 genotoxicity generally but not mutations specifically,
22 are you demonstrating the ability of some chemical to
23 cause cancer?

24 **A.** Not really, no.

25 **Q.** Now, continuing to where I was right before

1 the break, we were just getting started about the immune
2 system.

3 Can you just generally describe how the immune
4 system works with respect to detecting and protecting us
5 from foreign cells in our body.

6 **A.** So, first of all, the immune system is
7 comprised of many, many different cells: The
8 lymphocytes that we talked about, T lymphocytes,
9 B lymphocytes. There are cells called macrophages,
10 monocytes, dendritic cells, neutrophils, eosinophils,
11 basophils. There are many, many different components of
12 the immune system. And they work in concert, each doing
13 the job in another different kind of way, a little
14 different way, to try to keep us safe from these foreign
15 invaders.

16 **Q.** And, Dr. Levine, have you used pictures of
17 these immune system cells and their role and function
18 when you are teaching medical students or other
19 audiences?

20 **A.** Yes, I frequently use them.

21 **Q.** And have you brought some of those with you
22 today to help teach us about the immune system?

23 **A.** I did.

24 **Q.** So the first picture we have here, can you
25 describe what's going on? Well, first of all, how is

1 this picture even taken?

2 **A.** It's called an electron microscope. So it's a
3 way to go way down on the cell level and actually see
4 deeply into the cell when a regular microscope could not
5 see that. And then stains are applied to show the
6 different colors.

7 **Q.** This isn't a drawing or a cartoon; this is
8 actually a photo?

9 **A.** This is a photograph taken from an electron
10 micrograph.

11 **Q.** Can you tell us what you're showing here?

12 **A.** First of all, the green cell is something
13 called a macrophage, and that's part of the immune
14 system, one of those cells that's important. And what
15 you see in orange are literally TB germs.

16 **Q.** Are those tuberculosis germs?

17 **A.** I'm sorry. Tuberculosis. Correct.

18 So what you're seeing is the macrophage has
19 recognized these cells as being foreign. It's now
20 literally eating them; it's engulfing them. And once it
21 does, it will, quote, digest them. It will use all
22 kinds of chemicals to kill that TB.

23 Right now we have drugs for TB. We use them.
24 But prior to the time that we had medicines to treat TB,
25 lots of people had it, but not everyone dies of TB. And

1 the reason is we have an immune system, and the immune
2 system is supposed to do that for us, and very often it
3 does. So this is just an example of one cell in the
4 immune system recognizing a germ, a foreign germ as
5 foreign, and killing it.

6 Q. Is a cancer cell a foreign cell that the body
7 should recognize and protect us from?

8 A. Yes. That is exactly the point. A cancer
9 cell is foreign to you and should be seen as foreign to
10 you by that immune system. Should be able to see it,
11 recognize it, attach to it, and kill it.

12 Q. Now, are these also photographs of the immune
13 system working properly to identify a foreign cell?

14 A. Yes. And this is another example, something
15 called a natural killer cell, another part of that
16 immune system.

17 And the cancer cell is the one in yellow. The
18 natural killer cell is in that grayish-blue color. And
19 you see, first of all, it's attaching, parts of it are
20 actually attaching to that cancer cell. They recognize
21 it. They see that it's foreign, and they're attaching
22 to it. And as soon as they attach to it, they literally
23 are poking a hole in that cancer cell, and it just
24 explodes. It dies.

25 So that's an example of a cancer cell being

1 seen as foreign and being destroyed by the immune
2 system.

3 Q. Is this another photograph to help explain the
4 concept of the role of the immune system in detecting
5 foreign cells?

6 A. Yes. So what we're seeing here in the
7 middle -- what you see in the middle is a dendritic
8 cell, something called an activated dendritic cell,
9 activated because it's seeing something as foreign to
10 it.

11 And what it's doing here is relaying its
12 message. This is what foreign looks like to a T-cell.
13 So they're working in concert. The two kinds of cells
14 are working together, one to recognize and say this is
15 the foreign one; this is the one you better get rid of.

16 Now the T-cell has that message, and now the
17 T-cell is going to go forward to do something to that
18 foreign cell.

19 Q. And so if a patient has an abnormality in any
20 one of these processes, might that affect the patient's
21 ability to identify and protect that patient from cancer
22 cells?

23 A. Yes. So you don't need all of your immune
24 system to be gone to get in trouble here. You just need
25 one or another of these elements of the immune system to

1 be abnormal.

2 Q. So is it simply a question of measuring T-cell
3 count in a patient to determine whether their immune
4 system is functioning properly or not?

5 A. Well, first of all, T-cells are one part of
6 the immune system, and an important part; I don't deny.
7 On the other hand, there are other parts of the immune
8 system.

9 And, number one, you want each of these parts
10 to be the right number. You know, if you didn't have
11 any of these cells, you'd be in trouble. But even if
12 you have the right number, they have to be functioning
13 normally. They have to be working normally.

14 So the number is nice. But once you have a
15 number, now you have to know do those cells actually
16 work on not?

17 Q. So earlier in the trial, Dr. Nabhan was here
18 talking with the jury, and he referenced that
19 Mr. Pilliod had his T-cell count assessed at some point
20 in time.

21 Is that T-cell count -- is that the only thing
22 you have to consider when assessing whether Mr. Pilliod,
23 in particular, immune system was operating normally?

24 A. No. First of all, the T-cells -- I did see
25 that in his records, and the number of his T-cells were

1 normal, but there was no test done to look at the
2 function. I believe that his immune system is clearly
3 abnormal, and there are many, many different cells that
4 compromise that immune system.

5 Q. And we'll show the reasons why you've arrived
6 at that conclusion with respect to the immune system.

7 What are you depicting here in this next
8 photograph?

9 A. I'm showing the T-cell now had that message,
10 what is foreign? And in this example, the foreign was
11 the cancer cell, and the big brown thing there is a
12 cancer cell. And what you see is the T-cells are now --
13 they are armed with a message. They know what foreign
14 is. Foreign has told them that is the cancer cell.
15 They are attaching to the cancer cell, and they will
16 kill that cancer cell.

17 Q. And if there's some malfunction in this
18 process, either messaging or functioning of these cells,
19 will that put that patient at increased risk of
20 developing non-Hodgkin's lymphoma?

21 A. Sure. Those T-cells could be normal in number
22 but not functioning.

23 Q. Now, has this concept of the immune system
24 playing an important role in cancer risk resulted in new
25 therapies that researchers are coming up with to treat

1 these cancers?

2 A. Yes. This is one of the most exciting times
3 in all of oncology. We're using -- the immune system is
4 so powerful in preventing cancer in us and recognizing
5 this and preventing it, the next question was can we use
6 the immune system to treat cancer? Can we develop -- we
7 call them immunotherapies. And they're in the
8 newspapers. I don't know if you've read.

9 But, in any event, one of those first
10 immunotherapies, arming the immune system to fight the
11 person's cancer, is something called CAR T-cells,
12 chimeric antigen receptor. It's a big word; doesn't
13 matter. But anyway, they are T-cells that we
14 genetically modulate, engineer, to recognize diffuse
15 large B-cell lymphoma.

16 And, as it turns out, there are two products
17 that are licensed in the United States right now to
18 treat diffuse large B-cell lymphoma, and these are CAR
19 T-cells. They work. The T-cells, if they're working
20 properly, or if we can give the patient T-cells that
21 work properly, are remarkably effective. I can't tell
22 you how exciting it is. This is remarkably effective.

23 And what you see here is the genetically
24 engineered cell, the CAR T-cell directly attaching.
25 Again, it points an attachment. It sees. And once it

1 sees, again, it will destroy that cell and has been able
2 to provide survival in about 50 to 60 percent of
3 patients who had no treatment more available to them at
4 all with diffuse large B-cell lymphoma.

5 Q. Does the success of these immune-based
6 therapies in cancer treatment speak to the importance of
7 the immune system in protecting us all from cancer?

8 A. That is exactly the fact. And the reason that
9 abnormal immune system is so prominent as a risk factor
10 for non-Hodgkin's lymphoma is simply that fact.

11 Q. Now, there's a therapy called rituximab --

12 A. Correct.

13 Q. -- that has actually been referenced earlier
14 in this trial.

15 Did Mr. Pilliod receive rituximab as part of
16 his cancer treatment?

17 A. Yes, he did. It was part of his -- what's
18 called the R-CHOP regimen, and the R was rituximab.

19 Q. Can you tell us what you're showing here with
20 this drawing?

21 A. What I'm showing is the cancer cell looks
22 different from other kinds of cells. In this example,
23 the lymphoma cell has a protein on its surface. It's
24 called CD20.

25 And what we have is an antibody. Here's

1 what -- a B-cell would make an antibody to kill that
2 foreign germ. So here we have an antibody to CD20.
3 Biology works by a lock and a key. One chemical fits
4 into the other. And as soon as that happens, something
5 happens. But it starts with recognizing a fit, a lock
6 and a key.

7 So if the lock is the rituximab antibody, it
8 was designed, it was developed, engineered so that it's
9 a perfect fit to the CD20 on the non-Hodgkin's lymphoma
10 cell.

11 Mr. Pilliod's lymphoma was CD20 positive. He
12 was given the antibody. And what you can see is the
13 attachment. Right away, it's going to attach into that
14 lock and a key. And once it does that, by different
15 mechanisms that I don't have to go into unless you want
16 me to, the cell will die. By ADCC, by -- there are
17 different mechanisms. The cell will die.

18 **Q.** Is this a form of immunotherapy?

19 **A.** It is a form of immunotherapy and has changed
20 the prognosis in diffuse large B-cell lymphoma
21 appreciably since that antibody was developed and used.

22 **Q.** Is this rituximab therapy that was used in
23 Mr. Pilliod's case, was it effective as part of his
24 other cancer treatments in allowing him to get into
25 remission a few months after he was diagnosed?

1 **A.** Yes. This was a major component of the
2 success of the therapy that was used. And it was
3 successful therapy with Mr. Pilliod, which is really
4 good.

5 **Q.** Now, I want to talk further about Mr. Pilliod
6 and his medical history.

7 But, just generally, why do oncologists go
8 about getting a patient's past medical history when they
9 are newly diagnosed with cancer?

10 **A.** There are multiple different risk factors for
11 lymphoma. There are multiple points in a history that
12 might help me, guide me a little bit to know how I need
13 to treat that patient or what special concerns I must be
14 attentive to.

15 So I need to know the entirety of what is that
16 medical history. It tells me who the patient is in a
17 certain sense biologically, medically, gives me hints as
18 to how I need to treat, gives me hints perhaps as to
19 diagnosis or what I have to do.

20 **Q.** So let's just do an overview of Mr. Pilliod's
21 medical history. And then we'll talk about how these
22 factors led you to identify which risk factors he had
23 for non-Hodgkin's lymphoma.

24 So if you can just give us an overview, a
25 general picture of Mr. Pilliod's medical history as you

1 saw it from his medical records?

2 A. First of all, he has had a total of 22
3 different skin cancers. Those began in 1970 when he was
4 in his late 20s. That would be quite unusual to be
5 diagnosed with that many and starting so early in life.

6 Then I saw, in 1978, when he was 36, he had
7 his first episode of infection in the brain. And we
8 call that meningoencephalitis.

9 Encephalitis means infection and inflammation
10 in the brain. The meninges are the tissues that cover
11 the brain. So he had an infection of the brain,
12 encephalitis, and of the tissues surrounding the brain.

13 They did not know what caused it at that time.
14 They were thinking that it could be autoimmune; i.e.,
15 his own immune system saw his brain cells as foreign to
16 him and tried to destroy them, or they thought it might
17 be related to a virus of some sort. Did not know what
18 the virus could be, but those were the two things that
19 they were thinking about, something called herpes
20 simplex virus and autoimmune.

21 In time, he's had multiple -- he had four
22 other reoccurrences. So he's had five episodes of brain
23 infection. This is due to the herpes simplex virus,
24 HSV.

25 HSV, that herpes simplex virus, it causes cold

1 sores and is very, very common. I will assume that
2 almost everybody in this room has had a cold sore every
3 once in a while. And that's due to HSV type 1.
4 HSV type 2 can cause sores, the same kind of sores, but
5 in the anogenital region. But most of us certainly have
6 had HSV 1; we have not had infection of the brain on
7 five different occasions caused by the cold sore virus.
8 That said to me, whoa, what is this? What is this?

9 That was formally proven to be due to the
10 herpes simplex virus at a time when the spinal fluid was
11 examined and found to have HSV in the spinal fluid. He
12 was treated for HSV. He continues to be treated for
13 HSV.

14 He then had recurrent genital warts. Now,
15 that's also caused by a virus. It's called human
16 papilloma virus, HPV. Again, this is a relatively
17 common virus in the community in general; but, very
18 often, the most common thing is that your own immune
19 system clears it.

20 And then to have that herpes simplex virus
21 causing these genital warts at the age of 60 and so
22 forth, that would be very unusual. It was allowed to
23 persist. His immune system did not clear it, as usually
24 occurs.

25 In 2006, he was diagnosed with ulcerative

1 colitis. That was proven by a biopsy. And that means
2 it's an autoimmune disease. His immune system is seeing
3 his own colon tissue as foreign to him and trying to
4 kill it. So that was another example to me that, oh, my
5 gosh, this immune system, this is not normal here.

6 He does have a family history of cancer. And
7 that's associated with the patient himself developing
8 cancer.

9 He does have a history of 20-year pack-a-day
10 smoker. And then he has other medical conditions,
11 multiple brain injuries over the years in addition to
12 the infections in his brain. A history of stroke, sleep
13 apnea, high blood pressure, something called
14 hemochromatosis, which is congenital, you're born with
15 that, and you don't deal with iron normally.

16 Q. So let's break down some of the things you
17 just talked about with the jury. Let's start with skin
18 cancer.

19 Are these the dates and diagnoses and the
20 locations of the skin cancers that Mr. Pilliod has
21 experienced in his adult life?

22 A. Yes. These are.

23 Q. And have you looked at the medical records to
24 identify each one of these diagnoses and the dates and
25 locations?

1 **A.** Yes. I didn't have a location. I didn't have
2 records from 1970 to tell me the location. But other
3 than that, yes, we have the pathology reports, the dates
4 where these biopsies were taken, and so forth.

5 **Q.** And is this an accurate summary, to the best
6 of your ability, of those diagnoses?

7 **A.** Yes. And what you see on the left is all of
8 them that occurred before he ever had lymphoma. And, on
9 the right side, you see all of those that were diagnosed
10 after he had lymphoma.

11 **Q.** So rather than go through 22 different sets of
12 medical records, I want to work from this summary here.

13 So you said this first skin cancer diagnosis
14 was back in 1970. And how old was he at that time?

15 **A.** He was 28.

16 **Q.** Is that an unusually early time to present
17 with skin cancer?

18 **A.** Yes, it is. Skin cancer in general is not
19 uncommon; but, at age 28, or many, many, those facts are
20 uncommon.

21 **Q.** And that was a basal cell carcinoma?

22 **A.** Correct.

23 **Q.** Did he have repeated instances of basal cell
24 carcinoma?

25 **A.** Yes, he did. He had a total of 16 basal cell

1 carcinomas.

2 Q. Did he have other forms of skin cancer besides
3 basal cell carcinoma?

4 A. Yes. He also had something called squamous
5 cell cancer of the skin.

6 Q. Is that a different type of skin cancer?

7 A. It's a different type of skin cancer, yes.

8 Q. Did he also develop melanoma of the skin?

9 A. Yes. He developed melanoma, which is a very
10 aggressive kind of skin cancer, far more aggressive than
11 these other two. He developed that about a year prior
12 to the diagnosis of lymphoma.

13 Q. And you focused on this period the year prior
14 to his diagnosis. If we look here, the jury has heard
15 that Mr. Pilliod was diagnosed in June of 2011.

16 Did Mr. Pilliod develop basal cell carcinoma,
17 squamous cell carcinoma, and melanoma within the year
18 before he developed non-Hodgkin's lymphoma?

19 A. Yes. He developed three different kinds of
20 skin cancer before he ever had lymphoma, and about a
21 year before.

22 Q. In total, how many different skin cancers has
23 Mr. Pilliod had in his adult life?

24 A. So, in total, he's had 22 skin cancers.

25 Q. Now, as someone who's been practicing medicine

1 for nearly 50 years, have you ever seen a patient with
2 22 skin cancers?

3 A. Actually, this would be extremely unusual. I
4 really have not seen this before. I haven't really even
5 seen this in my AIDS patients.

6 Q. Now, it has been described to the jury
7 previously that skin cancer is associated with UV light
8 exposure?

9 A. Yes, it is.

10 Q. Is that a risk factor for the development of
11 skin cancer?

12 A. Yes. An important risk factor for skin cancer
13 is exposure to UV sunlight.

14 Q. And if patients have lighter skin tone, has
15 that also been reported as a risk factor for skin
16 cancer?

17 A. Yes. That is an increased risk factor for
18 skin cancer.

19 Q. Even given those risk factors, do you find it
20 unusual that a patient would develop skin cancer on 22
21 separate occasions in their adult life?

22 A. Yes, I do. That is unusual.

23 Q. And what is this -- what is the relationship,
24 as you see it, between the skin cancers and
25 understanding Mr. Pilliod's risk for developing

1 non-Hodgkin's lymphoma?

2 A. Well, first of all, just -- let's just talk
3 about the UV light for one moment.

4 UV light clearly is associated with an
5 increased risk of all of these skin cancers. But the
6 other interesting thing is that UV light is protective
7 against lymphoma. So it isn't the UV light that's
8 involved here. It's not that. That would have
9 protected him from lymphoma.

10 What this means to me is something -- I need
11 to look at his immune system. Something isn't right
12 with the immune system. That would be one of my
13 questions right away.

14 Q. Is the immune system part of the process of
15 cancer detection and cancer protection even in the
16 context of skin cancer?

17 A. Oh, yes. Absolutely. Immune system goes
18 everywhere in the body. It has to. It has to find
19 germs everywhere or foreign cells everywhere.

20 Q. Have researchers looked at the question of
21 whether having recurrent skin cancer is a risk factor
22 for developing non-Hodgkin's lymphoma?

23 A. Yes, they have.

24 Q. And have you reviewed that literature for your
25 opinions in this case?

1 **A.** I did.

2 **Q.** And the jury has seen each one of those
3 articles previously. And so we won't walk through them
4 yet again.

5 But can you tell us, Dr. Levine, whether
6 you've reviewed this literature and research yourself?

7 **A.** Yes, I have.

8 **Q.** Can you give us an overview of what these
9 studies show with respect to the risk of developing
10 non-Hodgkin's lymphoma in patients with recurrent skin
11 cancer?

12 **A.** Yes. So the first two articles on your left
13 talk about basal cell cancer. The next one talks
14 about -- well, okay.

15 The first two talk about skin cancer. Both of
16 them show statistically increased risk of developing
17 lymphoma if you have had basal cell cancer prior.

18 The Cho article talks about the more basal
19 cell cancers you have, the more increased risk you have,
20 0, 6, 12, and so forth.

21 The Nugent article talks about when you got
22 those skin cancers. All of these are statistically
23 significant, these relationships. They are
24 scientifically valid.

25 So if the basal cell was diagnosed less than a

1 year from the lymphoma, or one to four years, again,
2 significantly significant increase in lymphoma in those
3 patients.

4 Nugent also looked at squamous cell cancer.
5 And, again, squamous cell is associated with abnormal
6 immune system in general. We can talk about that later
7 if someone wishes.

8 In any event, the squamous cell is
9 statistically more likely to be associated with an
10 increased risk of lymphoma if diagnosed less than a year
11 or one to four years before.

12 The Wheless article talks both about basal
13 cell and squamous with the exact same data,
14 statistically significant increase in lymphoma in
15 patients who have had prior basal cell or prior squamous
16 cell carcinoma. All of these are saying the exact same
17 thing.

18 And then we have the melanoma work of
19 Dr. Verner and then Dr. Lens. What we see there is kind
20 of interesting. Because, if you have melanoma first,
21 you are statistically more likely to develop lymphoma in
22 time.

23 But the opposite is also true. If you develop
24 lymphoma first, you are statistically more likely to
25 develop melanoma over time.

1 In other words, it's going in both directions.
2 And when it goes in both directions like that, I, as a
3 clinician or a physician, will think of common cause.
4 It goes in either direction. What's the common cause?

5 **Q.** So in terms of these various relative risks
6 that you have reported here, this one is for basal cell
7 skin cancers of six or more. Does Mr. Pilliod fall in
8 that group?

9 **A.** Yes, he does.

10 **Q.** With respect to basal cell skin cancer, did
11 Mr. Pilliod have basal cell skin cancer both one year
12 and one to four years prior to his NHL?

13 **A.** Yes, he did.

14 **Q.** Same with the squamous cell?

15 **A.** Correct.

16 **Q.** This is an overall look at nonmelanoma skin
17 cancer. He would fall in these relative risks?

18 **A.** He falls within those risks, yes.

19 **Q.** And then does he fall in both of these with
20 respect to melanoma?

21 **A.** Well, he falls -- in other words, first he had
22 melanoma, and then he developed lymphoma. So he falls
23 in the first article there.

24 **Q.** Now, does this research mean that, if you have
25 skin cancer, it causes the patient to develop

1 non-Hodgkin's lymphoma? Does the skin cancer turn into
2 lymphoma?

3 **A.** No. It doesn't cause it at all; it's a risk
4 factor. So it says to the physician be careful here,
5 look for this, be careful for this. But it doesn't
6 cause it at all.

7 **Q.** Now, have some of these researchers looked to
8 see what the link is in terms of the risk of developing
9 skin cancer and the risk of developing non-Hodgkin's
10 lymphoma?

11 **A.** Yes, they have.

12 **Q.** Now, if you turn to Exhibit 6502 in your
13 binder.

14 Is that the Wheless article that we're showing
15 here?

16 **A.** Yes.

17 **Q.** Okay.

18 So this has been published previously.

19 And this is a look at the -- why don't you
20 tell us in a few sentences what this paper is doing.

21 **A.** It basically -- it's looking at a big review
22 of multiple articles, multiple studies that have been
23 published in the literature. And they're looking in
24 large numbers of patients at the risk of second primary
25 cancers in people who have had either basal cell or

1 squamous cell carcinoma in the past.

2 And what they're showing is a very significant
3 increased risk of a secondary primary -- another primary
4 cancer, just a completely independent, additional cancer
5 in these patients who have had nonmelanomatous skin
6 cancer.

7 Q. In this review, did these authors look at 21
8 individual studies?

9 A. Yes, they did.

10 Q. Now, if you turn to page 6, Table 3.

11 Were these authors -- is this where you got
12 the data that you showed on the prior slide with respect
13 to nonmelanoma skin cancers?

14 A. Yes, it is.

15 Q. If we go across here, does it show
16 non-Hodgkin's lymphoma and increased relative risks for
17 basal cell carcinoma and squamous cell carcinoma?

18 A. Yes, it does, statistically significant,
19 scientifically valid increases in non-Hodgkin's lymphoma
20 among patients with squamous cell or basal cell cancer
21 of the skin.

22 Q. Now, you told us that researchers have looked
23 into what might be increasing the risk in both types of
24 cancers.

25 I'll ask you to turn to page 8, and we'll see

1 if this is what you're referring to.

2 A. Yes.

3 Q. Are you there, Doctor?

4 A. I am.

5 Q. So you see the sentence that says "There are
6 several plausible biological mechanisms --"

7 A. Yes, I do.

8 Q. -- "that could explain the association between
9 nonmelanoma skin cancer and risk of other cancers,
10 including immunosuppression."

11 Does that relate to the immune system?

12 A. Yes, it does, weakening of the immune system.

13 Q. "Chronic inflammation." Do you see that as a
14 risk in both skin cancers and non-Hodgkin's lymphoma?

15 A. Yes, cells that are seen -- yes, turning over
16 of these lymphocytes and the possibility of an error.

17 Q. Is ulcerative colitis an autoimmune condition
18 that might relate in chronic inflammation?

19 A. Yes, it does.

20 Q. You see "variation in DNA repair efficiency."

21 Is that related to that process you were
22 telling us about, how we can have genetic damage but our
23 bodies repair it naturally?

24 A. Yes, that is what I meant. And in the Cho
25 article that we looked at a moment ago, he looked at DNA

1 repair mechanisms in these patients with basal cell
2 carcinomas and was able to show that 20 percent of them
3 did have errors in DNA repair. And that could be
4 consistent with other cancers as well.

5 Q. I want to look above.

6 Did they comment on the impact of controlling
7 for potential confounders in this study?

8 A. Yes.

9 Q. And do they write "The association between
10 nonmelanoma skin cancer and other cancers not only
11 persisted but actually increased in strength among
12 studies adjusting for potential confounders such as
13 smoking status"?

14 A. Yes. That's what they say.

15 Q. If the association increases when you control
16 for confounders, what does that mean to you as a
17 researcher?

18 A. It makes it more possible that this is for
19 real, that this is scientifically valid. So you get rid
20 of the confounders, and it's even stronger that there's
21 a relationship, an increased risk between these basal
22 cell and squamous cell cancers and development of
23 lymphoma.

24 Q. Now, we've talked about the 22 skin cancers
25 and what that tells you about Mr. Pilliod's immune

1 system. Are there other indications in his medical
2 history that lead you to conclude that his immune system
3 may not be functioning properly?

4 A. Yes.

5 Q. Now, you talked about meningoencephalitis.

6 A. Correct.

7 Q. The infection of the lining and of the tissue
8 of the brain.

9 A. Correct.

10 Q. You indicated that Mr. Pilliod first had
11 meningoencephalitis back in 1978, is it?

12 A. Correct.

13 Q. And then did that brain infection come back,
14 in Mr. Pilliod's case, more than once?

15 A. Yes, it did. It came back four different
16 times.

17 Q. Is this a serious infection?

18 A. This is an infection that could certainly lead
19 to death, could lead to serious long-term adverse
20 effects. This is -- any infection of the brain is a big
21 deal.

22 Q. Was it serious for Mr. Pilliod?

23 A. It was very serious. He was hospitalized, I
24 believe, for about six weeks. He was comatose, as I
25 understand, for about a month. He was exceedingly ill

1 with this.

2 Q. 1978, he was about 36 years old at that time?

3 A. Correct.

4 Q. Is developing meningitis, encephalitis at age
5 36 or 38 unusual?

6 A. HSV meningitis, the risk of that is basically
7 2 to 4 per million. It's very unusual. This germ is
8 common. We all get cold sores. But our immune system
9 takes care of it. We don't get brain infections, and we
10 certainly don't get brain infections five different
11 times.

12 Q. Now, you indicated that, at first, they didn't
13 know what was -- "they" being Mr. Pilliod's doctors --
14 didn't know what was causing his brain infections.

15 Was that later identified as the herpes
16 simplex virus?

17 A. Yes, it was.

18 Q. Will you turn to Exhibit 6417.

19 A. Yes.

20 Q. And specifically page 612.

21 A. 612.

22 Q. 612.

23 A. I see -- here it is, yes.

24 **MR. ISMAIL:** Permission to publish?

25 **MR. MILLER:** No objection, Your Honor.

1 **BY MR. ISMAIL:**

2 **Q.** So if we look up here at the top in this
3 medical record, this relates to Mr. Pilliod. This is
4 dated September of 2007, correct?

5 **A.** Correct.

6 **Q.** And discharge diagnoses, this was following a
7 hospitalization?

8 **A.** Correct.

9 **Q.** So what's the first discharge diagnosis?

10 **A.** HSV meningitis.

11 **Q.** What's HSV meningitis?

12 **A.** Herpes simplex virus.

13 **Q.** And, here, it notes he had two episodes prior
14 to this one in 2007.

15 Were there others documented in the medical
16 records beyond the three that are shown here?

17 **A.** Yes. He had an additional episode, I believe,
18 in 2001. I need to look it up to be sure.

19 **Q.** Does this discharge record show his diagnosis
20 for ulcerative colitis?

21 **A.** Yes, it does.

22 **Q.** Now, how did they go about identifying that
23 Mr. Pilliod's brain infections were coming from this
24 herpes virus?

25 **A.** They did a spinal tap. And they removed

1 spinal fluid, and that feeds the brain. You can tell --
2 you can get a lot of information about what's going on
3 in the brain by looking at the fluid that surrounds it
4 and feeds it.

5 And that fluid was tested in a very, very
6 sensitive and specific way for HSV, something called
7 PCR, polymerase chain reaction. But in a very, very
8 sensitive and specific assay, this spinal fluid was
9 positive for HSV. And that proved what the doctors had
10 believed all along: this was HSV.

11 Q. After this hospitalization, Mr. Pilliod
12 received antiviral treatment?

13 A. Yes, he did.

14 Q. What did he receive?

15 A. He received something called valacyclovir.
16 And that will treat HSV. So he's been on that
17 valacyclovir since 2007 and has not had another event.
18 He's been treated for HCV.

19 While he was actively infected with the
20 meningoencephalitis, on three occasions, he was treated
21 for HCV using specific drugs. One called acyclovir was
22 not available when the first diagnosis was made, the
23 first episode was made. But he's been treated for HCV
24 on these later episodes and continues to be treated for
25 HCV -- HSV. Sorry.

1 **Q.** You talked about the rarity of having one
2 episode of HSV -- herpes simplex virus -- induced brain
3 infection.

4 If you turn to Exhibit 6589, I'll ask you to
5 identify that article.

6 **A.** 6589. 6809, I have.

7 **Q.** I'm sorry. 6569. I'm sorry.

8 **MR. MILLER:** Your Honor, we need to approach
9 on that one.

10 **THE COURT:** Okay.

11 (Sidebar discussion not reported.)

12 **BY MR. ISMAIL:**

13 **Q.** Dr. Levine, you have that article in front of
14 you?

15 **A.** Yes, I do.

16 **Q.** Is that the Bradshaw publication?

17 **A.** Yes.

18 **Q.** And in terms of the -- does this discuss the
19 herpes simplex virus encephalitis in adults?

20 **A.** Yes, it does.

21 **Q.** And I would like you to turn to page 3 of this
22 publication.

23 **A.** Yes.

24 **Q.** And in that carryover in the top left
25 paragraph, do these authors talk about the prevalence of

1 having this brain infection due to the simple herpes
2 virus?

3 A. Yes, it does.

4 Q. What do they say?

5 A. They say that the incidence, the development
6 over time, of HSV encephalitis is estimated to be
7 between two and four cases per million, both globally
8 and in the United States.

9 Q. And so when you consider how rare of a
10 condition a brain infection is from the herpes virus, is
11 it significant to you that Mr. Pilliod had that on five
12 separate occasions?

13 A. It would be significant to me if he had it on
14 one occasion. If he had it on five occasions, it means
15 to me something is wrong with his immune system.

16 Q. Now, has Mr. Pilliod experienced lasting
17 consequences from the episodes of these brain infections
18 that he has in his medical history?

19 A. Yes, he has.

20 Q. And what has he developed as a result?

21 A. He has developed, according to the records,
22 seizure disorders, complicated seizure disorders.
23 Recently some information related to his higher cerebral
24 function -- his memory, his ability to use words
25 properly.

1 Q. If you turn to Exhibit 6396 in your binder.

2 A. Yes.

3 Q. I'm going to ask if you can identify that
4 medical record for us.

5 A. Yes. It is a record from Dr. Stan Lin,
6 Mr. Pilliod's neurologist, one of them, and it's
7 discussing a neuropsychiatric -- neuropsychologic
8 evaluation, the function of Mr. Pilliod's brain
9 function. And this is dated February 15 of 2011.

10 MR. ISMAIL: Permission to publish.

11 MR. MILLER: No objection, Your Honor.

12 THE COURT: Granted.

13 BY MR. ISMAIL:

14 Q. So we're looking up here at the top part of
15 this. The date of this report is in February of 2011?

16 A. Correct.

17 Q. Is that before Mr. Pilliod developed
18 non-Hodgkin's lymphoma?

19 A. Yes. He was diagnosed in June of 2012.

20 Q. 2011.

21 A. I'm sorry. 2011. I'm so sorry. Yes.

22 Q. So is this before he had chemotherapy?

23 A. Yes, it was.

24 Q. And do they note the reason for this referral?

25 A. It says "To evaluate the cognitive emotional

1 status due to changes in cognition" -- that's higher
2 brain function -- "with history of grand mal seizure,
3 status post viral meningitis."

4 Q. And was this all before the cancer diagnosis?

5 A. Yes, it was.

6 Q. And down below, I want to show the jury
7 whether this is the incident that you were talking about
8 with the jury earlier where it says "Briefly,
9 Mr. Pilliod stated that he suffered his first grand mal
10 seizure in 1978 and was apparently in a coma for four
11 weeks, some of which was at Stanford and others at
12 Washington Hospital."

13 A. Correct.

14 Q. Was that that first episode of
15 meningoencephalitis that you talked to the jury about?

16 A. Yes, it was.

17 Q. Does this report describe that -- whether the
18 seizure episodes and these brain infections has resulted
19 in any complications for Mr. Pilliod?

20 A. It indicates he did have complications --
21 seizure disorder, number one, and abnormalities in his
22 cognition, number two.

23 Q. And if you turn to -- all right.

24 If you turn to the third page of this exhibit,
25 page 241 --

1 A. Yes.

2 Q. -- down at the bottom.

3 In January of 2011, does it say "The client
4 reported that he was having sleep problem, concentration
5 difficulties, word-finding difficulties with regards to
6 nouns and numbers, and difficulty logging into an
7 account as he was unable to spell his name"?

8 A. Yes. It states all of that.

9 Q. Is that before or after his cancer diagnosis?

10 A. That is before the cancer diagnosis in June of
11 '11.

12 Q. Did you see other medical records that we
13 don't have to go through here that are consistent with
14 what is reported here by Dr. Lin with respect to how
15 significant these brain infections were for Mr. Pilliod?

16 A. Yes, I did go through other records in
17 addition.

18 Q. Now, we've talked about the 22 skin cancers.
19 We've talked about the five brain infections from the
20 herpesvirus.

21 Are there other indications from Mr. Pilliod's
22 medical records that you found significant with respect
23 to the immune system?

24 A. Yes.

25 **THE COURT:** Counsel, can we keep it to a

1 minimum.

2 MR. WISNER: I'm sorry.

3 MR. ISMAIL: Thank you, Your Honor.

4 BY MR. ISMAIL:

5 Q. What else did you find significant on this
6 question of how well functioning is Mr. Pilliod's immune
7 system?

8 A. The other finding was the diagnosis biopsy
9 proven of ulcerative colitis, which is an autoimmune
10 disease, which says to me that his immune system is
11 abnormal. There may be a question of deficiency or
12 abnormality, and this is an abnormality in the sense of
13 his immune system seeing his own body cells as foreign
14 to him and trying to kill them.

15 Q. If you turn to Exhibit 6376.

16 A. Yes.

17 Q. Can you tell us what that is?

18 A. This is a biopsy of Mr. Pilliod's colon. The
19 date, I believe, is 9/22/2006.

20 Q. And what was the diagnosis given by the
21 pathologist, if you turn to page 13, on this biopsy done
22 on Mr. Pilliod?

23 A. Number 4, that fourth biopsy, says
24 "Inflammatory bowel disease." That's what this whole
25 topic -- kind of illness is. "IBD, inflammatory bowel

1 disease, consistent with ulcerative colitis."

2 Q. And if you look just above that, when they
3 talk about the findings here, do they talk about whether
4 there's any inflammation found in the left colon?

5 A. Yes. It says "There was marked chronic
6 inflammation composed predominantly of plasma cells" and
7 so forth.

8 Q. And does having inflammation, does that relate
9 in any way to that chronic antigen stimulation you were
10 talking about with the jury earlier in your testimony?

11 A. Yes. Those were all the immune cells going
12 into that area trying to do their thing, dividing,
13 dividing, trying to get there, and the opportunity for
14 an accident as those cells and their DNA divide, an
15 error that could be a very specific driver mutation.

16 Q. Now, did Mr. -- has Mr. Pilliod been dealing
17 with other viruses other than the herpesvirus in his
18 adult life?

19 A. Yes.

20 Q. What is that?

21 A. He also had human papilloma virus, causing
22 genital warts.

23 Q. And has he had that on more than one occasion?

24 A. Yes, he has.

25 Q. And the jury -- we've talked about some of

1 these articles with other witnesses, so in the interest
2 of time, are these the dates upon which Mr. Pilliod was
3 diagnosed with genital warts as a result of the HPV
4 virus?

5 **A.** Correct, beginning in 2003 when he would have
6 been in his early 60s.

7 **Q.** Is it unusual of a gentleman of his age to
8 present with this virus when he did?

9 **A.** Yes, it is. It should have been cleared by
10 his immune system many, many decades before. That would
11 be the usual outcome.

12 **Q.** Has there been research published that looks
13 to see whether patients who have these genital warts
14 from HPV are at an increased risk of non-Hodgkin's
15 lymphoma?

16 **A.** Yes, there are studies that show a statistical
17 increase in lymphoma.

18 **Q.** Are these two of the studies that you
19 identified as part of your review of this case?

20 **A.** Yes. And both of them show that presence of
21 HPV infection statistically increases the risk of
22 subsequent development of non-Hodgkin's lymphoma.

23 **Q.** Do these authors comment about what might be
24 the shared increased risk between non-Hodgkin's lymphoma
25 and the outbreak of the genital warts?

1 **A.** Yes, they do.

2 **Q.** Are you showing that here on the next slide?

3 **A.** Yes. Both of them basically talk about the
4 commonality as an indicator of immune impairment. It
5 says Dr. Nordenvall and Dr. Blomberg is saying the
6 author suggests underlying immunodeficiency as an
7 explanation.

8 **Q.** Dr. Levine, have you helped us put together a
9 timeline to put in context all the different things
10 you've talked about thus far with Mr. Pilliod?

11 **A.** Yes.

12 **Q.** Is that what we're showing here?

13 **A.** That's what we're showing. It's impressive.

14 **Q.** So let's unpack this. What are you showing in
15 blue?

16 **A.** In blue are all of the times that he developed
17 either basal cell or squamous cell skin cancer.

18 **Q.** And you have this lighter blue color here.
19 Why is that a lighter color?

20 **A.** I made that different simply because it's
21 so -- it goes in either direction. It's so heavily an
22 immune responsive tumor, and it's a far more aggressive
23 tumor than the other skin cancers that he had. So I
24 don't think of it exactly in the same way.

25 **Q.** And we know Mr. Pilliod's diagnosis was

1 somewhere in here.

2 **A.** Correct.

3 **Q.** Did many of these skin cancers occur before he
4 was ever diagnosed with non-Hodgkin's lymphoma?

5 **A.** Yes. Most of them did occur prior to the time
6 that he was diagnosed with lymphoma.

7 **Q.** So what do you have in the green?

8 **A.** The green are the examples of brain infection
9 due to the herpes simplex cold sore virus.

10 **Q.** Was 2007 when he got put on that antiviral
11 treatment to try to prevent further brain infections?

12 **A.** Yes. He was treated with the antiretroviral
13 while he had the active infections prior to that, but
14 the first time that he was ever treated continuously
15 with antivirals to prevent recurrent meningoencephalitis
16 was on that occasion in 2007.

17 **Q.** And then in the gray, what do you have
18 depicted here in the gray?

19 **A.** The gray are his outbreaks of human papilloma
20 virus, genital warts.

21 **Q.** And then in the yellow?

22 **A.** The yellow is the autoimmune disease
23 ulcerative colitis.

24 **Q.** How was he treated for his ulcerative colitis?

25 **A.** He was treated with hydrocortisone enemas and

1 later received something called asacol.

2 Q. What is hydrocortisone?

3 A. Hydrocortisone is a type of -- I'll use the
4 same word; forgive me -- corticosteroid. It's a
5 steroid. And it has tremendously powerful effects to
6 weaken the immune system. They were trying to weaken
7 his immune system because his immune system was trying
8 to destroy his colon, and that needed to be stopped. So
9 they used hydrocortisone enemas to try to weaken the
10 immune system and the inflammation in his colon.

11 It turns out that cortisone kills lymphocytes.
12 Period. It kills them. It kills B-cells. It kills
13 T-cells. He got hydrocortisone enemas.

14 Q. Were you able to determine from the records
15 that were available for how long he was treated with
16 hydrocortisone and at what doses?

17 A. No, I can't say. I never got those records,
18 although I sure would have liked to have seen them.

19 Q. Is ulcerative colitis curable?

20 A. No. It waxes and wanes over time, gets worse,
21 gets better, gets worse, gets better on its own.

22 Q. Doctor, when you look at Mr. Pilliod's history
23 in total -- the skin cancers, the infections of
24 different types, the autoimmune condition -- what is it
25 telling you, as a cancer researcher and specialist?

1 **A.** What it tells me is that his immune system is
2 absolutely not normal. There are components, I assume,
3 that are normal. I don't know which specific component.
4 And I don't even have a name for this. But it's all
5 right. I've been in that situation before related to
6 HIV. Didn't have a name, but that was not a normal
7 immune system. I've seen that kind of thing before.

8 I don't know what his abnormality is. Don't
9 think that it's everything. I know it isn't every
10 component of his immune system. But to see this kind of
11 a history over and over -- repeated serious infections;
12 organisms that he should have been able to clear;
13 repeated skin cancers, 22 of them; ulcerative colitis,
14 an autoimmune disease -- this is not a normal immune
15 system. And I say that based on 50 years of being a
16 doctor who deals with this stuff. This is not a normal
17 immune system.

18 **Q.** Did Mr. Pilliod's abnormal immune system, as
19 you've described it, in your view, increase his risk of
20 developing non-Hodgkin's lymphoma?

21 **A.** I think that his abnormal immune system
22 substantially increased his risk of lymphoma. That is
23 the most prominent risk factored for non-Hodgkin's
24 lymphoma, abnormal immune system.

25 **Q.** At what age was Mr. Pilliod diagnosed with

1 non-Hodgkin's lymphoma?

2 A. It was in 6/20/11. He was 68, I believe.

3 Q. And are patients of that age at increased risk
4 of developing non-Hodgkin's lymphoma?

5 A. Yes. Increasing age is definitely a risk
6 factor for all cancer, actually, most cancer.

7 Q. And was he of that age that put him at an
8 increased risk?

9 A. Yes.

10 Q. Does that mean that getting older, having
11 another birthday, causes a patient to develop NHL?

12 A. No, not in any sense. There's an association
13 of risk, but it has nothing to do with cause.

14 Q. Now, Doctor, prior witnesses here have talked
15 with the jury about something they called a differential
16 for non-Hodgkin's lymphoma.

17 And these -- I don't remember who was who, but
18 one of these is Dr. Nabhan, and one of these is
19 Dr. Weisenburger. Using the same board.

20 First of all, differential for non-Hodgkin's
21 lymphoma. As someone who's been a practicing doctor in
22 this area for 50 years, does that make sense to you?

23 A. I normally will undergo a differential
24 diagnosis. A patient comes in, and I need to look at
25 all the things that could cause those symptoms and come

1 up with what the real diagnosis might be.

2 But a differential cause, a differential
3 ideology? No, this is not at all something that
4 would -- that I've really seen before.

5 Q. So when you're taking care of your patients,
6 do you go through an exercise of listing risk factors
7 and crossing them out and circling others?

8 A. No. That doesn't help me. There's no point
9 to that, really. That doesn't tell me anything.

10 Q. When you're teaching medical students, do you
11 go through an exercise like Dr. Nabhan and
12 Dr. Weisenburger do?

13 A. Well, if this is supposed to be a list of the
14 possible etiologies, the causes, it isn't, because age,
15 sex, race -- I'll go through all of them, but those are
16 risk factors, but they aren't causes.

17 So if you're looking for causes, you really
18 have to have causes. And I guess I'm impressed by the
19 fact that many of these are not causes. Some are; some
20 are not.

21 The other difficulty is that, in a general
22 sense, about 90 percent of diffuse large B-cell lymphoma
23 is idiopathic. We don't know what the cause is.
24 Eventually, hopefully, we'll know, but we don't know
25 right now.

1 And so, if you're dealing with a disease where
2 90 percent, we honestly don't know, it's very difficult
3 to put a list that has a couple of things on it when 90
4 percent we don't know.

5 So, no, this is not valid methodology to me
6 for many different reasons.

7 **Q.** What makes up that 10 percent of conditions of
8 NHLs for which we do know the cause of?

9 **A.** The most prominent of all would basically be
10 the infections. So there are a whole series of viruses
11 that can cause a non-Hodgkin's lymphoma: HIV,
12 Hepatitis C, Hepatitis B, adult T lymphoma leukemia,
13 Epstein-Barr virus. There are a whole series of viruses
14 that can cause lymphoma, that are known to be causes of
15 lymphoma, that cause these very specific driver
16 mutations.

17 There are other bacterial infections, believe
18 it or not, that cause lymphoma. One of them is a germ
19 called H. pylori. H. pylori causes stomach ulcers. No
20 big deal. It also causes non-Hodgkin's lymphoma.

21 There are many parasites that cause lymphoma.
22 And so if one looks at poorly resourced areas of the
23 world, poor areas of the world, about 20 percent of all
24 these lymphomas are due to these germs. In
25 resource-rich areas of the world, about 10 percent of

1 all lymphomas are due to those germs.

2 Q. If you don't have one of those known causes,
3 these viruses you talked about or bacteria, how do you
4 properly characterize that patient's non-Hodgkin's
5 lymphoma?

6 A. It's difficult to do so, especially when 90
7 percent we really don't know.

8 Q. Is that what the term you used earlier,
9 idiopathic?

10 A. Yes. Idiopathic is there but we don't know
11 why.

12 Q. Does the term "idiopathic" meaning nothing is
13 causing that patient to develop non-Hodgkin's lymphoma?

14 A. Oh, no. They had to have all the requisites,
15 the driver mutation, so forth. We just don't know what
16 did it in that given person.

17 Q. Now, if you're going to go through this
18 exercise of listing risk factors in Mr. Pilliod's case,
19 is there any way to cross out age or sex or race as
20 factors that he had?

21 A. No. They're well, well, well described.
22 Increasing age is a risk factor for lymphoma. Male
23 gender is a risk factor for lymphoma. Caucasian race is
24 a risk factor for lymphoma. You can't cross them off as
25 factors; they are real.

1 **Q.** Based on what you described, did Mr. Pilliod
2 have any of the known causes of NHL in terms of the
3 infectious processes or bacterias that you talked about
4 with the jury?

5 **A.** No.

6 **Q.** So how would you describe or characterize his
7 non-Hodgkin's lymphoma from a cause perspective?

8 **A.** From a cause perspective, it's really
9 idiopathic. I can't say what caused his driver
10 mutation. I don't know what caused his driver mutation.

11 **Q.** Did he, nevertheless, have risk factors for
12 developing that condition?

13 **A.** He has a massive risk factor for developing
14 lymphoma, and that was his immunodeficiency and abnormal
15 immune system.

16 **Q.** Drs. Weisenburger and Nabhan had pesticide use
17 on here, and I want to talk to you about that.

18 **A.** Okay.

19 **Q.** Are there certain pesticides that have been
20 associated with non-Hodgkin's lymphoma?

21 **A.** Yes.

22 **Q.** In fact, does your hospital's website describe
23 a link between pesticides, as a generic term, and NHL?

24 **A.** Yes, it does.

25 **Q.** Now, are there multiple types of pesticide?

1 **A.** Many, many. Hundreds. Maybe even more than
2 that.

3 **Q.** Does City of Hope list Roundup or glyphosate
4 as a cause or risk factor for NHL?

5 **A.** No, it does not.

6 **Q.** Do you believe, based on your review, that
7 Roundup is a risk factor for non-Hodgkin's lymphoma?

8 **A.** I think the summary, the basis of all of the
9 data together says to me that, no, Roundup is not
10 associated with development of diffuse large B-cell
11 lymphoma or non-Hodgkin's lymphoma itself.

12 **Q.** Now, after Mr. Pilliod was diagnosed, did you
13 review those records to determine how his care
14 management proceeded?

15 **A.** Yes, I did.

16 **Q.** And the jury has heard this previously. So if
17 you can just give us a quick summary reminder of how his
18 care progressed after his diagnosis in June of 2011.

19 **A.** He was treated with a regimen called R-CHOP.
20 R was the rituximab we talked about, and then the CHOP
21 chemotherapy. He had six cycles of R-CHOP chemotherapy.
22 After about four cycles, he had a repeat scan, which
23 showed the lymphoma was clearly going away, this PET
24 scan. And after six cycles, he was said to be in
25 complete remission. In other words, they repeated the

1 tests that were positive before for the lymphoma, and
2 now all of those tests are negative.

3 He's had other scans since that time. I
4 believe the last one that I saw was August of 2018. And
5 he remains in complete remission, which is really good.
6 So it's been over seven years in complete remission,
7 highly unlikely that he would ever relapse.

8 Q. Now, was there anything about the presentation
9 of Mr. Pilliod's DLBCL that you thought was unusual,
10 just in terms of his symptoms, his scans, his imaging
11 that looked unusual to you?

12 A. No. I've seen unusual cases, as I've
13 discussed, in the past. This was kind of a regular
14 diffuse large B-cell lymphoma, if you will.

15 Q. Is there anything in his medical records or
16 test results that suggested to you that there must be
17 some chemical exposure that caused his DLBCL?

18 A. No.

19 Q. Did you see anything in his workup, his
20 history, his presentation that would lead you to rule in
21 Roundup as a reason why he developed this cancer?

22 A. No.

23 Q. Now, did you consider the fact that
24 Mr. Pilliod was exposed to Roundup?

25 A. Of course.

1 **Q.** That was part of the materials that were
2 provided to you?

3 **A.** Absolutely.

4 **Q.** And based on everything that you've described,
5 do you believe Roundup played any role in the
6 development of Mr. Pilliod's NHL?

7 **A.** Based upon the entirety of the data, I feel
8 that Roundup did not have anything to do with his
9 development of non-Hodgkin's lymphoma.

10 **Q.** Are you aware that Mr. -- that Mrs. Pilliod
11 developed central nervous system lymphoma in 2013?

12 **A.** I am.

13 **Q.** And you reviewed portions of her deposition
14 testimony?

15 **A.** I did.

16 **Q.** Did you consider that fact when assessing
17 Mr. Pilliod's case? Were you aware of that fact as you
18 were assessing Mr. Pilliod's case?

19 **A.** Yes, I was aware of that fact.

20 **Q.** Now, in terms of -- first of all, is central
21 nervous system lymphoma the same thing as systemic
22 DLBCL?

23 **A.** No. They both are, quote, diffuse large
24 B-cell lymphoma, but primary central nervous system
25 diffuse large B-cell lymphoma is an entirely different

1 entity. It has a different classification system. It
2 is a separate entity. It's not the same as diffuse
3 large B-cell. It is -- the cause is different. The
4 treatment is different. The prognosis is different.

5 So there's no relationship between primary
6 central nervous system lymphoma and diffuse large B-cell
7 lymphoma. They are completely different diseases.

8 Q. Now, in terms of the question of whether two
9 people living in the same house or a husband and wife
10 can develop the same cancer, based on the prevalence of
11 non-Hodgkin's lymphoma, would you expect to see that
12 occur from time to time?

13 A. Sure. You'll see it by chance.

14 Q. And has that been described in the medical
15 literature as well?

16 A. Yes, it has.

17 Q. Have researchers looked to see whether that
18 development of non-Hodgkin's lymphoma in a household
19 occurs any more frequently than you would expect just
20 based on the background rate of NHL?

21 A. Yes. There are several studies which have
22 looked at that issue --

23 Q. And have you looked at that yourself?

24 A. Yes, I have.

25 Q. The jury has seen these papers before, so

1 we're not going to go through them in any great detail.

2 But, in terms of the research, there are
3 couples who are reported here, both of whom have -- both
4 husband and wife have non-Hodgkin's lymphoma.

5 A. Correct.

6 Q. I think, in one of these papers, it was nearly
7 100 couples, both husband and wife had the disease; and
8 another, it was 50 or 60, to that effect?

9 A. Yes.

10 Q. And so when these researchers looked to see is
11 that happening more common in couples than you would
12 expect to see in the background rate, what did they
13 find?

14 A. They found that it was the same as the
15 background rate. There were other cancers, for example,
16 tobacco-related that were related, both couples -- both
17 people smoking, but not lymphoma. There was no increase
18 in lymphoma beyond what would be expected in the normal
19 population.

20 Q. So, based on this research, does this -- how
21 do you assess this case here? Is it -- because
22 Mr. Pilliod had one form of NHL and Mrs. Pilliod had a
23 different form of NHL, does that mean it has to be some
24 environmental cause that led them to develop their
25 individual cancers?

1 **A.** No. Just as in these large studies, there's
2 no evidence that there is any kind of commonality, if
3 one member of a couple gets lymphoma, that the other
4 will. The data doesn't show that.

5 **Q.** Now, one of the prior witnesses for the
6 plaintiffs who testified here went through this exercise
7 on a flip chart. And I'll just describe it to you and
8 ask for your opinion.

9 It was described that the risk of getting
10 DLBCL is 1 in 120 on a population basis. And then they
11 multiplied 1 over 120 times 1 over 120, I guess to say
12 two people getting the condition.

13 As I'm describing that opinion -- methodology
14 to you, does that make sense to you as a cancer
15 researcher?

16 **A.** No, it really -- I don't understand it, but it
17 doesn't make sense to me. You have to look at these
18 cases no matter what. Mr. Pilliod had a real increased
19 risk for developing lymphoma due to his immune system.

20 And to take two numbers and multiply them
21 together to give you a risk factor for a given couple,
22 that doesn't make sense to me.

23 **Q.** So let's talk about that further.

24 So Mr. Pilliod has ulcerative colitis?

25 **A.** Correct.

1 Q. And what's the prevalence of that?

2 A. Oh, I don't know. I'd have to look it up.

3 Q. The prior witnesses said it was about 1 in
4 400.

5 A. Okay.

6 MR. MILLER: Object to leading.

7 THE COURT: Sustained.

8 MR. ISMAIL: Fine.

9 BY MR. ISMAIL:

10 Q. Mr. Pilliod's encephalitis, you said was --

11 A. 2 to 4 per million.

12 Q. And so you talked about the fact that he had
13 multiple skin cancers, correct?

14 A. Correct.

15 Q. Approximately what's the -- let's pick one of
16 them. Melanoma, for example -- the risk of getting a
17 melanoma?

18 A. I'd have to look that one up too.

19 Q. Would it make any sense, Doctor, to say, well,
20 Mr. Pilliod's risk of getting a brain infection from
21 herpes is 2 in a million, and I'm going to multiple it
22 by his risk of getting ulcerative colitis to see what
23 are the odds that the same person would have both
24 conditions?

25 A. No. That's just not scientifically valid in

1 any sense. It doesn't mean anything.

2 Q. What drives his risk of getting skin cancer or
3 encephalitis?

4 A. What's driving his risk is his abnormal immune
5 system.

6 Q. Doctor, I will not --

7 MR. ISMAIL: Your Honor, I was going to switch
8 subjects. Did you have a 12:00 stop today or --

9 THE COURT: Okay. Since it's noon, and you're
10 going to switch, let's do our lunch break now.

11 Ladies and gentlemen, we're going to have a
12 45-minute lunch today and resume at a quarter of the
13 hour. Don't talk about anything you heard in the
14 courtroom this morning. Go enjoy your lunch, and we'll
15 see you at 12:45. Thank you.

16 (Recess taken from 11:58 a.m. to 12:55 p.m.)

17 THE COURT: You may proceed, Mr. Ismail.

18 MR. ISMAIL: Thank you, Your Honor.

19 BY MR. ISMAIL:

20 Q. Dr. Levine, let's finish up direct examination
21 here this afternoon. I want to switch topics. We were
22 talking about the effect of Mr. Pilliod's medical
23 history.

24 And I want to briefly touch on some of the
25 other things you've done as part of your review in this

1 case. Okay?

2 A. Sure.

3 Q. Now, did you, as part of your review, also
4 look at the published literature regarding whether or
5 not there's a relationship between glyphosate-based
6 products and non-Hodgkin's lymphoma?

7 A. Yes, I did.

8 Q. And did you also review, as part of that, the
9 regulatory review that summarized and assessed that same
10 data?

11 A. Yes, I did.

12 Q. Now, the jury has heard a lot about that
13 information. So one of the disadvantages of going last
14 is we're not going to repeat everything the jury has
15 heard. But I do want to get your opinion based on your
16 review. Okay?

17 A. Sure.

18 Q. Now, when you looked at the various summaries
19 of the scientific data, did you also review the
20 summaries of the animal carcinogenicity studies and the
21 mechanism studies?

22 A. Yes, I did.

23 Q. And did you factor those reviews into your
24 opinions that you arrived at?

25 A. I certainly did.

1 **Q.** And did you read the epidemiology studies, the
2 likes of which the jury is well familiar?

3 **A.** Yes, I did.

4 **Q.** Did you undertake that epidemiological review
5 with the same process that you would as a peer reviewer
6 or as a researcher looking at medical literature?

7 **A.** Yes. I looked at it very carefully.

8 **Q.** And when you looked at the totality of that
9 information, what opinions did you arrive at with
10 respect to whether or not there's a relationship between
11 products like Roundup and non-Hodgkin's lymphoma?

12 **A.** When I looked at all of the data, reviewed it
13 really carefully, the bulk of the data, to me, indicates
14 that glyphosate is not a cause for non-Hodgkin's
15 lymphoma, nor is it a risk factor.

16 **Q.** One of the things you talked about this
17 morning is something called the SEER database.

18 **A.** Yes.

19 **Q.** Can you remind us what the SEER database is?

20 **A.** The SEER database is the United States' way of
21 looking at cancer across the entire population to figure
22 out if there are problems that we need to address,
23 certain things going up that we did not expect or going
24 down that we did not expect.

25 So I used that. And I've used it a great deal

1 in my entire career as I look at lymphoma and try to
2 figure out new things that we didn't really understand
3 in the past.

4 Q. So well before we came to you and asked for
5 your opinions in this case, did you have experience
6 looking at the SEER data in terms of these -- the rate
7 of non-Hodgkin's lymphoma?

8 A. Yes, I had a lot of experience. I've worked
9 with it a great deal, and I've used it many times in the
10 research that I've done.

11 Q. Now, have you looked to see the trends -- the
12 national trends in NHL in the United States over the
13 last couple of decades?

14 A. Yes, I have.

15 Q. And did you look at that same time period to
16 see what the usage of glyphosate-based products were
17 over that same period of time?

18 A. I did.

19 Q. And have you helped us put together a graph to
20 show that relationship based on your review?

21 A. Yes, I did.

22 Q. So let's just orient everyone here to what
23 we're looking at.

24 What is the orange line here?

25 A. The orange line is the incidence, the

1 development over time, of new diagnoses of non-Hodgkin's
2 lymphoma. It's given cases per 100,000 people. That's
3 how the US, that's how the NIH, that's how SEER, that's
4 how EPA, that's how others look at data of that sort,
5 by -- per 100,000 people. That's what that shows.

6 Q. Okay. So I think you told us in that last
7 answer, but what is the source of the data for the rate
8 of NHL?

9 A. The source of the data are these mandated SEER
10 registries, tumor registries, population-based, as well
11 as other agencies. The National Cancer Institute, for
12 example, will use those kinds of figures.

13 Q. Now, if we look back to 1974 and look at this
14 40-year trend line, I want to focus first on this
15 initial sort of kink here in the data.

16 A. Yes.

17 Q. Were you actually a practicing oncologist in
18 cancer research during this time period?

19 A. Yes, I was.

20 Q. And did you look at this data back then for
21 any particular purpose?

22 A. Yes. I looked at it very carefully because I
23 was seeing these unusual lymphomas in these young men.
24 And my question was whether that was just me at the LA
25 County Hospital or was that really a trend in the United

1 States.

2 So I went to this registry. And you can see
3 there's an uptick there. And it went up between --
4 actually, it started early 1980s, up until 1990,
5 significant increase year over year of these lymphomas.

6 From 1990 until about 2000, when it started to
7 be flat. Little bit of an increase, but not like it was
8 before.

9 And that, in my own view, was related -- and
10 then, after that, 2000 and beyond, it's pretty flat. If
11 anything, there's a little suggestion it might be going
12 down a little bit, as you can see. But it certainly is
13 not going up the way it did in the early 1980s and '90s.

14 Q. And what accounted for this increase in NHL
15 that you observed in the late '80s into the early '90s?

16 A. What accounted for the increase turned out to
17 be the AIDS-related lymphomas.

18 Q. And is it generally accepted, Doctor, that,
19 over the last couple of decades, the national incidence
20 of NHL has plateaued?

21 A. Yes. And what's really happened is, around
22 1996, we developed multiagent therapy, different drugs
23 to treat HIV. They're very, very successful. And we
24 cannot cure HIV, but we can control it so that people
25 live normal life spans, almost normal life spans. And

1 the risk of these lymphomas substantially went down.
2 And so that's the flat part.

3 Q. And what is the blue line?

4 A. The blue line is the use of glyphosate in the
5 United States in pounds over years, over time.

6 Q. And where did you get that data?

7 A. I got it from the Environmental Protection
8 Agency. The EPA had very specific data about glyphosate
9 usage in the U.S.

10 Q. And so I think the jury has heard from other
11 witnesses that, beginning in the mid 1990s, the usage of
12 glyphosate went up across the United States.

13 Is that consistent with the graph that you're
14 showing here?

15 A. Yes. Definite increase, significant increase
16 in the use of glyphosate over time.

17 Q. And what opinions, if any, Doctor, do you draw
18 from the juxtaposition of these two rates as you've
19 shown them here in this graph?

20 A. My understanding of this is that, as
21 glyphosate use increased substantially in the United
22 States -- and, as I understand it, one of, if not the
23 most commonly used, substance of its kind in the United
24 States -- if this really were a major cause or a cause
25 of non-Hodgkin's lymphoma, I should have seen the rate

1 of new non-Hodgkin's lymphomas going up, just as I saw
2 the rate go up when something new called HIV came along.
3 But I don't see that.

4 Q. And is this one piece of the puzzle, as it
5 were, that informs your opinion in this case?

6 A. Yes. It's population-based data, and it's
7 helped me many times in my career to understand what
8 might be going on with different potential causes of
9 lymphoma.

10 Q. Now, with respect to the epidemiology that you
11 looked at in this case, have you looked at studies
12 that -- some of which control for other pesticide
13 exposures and some of which that do not?

14 A. I have.

15 Q. Doctor, which do you believe to be the more
16 reliable data to look at if a study reports adjusted and
17 unadjusted data?

18 A. That's a really important issue. If you
19 don't -- if there are many pesticides, herbicides, other
20 kinds of factors that a person has been exposed to, and
21 you're looking at the results for one specific pesticide
22 or herbicide, you have to factor in everything else that
23 the patient has been exposed to.

24 And if you don't factor it in, it's not a
25 valid assessment of what's really happening. You have

1 to look at each independently. You can't look at a
2 whole glop and say that this one thing caused what
3 was -- actually, the exposure was much, much bigger than
4 that one thing.

5 Q. And so would you look at adjusted or
6 unadjusted data?

7 A. I would always look at adjusted data, adjusted
8 for those other factors that may be involved.

9 Q. Now, are these all studies that you reviewed
10 as part of your work in this case?

11 A. Yes.

12 Q. And the jury is familiar with all of them, so
13 we won't go through again and show the data.

14 But if you look through here, it says
15 "relative risk adjusted for other pesticides, if
16 available." Is that correct?

17 A. Correct.

18 Q. Is it the case that not every study reports
19 adjusted data?

20 A. That's true.

21 Q. But where there was adjusted data, which --
22 did you look to that for the relative risks?

23 A. That would be most important to me. That
24 would be most reliable and valid scientifically,
25 certainly.

1 **Q.** And when you looked at -- across this
2 collection of studies, looking at the adjusted data, did
3 any of them report a statistically significant increased
4 risk?

5 **A.** No. Every one of these studies, the -- none
6 of these are statistically significant, none of them.

7 **Q.** And the McDuffie and De Roos 2003 studies that
8 the jury has heard a great deal about, where do you
9 report that data on this graph?

10 **A.** Well, that was reported -- they are included
11 within the North American Pooled Project. So that was
12 an ability to take McDuffie and De Roos, add some other
13 cases, and make it a larger study. So that's where they
14 are.

15 **Q.** Do some of these studies report on diffuse
16 large B-cell lymphoma in particular, the likes of which
17 Mr. Pilliod had?

18 **A.** Some do, yes.

19 **Q.** And have you helped put together a chart to
20 look at that data as well?

21 **A.** Yes, I did, because that's what Mr. Pilliod
22 had.

23 **Q.** Now, again, some of these are not adjusted;
24 for example, Orsi, I believe, Eriksson, and Chang.

25 But even when you look at adjusted and some

1 unadjusted data, did any of them show a statistically
2 significant increased risk of DLBCL?

3 A. No, none of them, even at the higher dose
4 level or exposure levels on Andreotti's paper.

5 Q. And how do you assess the Leon paper down here
6 at the bottom?

7 A. Leon includes some of Andreotti, not all of
8 it. So I think it went through 2011, and Andreotti
9 several years beyond that. So it includes some of it
10 but not the full data set.

11 Q. Is that properly characterized as a borderline
12 finding?

13 A. Yeah. The confidence interval is 1.00 to
14 1.85. So it's very gray; it's borderline.

15 Q. But when you look at the totality, what does
16 it tell you as a cancer researcher?

17 A. The totality tells me that there is no
18 relationship here as far as use of glyphosate and the
19 subsequent development of diffuse large B-cell lymphoma.
20 It's not there.

21 Q. Did you also consider the regulatory reviews
22 as part of your work in this case?

23 A. I did.

24 Q. And did you find them significant in arriving
25 at your own opinions?

1 **A.** I certainly did.

2 **Q.** How so?

3 **A.** Well, the regulatory agencies, their job is to
4 assure the public health, to do whatever they can to
5 make sure that the public is not exposed to things that
6 are toxic or difficult to the health of the people who
7 live here.

8 That's a big responsibility. They're going to
9 look at these data very, very carefully. They are
10 responsible, ultimately. And I was impressed with the
11 findings around the world.

12 **Q.** Did you look at the findings of the various
13 agencies in the European Union?

14 **A.** Yes, I did.

15 **Q.** Did you look at the findings of the health
16 agencies in Canada?

17 **A.** Yes, I did.

18 **Q.** And in the United States?

19 **A.** Yes, I did, the EPA.

20 **Q.** In New Zealand?

21 **A.** Yes, I did.

22 **Q.** And what did you find when you looked at those
23 reviews?

24 **A.** I looked at the reviews, which were very, very
25 carefully done. They analyzed all of the data. They

1 analyzed more data than other studies had.

2 And, basically, what they conclude, there is
3 no -- glyphosate does not cause cancer in humans. And
4 that is the United States EPA. That is Japan. That is
5 New Zealand. That is Australia. That is Germany. That
6 is France. That is the entire European Union, all of
7 those countries.

8 The regulatory agencies in all of those
9 countries come to the conclusion that glyphosate is not
10 a hazard in terms of cancer to humans. And that, to me,
11 was very weighty data.

12 Q. Now, let's wrap up what we've talked about
13 today, and then we'll have Mr. Miller have an
14 opportunity to ask questions.

15 So in summary, Doctor, when you look at
16 Mr. Pilliod's case and his presentation and the testing
17 that he had done for his DLBCL, did you see anything
18 there to suggest any unusual course of his disease or
19 presentation of his disease?

20 A. No. It was very typical. I've seen new
21 things when they arise. This wasn't new; it was usual.

22 Q. And when you look at his medical records, did
23 you determine whether or not his immune system, as
24 evidenced by his various diseases and conditions he's
25 developed over the years, was functioning normally?

1 We've got a lot to cover. We'll try to do it
2 as efficiently as we can. Okay?

3 **A.** Sure.

4 **Q.** I'm going to grab a piece of paper and put it
5 up here and sort of write some stuff down.

6 What we're really going to be talking about is
7 what caused or contributed as a cause to Mr. Pilliod's
8 diffuse large B-cell lymphoma, right?

9 **A.** Right.

10 **MR. ISMAIL:** May I relocate, Your Honor, so I
11 can see?

12 **THE COURT:** Sure.

13 **BY MR. MILLER:**

14 **Q.** All right. Getting set up is work.

15 You and I agree that age didn't cause
16 Mr. Pilliod's non-Hodgkin's lymphoma, right?

17 **A.** I agree.

18 **Q.** All right. "Did not cause non-Hodgkin's
19 lymphoma."

20 All right. Age did not cause it, right?

21 All right. We agree his race did not cause
22 it, right?

23 **A.** Correct.

24 **Q.** Okay.

25 All right. "Did not cause." All right.

1 All right. His gender didn't cause it? Being
2 a male didn't cause him to get non-Hodgkin's lymphoma?

3 A. No, it didn't. You're right.

4 Q. All right. "Did not cause." All right.

5 You and I agree obesity didn't cause his
6 non-Hodgkin's lymphoma?

7 A. That's true.

8 Q. Right.

9 Okay. So, as I understand it, you went
10 through Mr. Pilliod's extensive medical history, right?

11 A. Correct.

12 Q. And you went through it with the idea that --
13 not that it caused his non-Hodgkin's lymphoma, but what
14 it does, it shows you he had a weakened immune system.

15 Is that fair?

16 A. It shows he had a weakened immune system and
17 an abnormal immune system.

18 Q. Right. So what you told us was you didn't
19 know what caused his non-Hodgkin's lymphoma, right?

20 A. That's correct.

21 Q. Okay.

22 L-E-V-I-N-E?

23 A. That's right.

24 Q. And I'm pronouncing it right, Levine?

25 A. Yes, you are.

1 **Q.** All right. "Does not know what caused Al
2 Pilliod's non-Hodgkin's lymphoma," right?

3 **A.** Correct.

4 **Q.** Where you and I will, with respect, disagree
5 with each other is you did not consider Roundup as a
6 cause, right?

7 **A.** No, that's not true. I definitely considered
8 Roundup. I have to keep an open mind.

9 And because I do keep an open mind, I'm able
10 to see things over the years. For example, HIV; for
11 example, Hepatitis C and others. No, I look at
12 everything. You can't close your mind as a doctor. You
13 have to look at everything, and I did.

14 **Q.** That's absolutely well said.

15 You considered it, looked at the evidence, and
16 then completely rejected that Roundup could cause it.
17 Is that a --

18 **A.** I didn't reject it. The data -- my
19 interpretation of the data allowed me to reject it as
20 the cause of his lymphoma.

21 **Q.** And of anyone's lymphoma. You think there's
22 anybody in the world that has non-Hodgkin's lymphoma as
23 a result of Roundup?

24 **A.** The totality of the data, as I have gone over
25 it extremely closely and carefully, does not suggest

1 that glyphosate is associated with an increased risk of
2 diffuse large B-cell lymphoma or of non-Hodgkin's
3 lymphoma.

4 Q. All right. Okay. That's your opinion. I
5 know that's where we're going to have respectful
6 disagreement.

7 But just to sum up, though, age didn't cause
8 it, race didn't cause it, gender didn't cause it,
9 obesity didn't cause it; and, as far as medical history,
10 you're not suggesting it caused it, but you're
11 suggesting it showed a weakened immune system, right?

12 A. Which allowed the cancer, whatever caused it,
13 to occur at an increased risk.

14 Q. And you and I agree that everyone who gets
15 non-Hodgkin's lymphoma, by definition, has a weakened
16 immune system?

17 A. Yes. That's part of any cancer, an
18 abnormality of mild or more. That's what age is all
19 about, for example.

20 Q. All right. So Al Pilliod fits squarely in --
21 75,000 people a year in America get non-Hodgkin's
22 lymphoma, right?

23 A. Did you say "dead of"? I don't know what
24 you're saying.

25 Q. I'm sorry. 75,000 people, approximately, a

1 year in America get told they have non-Hodgkin's
2 lymphoma; is that fair?

3 A. Yes, it is.

4 Q. And every one of them, by definition, has a
5 weakened immune system because they couldn't fight it
6 off?

7 A. That is true.

8 Q. Okay. And you and I agree that a chemical can
9 be the damage that starts the DNA problem that leads to
10 non-Hodgkin's lymphoma, right?

11 A. Sure. It depends on the chemical and so
12 forth, but certainly.

13 Q. And we agree a chemical can cause DNA damage
14 resulting in non-Hodgkin's lymphoma, right?

15 A. Yes.

16 Q. Okay. Can we agree that Roundup is a
17 chemical?

18 A. Roundup is a chemical.

19 Q. Okay. And although you didn't know it was a
20 pesticide on March 11th, you and I agree now Roundup is
21 a pesticide?

22 A. What I believe I said is that Roundup is an
23 herbicide, and herbicides are considered under the
24 larger umbrella of pesticides, so one could say it is
25 both.

1 Q. But you learned that on March 11th?

2 A. No, not on March 11th. I said it on March
3 11th. I made an error when I initially said it was an
4 herbicide and not a pesticide. In fact, it's both.

5 Q. So we do now agree that it is a pesticide?

6 A. It is a pesticide.

7 Q. And we agree that the website at the City of
8 Hope lists pesticides as a cause of non-Hodgkin's
9 lymphoma?

10 A. Yes, in a general statement.

11 Q. Okay. And you agree with that?

12 A. Yes, I do.

13 Q. I bet you and I can agree, but let's find out.
14 There's a scientist at City of Hope that knows more
15 about the relationship between pesticides and
16 non-Hodgkin's lymphoma than perhaps 99.99 percent of the
17 world?

18 A. I don't know, but I think it's probably true.

19 Q. Who would that be?

20 A. That's Dr. Weisenburger, someone I respect
21 highly.

22 Q. Sure. I hope I don't misspell his name.

23 All right. Now, you put in your report, and I
24 think you'll agree right here, that ulcerative colitis
25 in and of itself is not a cause of diffuse large B-cell

1 lymphoma?

2 A. That's true.

3 Q. And although everyone that gets non-Hodgkin's
4 lymphoma has a problem in the immune system, there's got
5 to be a defect or a hit at the cellular level in order
6 to cause cancer, right?

7 A. There are many steps along the pathway to get
8 cancer. Certainly one of them involves specific types
9 of driver mutations at the DNA, if that's what you
10 meant. I wasn't sure.

11 Q. Sure. Driving mutation. You've also called
12 it a hit-and-run mutation, right?

13 A. I have in other circumstances, yeah.

14 Q. Sure. And for that first hit to DNA, before
15 the cancer appeared, it can often takes years and years,
16 right?

17 A. The first hit can happen anytime,
18 theoretically.

19 Q. Sure. If someone came into your office, and
20 you found out -- I know lung cancer isn't your
21 specialty, but somebody -- and you had to diagnose that
22 person with lung cancer, and they said, "But, Doc, I
23 haven't smoked in 20 years," you'd probably tell them,
24 "Well, look, the damage is done, and it led 20 years
25 later to the cancer." That's what scientists

1 understand, right?

2 A. Well, yes. Actually, it's 15 years, but yes.

3 Q. Okay. Now, although you don't agree with the
4 conclusion, you do know that there was this
5 International Agency for the Research of Cancer, right?

6 A. Forgive me. Which one?

7 Q. International Agency for the Research of
8 Cancer.

9 A. IARC. Yes, I do.

10 Q. In fact, in the other report you did for
11 Monsanto, you cited them about nine times as authority
12 for about nine different issues.

13 Do you remember that in that report?

14 A. I don't remember nine, but I certainly did
15 speak to it.

16 Q. And you know that that agency, also called
17 IARC, invited 17 experts from around the world to look
18 at this issue of Roundup and non-Hodgkin's lymphoma,
19 right?

20 A. Yes.

21 Q. Let's just look for a minute. It's been a
22 long trial, so some of us -- I have -- have forgotten
23 who the folks are.

24 **MR. MILLER:** May I approach, Your Honor?

25 **THE COURT:** Yes.

1 **BY MR. MILLER:**

2 **Q.** Here, Doc.

3 **A.** Thank you.

4 **MR. MILLER:** Can we put that up on the screen?

5 It's been up on the screen before, I believe.

6 Permission to publish, your Honor.

7 **THE COURT:** I believe it has.

8 **MR. MILLER:** 3029.

9 **BY MR. MILLER:**

10 **Q.** This is the members of the working group that
11 looked at the issue of whether Roundup was a probable
12 human carcinogen, right?

13 **A.** They were looking at the issue of glyphosate
14 in relationship to the development of lymphoma, yes.

15 **Q.** Yes, ma'am. And not just glyphosate, but
16 glyphosate formulations, right?

17 **A.** Correct.

18 **Q.** And this is not -- you have a very
19 distinguished career, and we've talked about what you've
20 done. But you were not invited to this meeting, right?

21 **A.** No, I was not.

22 **Q.** And you wouldn't expect to be because you
23 don't really research pesticides and non-Hodgkin's
24 lymphoma?

25 **A.** That's true.

1 **Q.** Some of the people that were invited and voted
2 to conclude that, in fact, Roundup did cause
3 non-Hodgkin's lymphoma was a gentleman from the
4 Environmental Protection Agency. You see that? Peter
5 Egeghy?

6 **A.** Yes.

7 **Q.** And from --

8 **A.** Although it does say he was unable to attend.

9 **Q.** Oh, you're right. There were two people from
10 the EPA. One attended; one did not. I'll rephrase.

11 Aaron Blair, you understand he was on that
12 committee, right?

13 **A.** Yes.

14 **Q.** Gloria Jahnke from the National Institute of
15 Environmental Health Sciences?

16 **A.** Yes, she's listed.

17 **Q.** And Dr. Jameson. He got the chance to visit
18 with us here in the courtroom.

19 Have you read his expert report or deposition?

20 **A.** I don't remember whether I have, actually. I
21 think I did.

22 **Q.** Matthew Martin from the Environmental
23 Protection Agency did, in fact, attend, right?

24 **A.** Yes.

25 **Q.** But you're also right. The other gentleman, I

1 believe, did not attend.

2 Matthew Ross from Mississippi State. We have
3 someone from Texas A&M. And you mentioned New Zealand.
4 We have someone from New Zealand, don't we?

5 A. Yes.

6 Q. And we have someone from Canada too, don't we?

7 A. Yes.

8 Q. And we have Lauren Zeise from the California
9 Environmental Protection Agency, right?

10 A. Yes, she's listed.

11 Q. All right. And you understand that they voted
12 unanimously to conclude that Roundup was a probable
13 human carcinogen, right?

14 A. A probable human carcinogen, yes.

15 Q. And that was not an unscientific conclusion,
16 was it?

17 A. No, it wasn't at that time.

18 Q. I understand. And here's what they decided.

19 MR. MILLER: If I could approach, Your Honor.

20 BY MR. MILLER:

21 Q. Here is Exhibit 2048. I'm going to hand this
22 to you, Doctor.

23 MR. MILLER: Your Honor, did I hand you two
24 copies or one?

25 THE COURT: You did.

1 **MR. MILLER:** Sorry.

2 **BY MR. MILLER:**

3 **Q.** Okay. And have you reviewed this publication
4 in the Lancet where they reported the news of their
5 finding about Roundup and non-Hodgkin's lymphoma?

6 **A.** Yes. Well, glyphosate.

7 **Q.** Right. Well, it's also about glyphosate and
8 its formulations. Are you aware of that ma'am?

9 **A.** Yes.

10 **Q.** All right. Let's go, if we can, to the back
11 page. The jury has seen this before. Indulge me, but
12 it's been a while. Let's look at the bottom right side.
13 Let's go to the glyphosate and glyphosate-based
14 formulations. I'm going to highlight that for you so we
15 can all look at it together there.

16 Glyphosate and glyphosate formulations induced
17 what kind of damage?

18 **A.** It says DNA and chromosomal damage in --
19 that's what it says.

20 **Q.** In mammals and in human and in animal cells,
21 right?

22 **A.** Yes.

23 **Q.** And DNA damage is what can ultimately lead to
24 cancer, right, if the body can't repair and fight it
25 off?

1 **A.** It's not DNA damage in general that can lead
2 to cancer. It is a very specific kind of mutation
3 called a driver mutation that can lead to cancer.
4 Nonspecific abnormalities, nonspecific chromosomal or
5 DNA damage, that does not necessarily lead to cancer at
6 all.

7 **Q.** Sure, Doctor. And you figure these 17 experts
8 in cancer from around the world know what DNA damage can
9 and cannot cause cancer, right?

10 **A.** I would believe so.

11 **MR. ISMAIL:** Speculation, Your Honor.

12 **THE COURT:** Overruled. She can answer.

13 **THE WITNESS:** I believe so.

14 **BY MR. MILLER:**

15 **Q.** Sure. And what they said was this kind of DNA
16 damage made Roundup a probable human carcinogen, right?

17 **A.** I disagree with their conclusions. Even on
18 the bottom of what you're showing, bacterial mutagenesis
19 tests were negative. Glyphosate has not been shown to
20 be a mutagenesis. It does not cause mutations. They're
21 saying that right there.

22 **Q.** One study reported increases in blood markers
23 of chromosomal damage, right?

24 **A.** Yes.

25 **Q.** In residents of several communities after

1 spraying of glyphosate formulations, right?

2 A. Right.

3 Q. And the working group classified glyphosate as
4 a probable carcinogenic to humans.

5 A. Yes, they did. I just don't agree with their
6 conclusions.

7 Q. I understand. Now, let's continue. Okay.

8 The DNA defect that can cause cancer can be a
9 double-strand break, right?

10 A. No. A double-strand break in itself is not a
11 driver mutation, no. It doesn't equal the option for
12 cancer, given the other factors.

13 Q. Let me show you --

14 **MR. MILLER:** Your Honor, may I approach. I'm
15 going to hand the witness her deposition.

16 **BY MR. MILLER:**

17 Q. This is from March 15th when a lawyer from my
18 office came, I believe, down to Los Angeles and took
19 your deposition.

20 Do you remember that?

21 A. Yes, I do.

22 Q. Okay. Let's look at page 143, line 4. Were
23 you asked this question, and did you give this answer?

24 "Q. So that defect in the DNA could
25 be a hit-and-run kind of mechanism,

1 which means the agent, some agent, is
2 causing mutations in someone's DNA."

3 What was your answer?

4 **A.** I said, "That's correct."

5 **Q.** And the next question was "That defect could
6 be a double-strand break, correct?"

7 **A.** I said, "It could be."

8 **Q.** "Could be a single-strand break?"

9 **A.** I said, "It could be any number of defects,
10 many different defects."

11 **Q.** That's the truth, isn't it, Doctor?

12 **A.** If the defect is a specific kind of driver
13 mutation, is it causing mutation? That was what I said.
14 Which means the agent, some agent, is causing mutations
15 in someone's DNA.

16 **Q.** Okay. You know, while everybody else was
17 having lunch, I read your reports in both cases and
18 reread your deposition.

19 Do you agree with me, or do you want to look?
20 You don't use the phrase "driving mutation" in either
21 report or in this deposition.

22 Are you aware of that?

23 **A.** I am aware.

24 **Q.** Okay.

25 **A.** Reasons --

1 **Q.** I didn't mean to interrupt you.

2 And one of the reasons you never used that
3 phrase was, as of March 11th, you hadn't even looked at
4 the genotox material in this case.

5 Do you remember saying that in a sworn
6 proceeding?

7 **A.** I had looked at some of that data.

8 **Q.** Do you remember saying in a sworn proceeding
9 on March 11th you had not reviewed it?

10 **A.** On March 11th I had reviewed some of the data,
11 not all of the data. I had reviewed the epidemiologic
12 data carefully.

13 **Q.** You know, there's a difference between
14 epidemiologic data which you -- I'll take you at your
15 word, you reviewed carefully. But you did not review,
16 as of March 11, the genotox data, right?

17 **A.** I was not asked to do so.

18 **Q.** That's right. You gave your opinion without
19 being asked or looking at that material. That's what
20 the Monsanto lawyers wanted you to do, right?

21 **A.** No.

22 **Q.** I'm sorry. I'm confused.

23 You gave your report in this case in January,
24 right?

25 **A.** Yes.

1 Q. And as of March 11th, in a sworn proceeding,
2 you advised you hadn't reviewed the genotox data yet
3 because you had not been asked to review it, right?

4 A. I had not been asked to comment upon it.

5 Q. And you hadn't done a Bradford Hill causality
6 review of this case, right?

7 A. That is true.

8 Q. You hadn't been asked to do that either, had
9 you?

10 As of March 11th, you had not looked at the
11 animal studies on Roundup. That's true, isn't it?

12 A. That is true.

13 Q. And as of March 11th, you had no opinion on
14 the mechanistic data, or the genotox data. That's true,
15 isn't it, Doctor?

16 A. At that time.

17 Q. So was it this weekend that you came up with
18 the genotox opinion?

19 **MR. ISMAIL:** Objection. Argumentative.

20 **THE COURT:** Sustained.

21 **BY MR. MILLER:**

22 Q. When did you come up with an opinion on the
23 genotox?

24 A. When I got into the data and read it carefully
25 and saw what it really said.

1 Q. But you wrote a report telling the world that
2 my client's cancer wasn't caused by Roundup, and you
3 hadn't read that stuff?

4 A. There is no study that shows that Roundup
5 causes mutagen. It is nonmutagenic. IARC says it is
6 nonmutagenic. EPA says it is nonmutagenic. Every one
7 of the regulatory agencies says it does not cause
8 mutations. You need a driver mutation. Another
9 patient -- never mind.

10 Q. Do you know who Chris Portier is?

11 A. I don't know him.

12 Q. Have you read his deposition?

13 A. Yes, I have.

14 Q. Do you know who Dr. Jameson is?

15 A. Yes.

16 Q. Did you read his deposition?

17 A. Yes, I did.

18 Q. When did Roundup come on the market?

19 A. I believe it came on the market around 1974.

20 Q. What else is in Roundup besides glyphosate?

21 A. My understanding is that there are solvents,
22 there are other substances in the formulation. They are
23 not exactly the same in many different varieties of this
24 substance.

25 Q. Do you know what people that know pesticides

1 call the other ingredients in Roundup?

2 A. I'm not sure what word they use.

3 Q. Have you ever heard the word "surfactant"
4 before?

5 A. I most certainly have.

6 Q. What's your understanding of a surfactant?

7 A. Surfactant allows a given substance to get
8 into the body more carefully and the skin more carefully
9 and so forth, more completely.

10 Q. Substance to get into the body more
11 completely.

12 Is there a surfactant in Roundup?

13 A. I believe there is.

14 Q. Can you tell us what it is?

15 A. No, I can't.

16 Q. Can you -- have you ever heard this acronym
17 before, POEA?

18 A. Yes, I have.

19 Q. What is it?

20 A. I can't tell you what it stands for. I
21 believe it is one of the surfactants that is included in
22 Roundup.

23 Q. Is it included in Roundup in Europe or just
24 America?

25 A. I don't know.

1 **MR. ISMAIL:** Objection, Your Honor. Lack of
2 foundation.

3 **THE COURT:** Sustained.

4 **BY MR. MILLER:**

5 **Q.** Did you give us an opinion about regulatory
6 issues in Europe?

7 **A.** Yes, I did.

8 **Q.** Before you would give us regulatory opinions
9 about what Roundup is used in Europe and whether it's
10 safe, would you want to know what surfactant they used
11 in Europe?

12 **A.** I might.

13 **Q.** Do you know?

14 **A.** I don't.

15 **Q.** Would it surprise you to learn they don't use
16 POEA in Europe?

17 **A.** No, it wouldn't surprise me.

18 **MR. ISMAIL:** Objection, Your Honor.

19 **THE COURT:** Sustained. Stricken.

20 **BY MR. MILLER:**

21 **Q.** You and I agree -- and I respect and thank
22 you -- you said you took Al Pilliod at his word, right?

23 **A.** Yes, I did.

24 **Q.** You and I agree that Al Pilliod started
25 spraying Roundup in 1982?

1 **A.** That's what was said.

2 **Q.** Do you believe him?

3 **A.** I have no reason to disbelieve him.

4 **Q.** Okay. And you and I agree that Al sprayed
5 Roundup nine months a year for 28 years?

6 **MR. ISMAIL:** Objection, Your Honor. Lack of
7 foundation. There's no way for the witness to know.

8 **THE COURT:** Okay. If she knows or how she
9 knows.

10 **BY MR. MILLER:**

11 **Q.** Did you read Al Pilliod's deposition?

12 **A.** I did.

13 **Q.** Then you would know that Al sprayed Roundup
14 for nine months a year for 28 years before he got
15 non-Hodgkin's lymphoma.

16 **A.** I thought it was 36 years, but I could have
17 been mistaken. It could have been 28.

18 **Q.** He sprayed it for 36 years, but I was trying
19 to be fair. It was 28 years of spraying before he
20 got --

21 **A.** I see.

22 **Q.** And in what year did he get non-Hodgkin's
23 lymphoma?

24 **A.** In 2011 he was diagnosed.

25 **Q.** And while we're there, he was Stage 4, right?

1 **A.** Yes.

2 **Q.** Which is -- Stage 4 is the worst it can be,
3 right?

4 **A.** Luckily, he's in complete remission and has
5 been cured of the disease.

6 **Q.** And we're all thrilled. And I'm sure you are
7 as well. But my question was it was the worst stage it
8 could be at that time?

9 **A.** Yes. It was in extranodal sites. It wasn't
10 just in lymph nodes. It was in the organ, and the organ
11 was the bone and the bone marrow.

12 **Q.** And you agree that, not only was he diagnosed
13 with diffuse large B-cell lymphoma, but his wife four
14 years later was diagnosed with a form of diffuse large
15 B-cell lymphoma.

16 **A.** Well, she was diagnosed with primary CNS
17 lymphoma, which is a different disease, but it's a kind
18 of lymphoma.

19 **Q.** Isn't it true that PCN, the kind of lymphoma
20 that Alberta Pilliod had, is a form of diffuse large
21 B-cell?

22 **A.** No. It's not a subtype. It is a different
23 distinct entity and is considered a distinct entity in
24 all of the classification systems.

25 **Q.** So your testimony is that Alberta Pilliod did

1 not have diffuse large B-cell lymphoma?

2 A. She had primary central nervous system
3 lymphoma, DLBCL.

4 Q. DLBCL stands for what?

5 A. Diffuse large B-cell lymphoma --

6 Q. Okay.

7 A. -- of her primary CNS, which is a different
8 disease.

9 Q. Do you know if -- how many properties Al
10 Pilliod sprayed?

11 A. I think they had three properties and one
12 house.

13 Q. So that's four properties total?

14 A. I believe that was my recollection.

15 Q. Do you know if he sprayed concentrate?

16 A. I believe he -- he may have -- no, I don't
17 think he really sprayed the concentrate, although I
18 don't remember.

19 Q. Do you know if he ever spilled it on him?

20 A. Yes, I do recall I believe he spilled a bit on
21 his hands two times, I think it was.

22 Q. Do you know if he ever wore protective gear?

23 A. I don't believe he did, but I'm not sure.

24 Q. Now, non-Hodgkin's lymphoma can start in the
25 bone marrow, right?

1 **A.** It can.

2 **Q.** Sure. And do you know if Roundup gets into
3 the bone marrow?

4 **A.** I assume it does, yes.

5 **Q.** Okay. Do you know how long it stays in the
6 bone marrow?

7 **A.** No, I don't.

8 **MR. ISMAIL:** Objection, Your Honor. Beyond
9 the scope.

10 **THE COURT:** Overruled. If she knows.

11 **THE WITNESS:** I don't know.

12 **BY MR. MILLER:**

13 **Q.** Okay. Wouldn't that be important?

14 **A.** Not necessarily.

15 **Q.** Okay. Now, you talked about regulators around
16 the world. You talked about New Zealand. You talked
17 about Australia and Japan. Right here in the state of
18 California, they have a mechanism by which they turn to
19 IARC, right?

20 **A.** They do.

21 **Q.** Okay. And that's because, at least here in
22 this -- not in New Zealand, but in California, they
23 believe IARC and their scientists set a pattern that
24 they follow here.

25 Is that your understanding?

1 **A.** My understanding is that any statement from
2 IARC that something is a probable carcinogen or
3 carcinogen would automatically go onto Proposition 65 of
4 California.

5 **Q.** Okay. And you know that, as we sit here, in
6 California, Roundup is a known cause of cancer for
7 non-Hodgkin's lymphoma?

8 **A.** No. I know that the State of California puts
9 anything that IARC calls a probable or carcinogen onto
10 their Proposition 65 list.

11 **Q.** Let me show you what's been marked as
12 Exhibit 1093.

13 **A.** Thank you.

14 **Q.** Now, this is from the California Environmental
15 Protection Agency?

16 **A.** Yes, it is.

17 **Q.** It says "Chemicals listed as known to the
18 State of California to cause cancer."

19 And what is listed there?

20 **A.** Glyphosate.

21 **Q.** So you and I can agree that glyphosate is
22 known to the State of California to cause cancer?

23 **MR. ISMAIL:** Objection. Asked and answered.

24 **THE COURT:** Sustained.

25 ///
26

1 **BY MR. MILLER:**

2 **Q.** Do you disagree with the State of California
3 on this?

4 **A.** I agree that the State of California states
5 that glyphosate is a potential carcinogen. I disagree
6 with that opinion.

7 **Q.** Now, you know that Al had treating physicians,
8 right?

9 **A.** Yes.

10 **Q.** And Dr. Raj, did you read her deposition?

11 **A.** Yes, I did.

12 **Q.** She's an oncologist. Are you aware of that?

13 **A.** Yes, I am.

14 **Q.** And a hematologist?

15 **A.** Yes, she is.

16 **Q.** The same formal training that you have, right?

17 **A.** I assume so. I'm not sure exactly what her
18 training was.

19 **Q.** Sure. And she was able to meet the patient
20 and talk to the patient and examine the patient, right?

21 **A.** Yes.

22 **Q.** Okay. You never talked to Al Pilliod?

23 **A.** No, I didn't.

24 **Q.** Never examined him?

25 **A.** No, I didn't.

1 Q. And never talked to Dr. Raj?

2 A. No, I did not.

3 Q. Okay. And you know, though, that Monsanto's
4 lawyers asked Dr. Raj if Al was immunocompromised.

5 Do you remember reading that?

6 A. No, I don't.

7 Q. You're not aware that she said he was not
8 immunocompromised?

9 A. I would be happy to look at it. I don't
10 recall that off the top of my head.

11 Q. Now, you told us there's no genetic signature
12 from the pathology that tells us Roundup caused it,
13 right?

14 A. That's true.

15 Q. It's also true that there's no signature under
16 the microscope to say AIDS caused a particular
17 non-Hodgkin's lymphoma, right?

18 A. I would disagree there, because, under the
19 microscope, you could see HIV virus.

20 Q. But without seeing the HIV virus, there's no
21 way to tell? Non-Hodgkin's lymphoma looks like
22 non-Hodgkin's lymphoma?

23 A. That's true.

24 Q. And Hepatitis C as a cause of non-Hodgkin's
25 lymphoma, there is no way to look under the microscope

1 and say Hepatitis C caused that non-Hodgkin's lymphoma?

2 A. No. You can look in the lymphoma tissue and
3 see the Hepatitis C in the lymphoma tissue, but that's
4 done by other means other than microscope.

5 Q. Right. And the last matter that you wrote a
6 report on, gave testimony on, you said Hepatitis C
7 caused his lymphoma, and there was nothing under the
8 microscope to prove that Hepatitis C caused it, right?

9 A. If I'm allowed to opine, the individual had
10 been infected with Hepatitis C for decades.

11 Q. And he hadn't had Hepatitis C for ten years --

12 MR. ISMAIL: Objection.

13 THE COURT: Approach.

14 MR. MILLER: I'll withdraw it, Your Honor.
15 I'll withdraw it.

16 MR. ISMAIL: Well, perhaps...

17 THE COURT: Yes. Come up.

18 (Sidebar discussion not reported.)

19 BY MR. MILLER:

20 Q. So, going back to what we were talking about,
21 with AIDS or Hepatitis C or Hepatitis B, you can be
22 negative -- well, let's just narrow it down to
23 hepatitis. You can be negative for ten years and still
24 have it be a cause; is that right?

25 A. Are you talking about Hepatitis B causing a

1 lymphoma, or explain.

2 Q. Yes. Or C.

3 A. So if -- so the question is you can have
4 Hepatitis B or C for many years and get lymphoma? Is
5 that the question?

6 Q. It is.

7 A. Yes.

8 Q. Okay. Now, we're going to go through some of
9 these studies about the weakened immune system.

10 But there are many people that get
11 encephalitis who are immunocompetent. That's true,
12 isn't it?

13 A. Yes. Well, I don't know about many. It's 2
14 to 4 per million.

15 Q. Well, 2 to 4 per million get encephalitis.
16 But out of the people that get encephalitis, in fact,
17 many of them are immunocompetent?

18 A. That's true.

19 Q. Okay. Right. So just because one has
20 encephalitis does not mean someone is immunosuppressed,
21 right?

22 A. One episode? No. It doesn't mean somebody is
23 immunosuppressed.

24 Q. Okay.

25 Do you want some water?

1 **A.** No. I have some right here.

2 **Q.** All right. I want to be a gentleman.

3 All right. Hang on here.

4 Now, tell the folks what a CD4 count is.

5 **A.** A CD4 count is -- it's a count of the number
6 of T-cells that are called helper T-cells, T4 or CD4.
7 Lymphocytes are helper lymphocytes and an important part
8 of the immune system.

9 **Q.** And as an important part of the immune system,
10 it can be measured -- right? -- in patients?

11 **A.** The number can be measured, and the function
12 can be measured also.

13 **Q.** And you agree that a low CD4 count would show
14 someone had an immunocompromise situation?

15 **A.** Yeah. A low CD4 count would show someone was
16 deficient in CD4 cells and therefore would be
17 compromised.

18 **Q.** And when we say low CD4 count, we mean
19 anything lower than 440?

20 **A.** It depends on the lab that you're dealing
21 with. Every lab has different cutoffs. But, in
22 general, that would be the right range.

23 **Q.** Okay. Around that range, 400, 420, 440,
24 something like that?

25 **A.** Yes.

1 **Q.** Now, how many pages of medical records do you
2 think you reviewed for Al Pilliod?

3 **A.** I was asked that before, and I couldn't
4 answer. There were thousands of pages. Some of them
5 came on CD. Some of them were on pages. I've never
6 counted them. It's thousands of pages.

7 **Q.** Okay. And you didn't see one page where Al
8 Pilliod had a low CD4 count?

9 **A.** I saw one page where the doctor was concerned
10 enough to get a CD4 count, and the count was normal.

11 **Q.** And when we took your deposition, you said you
12 never considered Al's CD4 records when forming your
13 opinions in this case, true?

14 **A.** I was being informed by the entire totality of
15 his medical history. And the CD4 count, the number
16 per se, did not inform my opinion.

17 **Q.** You didn't know there had been a CD4 lab test
18 when we took your deposition, right?

19 **A.** The records kept coming in as the months went
20 on. I'm not exactly sure when I got that one, but it
21 was more recently.

22 **Q.** And we can both agree now that there was a CD4
23 count done on Al Pilliod and it was above normal?

24 **A.** Yes. It was good and normal.

25 **Q.** And that was done in the year 2000, right?

1 A. I would have to check that, but I'll take your
2 word for it.

3 Q. Let's all take a look at it.

4 A. Okay.

5 Q. It's Exhibit 3112.

6 A. Thank you.

7 **MR. MILLER:** Permission to publish?

8 **MR. ISMAIL:** No objection, Your Honor.

9 **BY MR. MILLER:**

10 Q. So this was in the hospital with one of those
11 encephalitis problems he had, right?

12 A. Yes.

13 Q. Okay. And his CD count was normal, right?

14 A. His CD count was 1,814. Normal is up to
15 1,440.

16 Q. Answer, yes, it was normal?

17 A. It was high; it wasn't normal.

18 Q. Okay. It was high, but it sure wasn't low?

19 A. It was not low. The number was not low.

20 Q. And, just to be clear, you would expect a low
21 CD4 count for someone who had an immune problem, right?

22 A. No. I disagree with that totally.

23 Q. Are you aware that -- well, you do a lot of
24 HIV work, right?

25 A. I do.

1 **Q.** And they have immunocompromise problems,
2 right? When you have HIV, that's part of the problem,
3 right?

4 **A.** The specific problem in that entity is that
5 the HIV virus infects the CD4 cells and kills them. So
6 in that particular issue, the specific kind of immune
7 deficiency is CD4, but that doesn't mean that that's the
8 only kind of immune deficiency that could be possible.

9 **Q.** AIDS, acquired immune deficiency syndrome,
10 right?

11 **A.** Correct.

12 **Q.** And with those immune deficiency syndromes,
13 you're looking at CD4 counts of 100, 150, or even lower?

14 **A.** I'm not sure what your question is, but there
15 are many different types of abnormalities of the immune
16 system. I showed you dendritic cells. I showed you
17 macrophages. I showed you T-cells, T8 cells.

18 I showed other things -- other things that I
19 didn't show but I talked about were neutrophils,
20 eosinophils, monocytes, and so forth. There are many
21 components of the immune system and many ways for the
22 immune system to be abnormal.

23 One of those ways that is classic of HIV is a
24 deficiency of CD4 cells. Mr. Pilliod did not have a
25 deficiency of CD4 cells. And, as we have discussed, he

1 did not have AIDS.

2 Q. And no doctor ever diagnosed him with having a
3 T-cell abnormality?

4 A. No, no doctor did.

5 Q. Okay. And you're aware that Dr. Raj testified
6 that Al had never been on immunosuppressive therapy?

7 A. I will disagree with that. He was on
8 hydrocortisone for several different reasons. That is
9 immunosuppressive therapy.

10 Q. But Dr. Raj didn't think so?

11 MR. ISMAIL: Objection, Your Honor.

12 THE COURT: Sustained.

13 BY MR. MILLER:

14 Q. You agree that none of -- well, I'll agree
15 with you. None of the treaters said, hey, skin cancer
16 caused his non-Hodgkin's lymphoma?

17 A. I think one of the interesting things about
18 this, as I read the record, is that he's had so many
19 doctors. And they're all specialists. And everybody is
20 looking at their little section.

21 I had the opportunity to look at the whole
22 thing. And when I put the whole thing together, he is
23 immunosuppressed.

24 Q. Immunosuppressed is a diagnosis made by
25 Dr. Levine?

1 **A.** I am saying he was immunosuppressed. I have
2 not, in 50 years, seen this kind of a history in someone
3 whose immune system is fully normal.

4 **Q.** Okay. But everyone that gets non-Hodgkin's
5 lymphoma has a problem with their immune system?

6 **A.** The interesting thing is that the immune
7 system weakens in all of us as we age. It's not enough
8 to cause, you know, all these opportunistic infections
9 and so forth like AIDS patients do. But it is enough to
10 give a little bit of an advantage to that cancer cell.
11 It's weak enough. That's why age is associated with
12 increasing cancer of almost all types.

13 **Q.** But you and I agree age didn't cause
14 Mr. Pilliod's non-Hodgkin's lymphoma?

15 **A.** No, it did not.

16 **Q.** All right. And how many people get skin
17 cancer a year?

18 **A.** I don't know, but I know it's a lot.

19 **Q.** About 3 million, right?

20 **A.** It's a common occurrence.

21 **Q.** The number one cause of skin cancer is being
22 out in the sun?

23 **A.** That's true.

24 **Q.** And, in fact, being out in the sun reduces
25 your risk of non-Hodgkin's lymphoma?

1 **A.** It does.

2 **Q.** Okay. All right.

3 And fair-skinned people have a higher risk of
4 skin cancer, right?

5 **A.** That's true.

6 **Q.** And you didn't look at a picture of
7 Mr. Pilliod or look at him before you made your
8 conclusions about immunosuppression, right?

9 **A.** I knew he was Caucasian, and I knew that
10 Caucasian was an increased risk as opposed to other
11 races.

12 **Q.** You didn't know he was a really fair-skinned
13 person?

14 **A.** No, I didn't.

15 **Q.** Did you know how much time he spent in the
16 sun?

17 **A.** I knew he had a boat. I knew he said he did
18 spend significant time in the sun. I don't know how
19 much time per se that was.

20 **Q.** Do you agree that people with blue eyes are at
21 increased risk of skin cancer, right?

22 **A.** That's true.

23 **Q.** What color are Al's eyes?

24 **A.** I don't know. I subsequently learned that
25 they are probably blue, but I don't know that.

1 Q. All right. All right.

2 You did not know what color Al's hair was,
3 that he had red hair, before you reached your opinions,
4 right?

5 A. I didn't know. You're right.

6 Q. And you had never seen a color picture of Al,
7 a photograph of him before?

8 A. You're right. I had not.

9 Q. Okay. All right.

10 And you and I can agree, though, that, if
11 somebody has a family history of skin cancer, they're
12 more likely to get skin cancer as well?

13 A. Yes.

14 Q. Did Al have a family history of skin cancer?

15 A. Yes, he did.

16 Q. But he did not have a family history of
17 non-Hodgkin's lymphoma? That's true as well?

18 A. That is true.

19 Q. Okay. Now, you know that the melanoma he had
20 was superficial?

21 A. Yes.

22 Q. Okay. And you know what I mean when I say
23 clean margin, right?

24 A. Yes, I do.

25 Q. And when his superficial skin melanoma was

1 removed, he had a clean margin?

2 A. Yes, he did.

3 Q. Okay. Let's look at Exhibit 3118.

4 Let me show you an article I would like to
5 look at with you real quick on melanoma and skin cancer
6 and subsequent cancer risk, Exhibit 3118.

7 MR. MILLER: Permission to publish, Your
8 Honor?

9 THE COURT: Any objection?

10 MR. ISMAIL: No, Your Honor.

11 THE COURT: Granted.

12 BY MR. MILLER:

13 Q. Now, this is a study -- when you looked at
14 skin cancer studies, you were looking at
15 population-based studies, weren't you?

16 A. Yes. You need large studies because this is
17 so common.

18 Q. Right. And the reason they can't do a
19 relative risk or an odds ratio out of a population-based
20 study, they do an SIR, right?

21 A. I can't agree to -- that's a big blanket
22 statement. A standardized incidence ratio is one of the
23 tests used to look at significance of data.

24 Q. Right. It's not relative risk and it's not
25 odds ratio; it's a standardized incident ratio, right?

1 **A.** That's correct.

2 **Q.** All right.

3 Now, this study looked at this issue of skin
4 cancer and subsequent risk of cancer.

5 And if we could please turn to Table 3, this
6 is a 2014 study. And it shows risk of non-Hodgkin's
7 lymphoma -- way at the bottom there. There you go,
8 non-Hodgkin's lymphoma.

9 And it shows, for basal cell carcinoma, 1.08.
10 Not statistically significant, right?

11 **A.** Non-Hodgkin's lymphoma controls in BCC. It
12 was -- you are correct, 1.08, and not significant
13 clinically -- or statistically. Forgive me.

14 **THE COURT:** Doctor, if you could raise your
15 voice just a bit and speak into the mic.

16 **THE WITNESS:** Sorry.

17 **BY MR. MILLER:**

18 **Q.** And for squamous cell, it's not statistically
19 significant either, is it?

20 **A.** That's true.

21 **Q.** It's not even close, is it?

22 **A.** It's not statistically significant.

23 **Q.** You wouldn't want to draw any conclusions from
24 that kind of data, would you?

25 **A.** No. I wouldn't draw conclusions from any one

1 piece of data anywhere. I'd like the entirety of the
2 data to review and look at carefully.

3 Q. Let's look at the Herr study, 3156.

4 You know who Dr. Lindsay Morton is, right?

5 A. Yes, I do.

6 Q. You've published with Dr. Morton, haven't you?

7 A. Yes.

8 Q. Fine doctor?

9 A. Yes.

10 Q. Let's take a look at Exhibit 3156.

11 I have a copy for you, Doctor.

12 A. Thank you.

13 Q. Yes, ma'am.

14 MR. MILLER: Permission to publish?

15 MR. ISMAIL: No objection.

16 THE COURT: Granted.

17 BY MR. MILLER:

18 Q. Now, in this article published in 2018 --
19 that's pretty recent, right?

20 A. Yes.

21 Q. And by one of your coauthors, Dr. Lindsay
22 Morton, right?

23 A. Well, not on this particular paper.

24 Q. Right. But you've published papers with her?

25 A. Yes, in the past.

1 **Q.** All right. So let's go to the risks for CM.
2 It's in the abstract section there. What Dr. Morton
3 tells us is "the risk for cutaneous melanoma was
4 significantly elevated after diffuse large B-cell
5 lymphoma," right? Which means to say, if you get
6 non-Hodgkin's lymphoma, she did find an increased risk
7 of subsequent melanomas, right?

8 **A.** I'll look at this and confirm it.
9 Do you want to show me where the table is?

10 **Q.** Well, let me finish that sentence, and we'll
11 look anywhere you want.

12 "But the reciprocal relationship was not
13 observed," meaning she did not find an increased risk of
14 non-Hodgkin's lymphoma after cutaneous melanoma.

15 That's what she reports, right?

16 **A.** I have to look at this carefully before I can
17 answer.

18 **Q.** Well, go right ahead.

19 **A.** So tell me your question again.

20 **Q.** Sure. Did I read this correctly? Dr. Morton
21 says, "Risk for cutaneous melanoma was statistically
22 elevated after a diffuse large B-cell lymphoma."

23 **A.** Where are you reading so I can confirm to you
24 that that's what she said?

25 **Q.** It's on the screen, Doc. I'm in the abstract.

1 "Risk for cutaneous melanoma was statistically
2 elevated after diffuse large B-cell and Hodgkin's
3 lymphoma, but the reciprocal relationship was not
4 observed," right?

5 **A.** Yes, that's what she said.

6 **Q.** And what that means is she did not see a
7 relationship where you would be at increased risk for
8 non-Hodgkin's lymphoma after a cutaneous melanoma?

9 **A.** That's what she says.

10 **Q.** And let's look at her tables to be precise
11 about it. In fact, what she finds in her tables is
12 that, if you've had cutaneous melanoma, you're at less
13 risk for diffuse large B-cell lymphoma.

14 Let's look at Table 3. Let's look at what
15 Table 3 is about first.

16 It says "Standardized incidence ratios for a
17 second primary lymphoid neoplasm incidence adjusted by
18 age, sex, latency, and stage among greater-than-one-year
19 Caucasian adult survivors for first primary cutaneous
20 melanoma," right?

21 **A.** Yes.

22 **Q.** And they're talking about what is your risk
23 for a second primary lymphoid neoplasm.

24 Do you see that?

25 **A.** I do.

1 Q. So what Dr. Morton is telling us, if you're 60
2 to 69, let's look at that category.

3 That would apply to Mr. Pilliod, right?

4 A. Yes, it would. Uh-huh.

5 Q. Okay. And you have a diffuse large B-cell.
6 Do you see that?

7 A. I do.

8 Q. So for people of his age who have a diffuse
9 large B-cell, they're at decreased risk of getting...

10 A. That's what that shows.

11 Q. Okay. And that was just 2018, right?

12 A. Yes.

13 Q. From a very well-respected person that you
14 coauthor articles with?

15 A. Yes.

16 Q. Okay. Let's look at the Song study.

17 Here we go. I'm going to hand you what we've
18 marked as Exhibit 3157.

19 A. Thank you.

20 Q. Are you familiar with this study --

21 **MR. MILLER:** First ask for permission to
22 publish.

23 **MR. ISMAIL:** No objection.

24 **THE COURT:** Granted.

25 ///

1 **BY MR. MILLER:**

2 **Q.** What these scientists do in this journal, they
3 write an article about the "Risk of a Second Primary
4 Cancer After a Nonmelanoma Skin Cancer in White Men and
5 Women: A Prospective Cohort," right?

6 **A.** Yes.

7 **Q.** So unlike the population-based studies, these
8 folks are now looking at a cohort study, right?

9 **A.** That's true.

10 **Q.** Yes, ma'am.

11 And to answer a question we had earlier, look
12 at the introduction section real quick, and then we'll
13 go to the heart of the matter. Down here at the bottom.
14 Just highlight that.

15 Nonmelanoma skin cancer is the most common
16 cancer in the United States, right?

17 **A.** Yes.

18 **Q.** It consists mainly of basal cell and squamous
19 cell. Its incidence has been rapidly increasing over
20 the past several decades with about 6,000 in 100,000 in
21 the year 2006, right?

22 **A.** That's what it says, yes.

23 **Q.** That sounds about right in your estimation; is
24 that fair?

25 **A.** I have no reason to disagree.

1 **Q.** Okay. If we can go to page 2, top left
2 corner, these scientists actually talk about those
3 population studies. We'll start with "Most previous
4 reports."

5 It says, "Most previous reports, however, were
6 based on cancer registry data without adjustment for
7 potential confounding lifestyle factors."

8 That's what population studies do, right?

9 **A.** Yes.

10 **Q.** Okay. "So the only cohort study was limited
11 by its sample size and lacked adequate power to assess
12 individual cancer sites. So we carried out a cohort
13 analysis to evaluate the association between personal
14 history of nonmelanoma skin cancer and subsequent
15 malignancy in the Nurses' Health Study and the
16 Professionals' Follow-up Study," right?

17 **A.** That's what it says.

18 **Q.** So they took that cohort database. And what
19 they did -- please turn to Table 3.

20 Risk of -- let's look at what this table is
21 about. "Risk of subsequent primary cancers at different
22 sites according to personal history of nonmelanoma skin
23 cancer in men and women," right?

24 **A.** That's what it says, yes.

25 **Q.** "Non-Hodgkin's lymphoma, our cancer of

1 interest, not statistically significant, 17 percent,"
2 right?

3 A. It is not statistically significant. That's
4 what it shows.

5 Q. You know, I'm going to show you in a bit
6 studies on the association between Roundup and
7 non-Hodgkin's lymphoma that show a doubling of the risk
8 for diffuse large B-cell.

9 You're aware of that, right?

10 MR. ISMAIL: Objection, Your Honor.

11 THE COURT: Sustained. Is that a question?

12 MR. MILLER: I'll rephrase.

13 BY MR. MILLER:

14 Q. Have you looked at the Chang and Delzell
15 study?

16 A. Yes, I have.

17 Q. And you understand that was funded by
18 Monsanto?

19 A. I'd have to look at it to be sure. Don't know
20 that off the top.

21 Q. Do you remember -- we'll look at it in a
22 minute -- that it has a statistically significant
23 doubling of the risk for people exposed to Roundup who
24 get diffuse large B-cell lymphoma?

25 A. I would need to look at that data to be able

1 to answer the question properly.

2 Q. All right. And just last point on this before
3 we move on.

4 If we can please turn to page 7. Page 7, "the
5 strengths of our study."

6 "The strengths of our study included a
7 prospective cohort design," right?

8 A. That's what it says.

9 Q. Okay. And they did a detailed analysis,
10 right?

11 A. That's what it says, yes.

12 MR. MILLER: If Your Honor wants to take an
13 afternoon break now, we can take it. I've got another
14 45 minutes or so.

15 THE COURT: It's a little too early for the
16 break. I think we probably need to go to 20 of the hour
17 or so. Another 30 minutes.

18 MR. MILLER: Good.

19 Anybody want to stretch or anything? Okay.

20 All right. Okay. Let's move on.

21 BY MR. MILLER:

22 Q. Just to be clear, before I leave the -- none
23 of the doctors say genital warts caused this
24 non-Hodgkin's lymphoma, right?

25 A. No. It's a risk factor like many others.

1 **Q.** And none of the doctors say that cold sores
2 cause non-Hodgkin's lymphoma, right?

3 **A.** I'm not sure what you mean by "none of the
4 doctors," but I don't think that cold sores cause
5 lymphoma, no.

6 **Q.** And you agree with the treaters that the cold
7 sores didn't cause the NHL. Maybe that's a better way
8 to say it. All right.

9 And I think we've been over this. I
10 apologize. I'm trying to finish up my notes. But we'd
11 agree that also colitis did not cause the development of
12 the diffuse large B-cell, right?

13 **A.** Right. Did not cause it but caused an
14 increased risk.

15 **Q.** Caused an increased risk as part of this
16 immune problem?

17 **A.** Yes.

18 **Q.** Okay. And just to be fair, though, there are
19 certain drugs, like TNF inhibitors, that sometimes
20 ulcerative colitis patients take, and they do cause
21 non-Hodgkin's lymphoma, right?

22 **A.** TNF inhibitors are drugs that are specific
23 suppressors of the immune system. They don't cause
24 lymphoma, but they are clearly associated with an
25 increased risk of lymphoma.

1 Q. And Al Pilliod did not ever take a TNF
2 inhibitor?

3 A. No, he didn't. You're right.

4 Q. Let's look at Exhibit 6002. Okay.

5 Are you a member of the InterLymph Consortium?

6 A. No, I'm not an official member at this point.

7 Q. Do you know what the InterLymph Consortium is?

8 A. Yes. It's a group of investigators around the
9 globe interested in lymphoma and doing studies on
10 lymphoma.

11 Q. You know Dr. Weisenburger is a member?

12 A. Yes, I do.

13 Q. He was one of the founders, I believe?

14 A. I don't really know that, but I think it may
15 be true.

16 Q. Well, let's look at this study from the
17 InterLymph Consortium, Exhibit 6002.

18 **MR. MILLER:** Permission to publish.

19 **MR. ISMAIL:** No objection.

20 **THE COURT:** Granted.

21 **BY MR. MILLER:**

22 Q. Have you reviewed this before, Doctor?

23 A. Yes, I have.

24 Q. And it's "Autoimmune Disorders and Risk of
25 non-Hodgkin's Lymphoma Subtypes," right?

1 A. Right.

2 Q. And this was published in 2008?

3 A. Correct.

4 Q. And let's go to Table 3. And what they look
5 at is personal history of selected autoimmune disorders
6 and pooled relative risk of non-Hodgkin's lymphoma,
7 right?

8 A. Yes, sir.

9 Q. And they look at ulcerative colitis, right?

10 A. They do.

11 Q. And for ulcerative colitis, they show a
12 2 percent increased risk, not statistically significant.

13 A. That is true.

14 Q. All right. Exhibit 6193. One more ulcerative
15 colitis study, and I promise we'll move on. Okay. I
16 apologize.

17 Thanks, Doctor. We'll keep this moving.
18 Exhibit 6493.

19 Do you know who Dr. Siegel is?

20 A. I don't know him.

21 **MR. MILLER:** Permission to publish.

22 **MR. ISMAIL:** No objection, Your Honor.

23 **THE COURT:** Granted.

24 **BY MR. MILLER:**

25 Q. What this doctor is looking at is a risk of

1 lymphoma in inflammatory bowel disease, right?

2 A. Yes.

3 Q. What he's published in 2009, a couple points I
4 wanted to ask you about here.

5 In the abstract, "A general message to convey
6 to patients is that there is likely an increased risk of
7 lymphoma associated with the treatment for inflammatory
8 bowel disease but that the substantial benefit of
9 therapies outweighs the very small risk incurred,"
10 right?

11 A. Yes, that's what it says.

12 Q. And you agree with that?

13 A. I agree that there is an increased risk of
14 lymphoma. And, depending on the patient, I can't really
15 say. It depends on the given patient. There certainly
16 will be patients in whom the risk of the lymphoma is
17 lesser a risk than the disease being experienced by this
18 patient with this inflammatory bowel disease.

19 In other words, these decisions are made on a
20 case-by-case basis. If the inflammatory bowel disease
21 is severe in causing real symptoms and problems to the
22 patient, yes, it's worth it to get it treated.

23 Q. Right. Let's see what he says on page 785.

24 This scientist tells us "Standardized
25 incidence ratios were calculated based upon the rates of

1 lymphoma in these populations compared to the expected
2 rates in the general Swedish population. For patients
3 with ulcerative colitis, there was no statistically
4 significant increased risk of lymphoma," right?

5 A. I see where it says that.

6 Q. I'm sorry. This is on page 785. Excuse me.

7 This scientist tells us, "For patients with
8 ulcerative colitis, there was no statistically
9 significant increased risk of lymphoma," right?

10 A. That's what it says, yes.

11 Q. Whether breaking down the analysis by
12 Hodgkin's disease or non-Hodgkin's lymphoma, right?

13 A. That's what it says.

14 Q. By inpatient or outpatient registries, right?

15 A. That's what it says, yes.

16 Q. And you yourself have not written on the
17 relationship between ulcerative colitis and
18 non-Hodgkin's lymphoma?

19 A. No, I haven't.

20 Q. Let's go to one more point in this paper, and
21 we'll move on.

22 Page 796, right side. "In summary, although
23 some studies examining the risk of lymphoma associated
24 with IBD have revealed subgroups that may be at risk" --
25 IBD is inflammatory bowel disease?

1 **A.** Yes, it is.

2 **Q.** -- "the vast majority of studies, including
3 those from large population-based cohorts, do not
4 confirm these findings." That's what he reports, right?

5 **A.** That's what he says.

6 **Q.** "Based upon the available data, it is likely
7 safe to assume that the baseline risk of lymphoma in
8 irritable bowel disease patients mirrors that of the
9 general population," right?

10 **A.** That's what it says, yes.

11 **Q.** And that's why, at the City of Hope website,
12 you don't list ulcerative colitis as a cause of
13 non-Hodgkin's lymphoma.

14 **A.** Well, I would never think that any of these
15 autoimmune diseases would cause lymphoma; they would be
16 risk factors.

17 **Q.** Okay. All right. Let's look at 3160.

18 This is on the issue of -- I think you said
19 something about corticosteroids increase the risk of
20 non-Hodgkin's lymphoma or something?

21 **A.** No. I said that corticosteroids suppress the
22 immune system. What they do is kill lymphocytes.

23 **Q.** All right. I don't need to show you, then, if
24 we can agree that corticosteroids do not cause
25 non-Hodgkin's lymphoma?

1 A. No, they don't.

2 Q. Okay.

3 A. They cause immune deficiency.

4 Q. Okay. Now, since you've been retained as an
5 expert by Monsanto, have you taken any steps to -- well,
6 let me back up.

7 You're now aware that, A, Roundup is a
8 pesticide, right?

9 A. Say that again.

10 Q. Roundup is a pesticide, right?

11 A. Yes.

12 Q. And I think you told us -- correct me if I'm
13 wrong -- you're aware that it's the number one pesticide
14 in America?

15 A. I know it's used very commonly. It may be the
16 number one or right up there.

17 Q. Okay. So my question is have you -- you've
18 told us you feel pretty strongly Roundup does not cause
19 non-Hodgkin's lymphoma.

20 Have you taken any steps to see that that
21 information is conveyed on the website at City of Hope,
22 which now says pesticides can cause non-Hodgkin's
23 lymphoma?

24 **MR. ISMAIL:** Objection, Your Honor.

25 **THE COURT:** I understood the question.

1 Overruled. She can answer if she knows.

2 **THE WITNESS:** I think the website is correct.
3 Pesticides can cause. On the other hand -- repeat your
4 question again. Now I'm forgetting what it was.

5 **BY MR. MILLER:**

6 **Q.** I'm sorry.

7 **A.** Now I'm forgetting what you were asking. Tell
8 me what your question was. Would you repeat it.

9 **Q.** Have you done anything to say, "Hey, get that
10 off the website"?

11 **A.** Oh, yeah, yeah. That's it.

12 No, I have not. And I could go on for a
13 thousand pages on all of the things that don't cause
14 lymphoma. That would not be an appropriate thing to put
15 on a statement of that sort.

16 **Q.** Exhibit 3135, if I could.

17 Look at this, if you could, Exhibit 3135.

18 **A.** Thank you.

19 **Q.** All right.

20 **MR. MILLER:** Permission to publish.

21 **MR. ISMAIL:** Objection, Your Honor. We
22 object.

23 **THE COURT:** You object?

24 **MR. ISMAIL:** Yes.

25 **MR. MILLER:** I'll pull it down.

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THE COURT: Pull it down.

(Sidebar discussion not reported.)

BY MR. MILLER:

Q. We're not going to publish it; we're going to talk about it. Okay?

A. What are we -- I'm sorry.

Q. We're going to talk about the first invoice -- or is this the first invoice you sent to Monsanto for your work on Al Pilliod's case?

A. It's the only invoice I've sent to date.

Q. And the invoice covered from Christmas Day, right --

A. Yes.

Q. -- of 2018 through February 10th of 2019, right?

A. That's what it says, correct.

Q. And we know that you wrote your report in late January, right?

A. Yes.

Q. Okay. And what you do, you get paid by the hour. So you tell them how many hours you spent here and how many hours you spent there, right?

A. Yes.

Q. You told us there were thousands of pages of medical records, right?

1 **A.** Yes.

2 **Q.** Tell the ladies and gentlemen how many hours
3 you spent reviewing the medical records before you wrote
4 this report.

5 **A.** 17 1/2 hours.

6 **Q.** It says, "Review medical records, 7.5."

7 **A.** I'm sorry. I'm sorry. "Review medical
8 records, 7.5 hours." Sorry.

9 **Q.** So you spent 7.5 hours reviewing the medical
10 records --

11 **A.** Yes.

12 **Q.** -- thousands of pages?

13 **A.** Yes.

14 **Q.** And then wrote a report that Roundup was not
15 implicated in any way, shape, or form, right?

16 **A.** The medical records have nothing to do with
17 the -- I don't understand your question. Please repeat
18 it.

19 **Q.** I just wanted to know the amount of time and
20 energy you put into this before you wrote a report to
21 say my client -- his problem is not related to Roundup.
22 You spent seven and a half hours reviewing medical
23 records, right?

24 **A.** I spent seven and a half hours reviewing those
25 records. And many, many, many hundreds of pages were

1 related to nursing notes, vital signs, and so forth.
2 It's easy to go through those.

3 Q. You spent 17 1/2 hours collecting and
4 reviewing pertinent literature?

5 A. Yes.

6 Q. All right. You spent 13 1/2 hours reviewing
7 expert reports, right?

8 A. Yes.

9 Q. You spent 16 1/2 hours preparing and editing
10 your report?

11 A. That's what it says, yes.

12 Q. Six and a half hours in conference calls and
13 meetings with lawyers?

14 A. Yes.

15 Q. 61 1/2 hours total by February 10?

16 A. Correct.

17 Q. \$30,000 and 750, right?

18 A. That's what it says, right.

19 Q. How many more hours have you put in since
20 then?

21 A. I really have not counted them. I've not done
22 this kind of analysis yet.

23 Q. We asked you for a new invoice at your
24 deposition?

25 A. You didn't.

1 Q. We did not?

2 A. Did you ask me?

3 Q. This young man sitting right here, Curtis
4 Hoke, did he ask you for an updated invoice?

5 A. I don't recall that he did.

6 Q. Okay. Have you finished invoicing for the
7 other matter that you're handling for Monsanto?

8 A. Yes.

9 Q. What's your total bill there?

10 A. It was about \$80,000.

11 Q. So no reason to believe your total bill here
12 is going to be any less than 80,000?

13 A. I don't know.

14 Q. Might be more?

15 A. I don't know.

16 Q. Okay. Now, you agree that hay fever and food
17 allergies decrease the risk of non-Hodgkin's lymphoma,
18 right?

19 A. The data show that.

20 Q. And you put that in your other report, right?

21 **MR. ISMAIL:** Objection, Your Honor.

22 **THE COURT:** Approach did you say, Counsel?

23 **MR. ISMAIL:** I said objection to the question.
24 I objected to the question.

25 **THE COURT:** I know. Basis?

1 **MR. ISMAIL:** Conversation we had at sidebar.

2 **THE COURT:** So I think Mr. Miller has his
3 direction as to what he can do. Clarify all of that.

4 **BY MR. MILLER:**

5 **Q.** You put that in a report not involving
6 Mr. Pilliod, right?

7 **A.** I can review it. I don't totally recall that,
8 but I may have.

9 **Q.** At some point, the Court will take a break,
10 and here's what I'm going to ask you. First, Al Pilliod
11 had a food allergy. Are you aware of that?

12 **A.** I'm not aware of what it was.

13 **Q.** Okay. Would there be some reason why you put
14 that in a report not involving Mr. Pilliod, that food
15 allergies decrease the risk of non-Hodgkin's lymphoma
16 and not put it in Mr. Pilliod's report?

17 **A.** I assume I forgot other things as well.
18 There's no particular reason in any sense.

19 **Q.** You sort of used the same computer program for
20 both reports?

21 **A.** I use the same computer. I don't have a
22 program for these reports.

23 **Q.** I guess "program" is the wrong word. But, I
24 mean, there's a lot of similarity between the two
25 reports, that's --

1 A. There's some similarity.

2 Q. Okay. Well, now, have you heard of Aaron
3 Blair?

4 A. I've heard of Aaron Blair.

5 Q. You understand he's an epidemiologist?

6 A. That's what I understand.

7 Q. And you understand he was the chairman of the
8 IARC? Are you aware of that?

9 A. I am.

10 Q. Was he also involved as an author in the
11 Agricultural Health Study?

12 A. I believe he was, yes.

13 Q. Did you read Aaron Blair's sworn deposition in
14 this case?

15 A. I believe I did, yeah.

16 Q. Okay. Then you know that he believes Roundup
17 is a probable human carcinogen?

18 **MR. ISMAIL:** Objection, Your Honor.

19 **THE COURT:** If she knows. You can lay a
20 foundation as to whether she does or does not know.

21 **BY MR. MILLER:**

22 Q. You've told us that you've read his
23 deposition?

24 A. Yes.

25 Q. Okay. And you're aware, then, that he says

1 Roundup is a probable human carcinogen?

2 A. Yes. And, as chairman of IARC, I would expect
3 that he would say that.

4 Q. Sure. You disagree?

5 A. I do disagree.

6 Q. I'm ready to look at Exhibit 2107. And I
7 promise to make this quick because we've looked at it a
8 few times here in this courtroom. But this is a
9 meta-analysis performed by Drs. Chang and Delzell at the
10 request of Monsanto.

11 A. Do not know.

12 MR. MILLER: Permission to publish.

13 MR. ISMAIL: No objection, Your Honor.

14 BY MR. MILLER:

15 Q. You reviewed this, right?

16 A. Yes.

17 Q. And you know that this was prepared at the
18 request of Monsanto?

19 A. Actually, I did not. But I have no reason to
20 doubt you.

21 Q. Right. Okay.

22 So this is a meta-analysis -- well, let's be
23 precise.

24 It is a systematic review and meta-analysis of
25 glyphosate exposure and the risk of lympho and

1 hemopoietic cancers, right?

2 A. Yes.

3 Q. And lympho and hemopoietic cancers include
4 non-Hodgkin's lymphoma?

5 A. Yes.

6 Q. And they include diffuse large B-cell
7 lymphoma?

8 A. Yes.

9 Q. Which, of course, we all know is what Al had,
10 right?

11 A. Correct.

12 Q. So let's go then together to page 12, bottom
13 right. The meta relative risk for the association
14 between any use of glyphosate.

15 When we say "any use," that means just a
16 little bit or a lot, right?

17 A. Yes.

18 Q. And the risk of B-cell lymphoma based on two
19 studies was 2.0, according to random effects and
20 fixed-model estimates. That's what they report here,
21 right?

22 A. That's what they say.

23 Q. The results are the same as reported by
24 Schinasi and Leon, right?

25 A. That's what they say.

1 **Q.** Did you ever speak to Dr. Chang or Dr. Delzell
2 about this case?

3 **A.** No.

4 **Q.** All right.

5 One more study. Okay. Here we go.

6 Exhibit 2006. Thanks for your patience, Doctor.

7 **A.** Thank you.

8 **Q.** Thanks very much.

9 **MR. MILLER:** Permission to publish?

10 **MR. ISMAIL:** No objection, Your Honor.

11 **MR. MILLER:** All right.

12 **THE COURT:** Granted.

13 **MR. MILLER:** Might be break time? All right.

14 **BY MR. MILLER:**

15 **Q.** We've seen it before. Let's look at it again,
16 Doctor, with you, and then probably take a break.

17 What these folks are doing in this
18 peer-reviewed journal, Dr. Schinasi and Dr. Leon, and
19 they're looking at non-Hodgkin's lymphoma and
20 occupational exposure to agricultural pesticide, a
21 systematic review and a meta-analysis, right?

22 **A.** Yes.

23 **Q.** And this was published in 2014. To put it in
24 context, the year before IARC, right?

25 **A.** Correct.

1 **Q.** Okay. And just to look real quick at the
2 abstract, the first sentence, "This paper describes
3 results from a systematic review and a series of
4 meta-analyses of nearly three decades worth of
5 epidemiologic research on the relationship between
6 non-Hodgkin's lymphoma and occupational exposure to
7 agricultural pesticide ingredients and chemical groups,"
8 right?

9 **A.** That's what it says, yes.

10 **Q.** That's what they're studying, right?

11 **A.** Yes.

12 **Q.** And they go on down a couple sentences. "In a
13 handful of papers, associations between pesticides and
14 NHL subtypes were reported, B-cell lymphoma -- in a
15 handful of papers, associations between pesticides and
16 non-Hodgkin's lymphoma subtypes were reported. B-cell
17 lymphoma was positively associated with phenoxy
18 herbicides and the organophosphorous herbicide
19 glyphosate," right?

20 **A.** No, it doesn't really say that. It says that
21 NHL subtypes were reported. "B-Cell lymphoma was
22 positively associated with phenoxy herbicides and the
23 organophosphorous herbicide glyphosate." It doesn't say
24 that diffuse large B-cell.

25 **Q.** Okay. Take a look back here. Diffuse large

1 B-cell is a form of B-cell lymphoma, right?

2 A. Yes, it's within that category, but the
3 category of B-cell lymphoma is very heterogeneous. It's
4 not one entity; it's many.

5 Q. Let's go to page 64.

6 "The strongest meta RR," relative risk
7 estimates.

8 Blow that up.

9 "The strongest meta relative risk estimates
10 were associated with subtypes of non-Hodgkin's lymphoma.
11 There was a positive association between exposure to
12 organophosphorous herbicide glyphosate and B-cell
13 lymphoma," right?

14 A. That's what it says there, yes.

15 Q. And then, to be precise, it goes down to
16 diffuse large B-cell, right?

17 MR. ISMAIL: Objection, Your Honor.

18 THE COURT: Hold on one second. Don't answer
19 the question once there's an objection.

20 The objection is?

21 MR. ISMAIL: So if the question --

22 MR. MILLER: I'll withdraw that question.

23 Yeah. Fair enough.

24 BY MR. MILLER:

25 Q. So "the strongest relative risk estimates were

1 associated with subtypes of non-Hodgkin's lymphoma.
2 There was a positive association between exposure to
3 organophosphorous herbicide glyphosate and B-cell
4 lymphoma." There was a doubling of risk. It was
5 statistically significant, right?

6 **A.** That's what it says, yes.

7 **Q.** Thank you. All right.

8 **MR. MILLER:** Your Honor, you want to take that
9 break now?

10 **THE COURT:** Yes, I do.

11 **MR. MILLER:** You look like you're ready for a
12 break.

13 **THE COURT:** I think a 15-minute break. We'll
14 start at five of the hour.

15 (Recess taken from 2:41 p.m. to 2:58 p.m.)

16 **THE COURT:** You may proceed.

17 **MR. MILLER:** Thank you, Your Honor.

18 **BY MR. MILLER:**

19 **Q.** Doctor, I want to go to the chart work that
20 you did with counsel on population-based increases in
21 non-Hodgkin's. You remember that general line of
22 questioning?

23 **A.** Yes, I do.

24 **Q.** Okay. I'm going to show you that exhibit.
25 I've attached that information to it.

1 I have one for counsel as well.

2 If we can put that up on the screen.

3 **MR. MILLER:** Permission to publish?

4 **MR. ISMAIL:** What's the number?

5 **MR. MILLER:** This was published by the
6 defendants, Your Honor.

7 **MR. ISMAIL:** Well, no objection to the first
8 page. I don't know what the rest of it is.

9 **MR. MILLER:** Well, I intend to publish the
10 front page created by the defendant and the second page
11 that we just created.

12 **THE COURT:** Do you have any objection?
13 Clearly, the first page is -- I guess if he lays
14 foundation.

15 Why don't we just wait and see if he lays a
16 foundation. If you have an objection after that.

17 **MR. ISMAIL:** Thank you, Your Honor.

18 **BY MR. MILLER:**

19 **Q.** This first page is what you showed the jury,
20 right?

21 **A.** Yes.

22 **Q.** And, as we look on the scale on the side, the
23 right side, you list 0 to 100.

24 Now, what does that mean?

25 **A.** That was basically kilograms, amount of

1 glyphosate used, based upon data from the EPA.

2 Q. All right. And then, on the left side, what
3 are those numbers?

4 A. Those are the new non-Hodgkin's lymphoma cases
5 in the United States per 100,000. And, again, that's
6 the way the NIH provides data and looks at data of that
7 sort.

8 MR. ISMAIL: They've cut off the exhibit, Your
9 Honor.

10 THE COURT: Why don't we just hold on one
11 second.

12 BY MR. MILLER:

13 Q. I think this is the one that you showed
14 through defense, right?

15 A. I can't tell.

16 Q. The question is, just wanted you to confirm
17 that this is the one that Monsanto's lawyer and you
18 talked about in the direct examination.

19 A. On the screen -- yes. It's not what I have
20 printed here.

21 Q. Yes, ma'am.

22 And so, to be clear, the pounds per acres on
23 the left side, right?

24 A. Okay.

25 Q. And the right side represents, per 100,000

1 persons, the incidence rate of non-Hodgkin's lymphoma,
2 right?

3 A. Yes. Forgive me, because what was given to me
4 did not have either of those edges of the slide.

5 Q. That's why I'm glad we switched to the other
6 one. I wanted to make sure we had that. And I wasn't
7 trying to trick you; I was just trying to get oriented.

8 So pounds is on the left side and incidence of
9 non-Hodgkin's lymphoma is from 0 to 100 on the right
10 side, right?

11 A. Right. 100,000 persons.

12 Q. So look at the one we created that is page 3.
13 And you'll see, ma'am, all we did was change the per
14 100,000 persons, instead of going from 0 to 100, we have
15 it go from 10 to 22.

16 Do you see that?

17 A. Yes, I do.

18 Q. Okay.

19 MR. MILLER: Permission to publish, Your
20 Honor?

21 MR. ISMAIL: Well, Your Honor -- you know
22 what? It's fine.

23 BY MR. MILLER:

24 Q. When you change --

25 THE COURT: Okay.

1 **MR. ISMAIL:** No objection --

2 **THE COURT:** Okay. No objection.

3 **MR. ISMAIL:** -- is the response I should have
4 said.

5 **THE COURT:** That's fine. Okay.

6 Permission to publish.

7 **BY MR. MILLER:**

8 **Q.** So everybody knows, all we did here was change
9 from 0 to 100 for the incidence rate for non-Hodgkin's
10 lymphoma, and we changed it to 10 to 22.

11 Do you see that?

12 **A.** I do.

13 **Q.** So what it shows -- some colored pens here --
14 oh, it's in color.

15 New cases of non-Hodgkin's lymphoma go up --
16 when you do 10 to 22, go up dramatically until 1990, and
17 they keep going up until about 2005, right?

18 **A.** Yes.

19 **Q.** And the use of glyphosate is in blue, isn't
20 it?

21 **A.** On this slide, yes, it is.

22 **Q.** All right. And so, in 2005, what we have --
23 by then we have the new drugs for AIDS, right?

24 **A.** We do.

25 **Q.** And so that reduces the risk in non-Hodgkin's

1 lymphoma, right?

2 A. It does.

3 Q. Okay. So this would explain -- part of the
4 dramatic increase could be explained by AIDS, but
5 there's something else going on to keep the risk of
6 non-Hodgkin's lymphoma going up and up until, I think it
7 says, 2005, right?

8 A. Yes.

9 Q. And then it plateaus off effectively. It
10 hovers around -- and it's at a rate of around 20, right?

11 A. That's true. The new drugs were licensed for
12 the first time in 1996, and a few people were taking
13 them at that point. More and more people were taking
14 them over time, and the incidence of lymphoma going down
15 over time in that group.

16 Q. Okay. We're happy to report there are less
17 non-Hodgkin's lymphoma cases with the AIDS people
18 because of these new drugs, right?

19 A. Right.

20 Q. All right. Let's move on to spousal
21 concordance.

22 And you showed the jury a -- there's another
23 blowup I want to talk to you about for a second.

24 Here it is. Okay.

25 All right. You said large studies, and they

1 show no spousal concordance. And I think we all know
2 that spousal concordance is risk of one spouse getting
3 it if the other spouse has it. Generally, that's the
4 topic, right?

5 A. It means the risk of one spouse getting the
6 same disease as the second spouse.

7 Q. All right. And you and I agree that Roundup
8 came on the market in '75?

9 A. I thought it was '74. '75 is fine.

10 Q. Yeah, I think it was commercially available in
11 '75. I'm not going to argue with you.

12 A. Okay.

13 Q. I want to let the jury know when they started
14 looking at the data. Was it before Roundup was on the
15 market, or was it after Roundup was on the market?

16 A. Some of these studies are clearly before
17 Roundup was on the market.

18 Q. Let's be more precise, if we can. Wallach
19 studied people at a Jewish hospital from 1960 to 1992.

20 Can we agree on that?

21 A. Could I see the paper before I could
22 absolutely confirm that?

23 Q. That's the paper you were referring to in your
24 PowerPoint, right?

25 A. Yes.

1 Q. Okay. So this paper, we started looking in
2 1960, right?

3 A. That is correct.

4 Q. Okay. And you and I agree that's 15 years
5 before Roundup was on the market, right?

6 A. Yes.

7 Q. Okay. The Hemminki paper, do you remember
8 what year they started looking at it?

9 A. No, I don't remember offhand.

10 Q. Will you accept my representation '58, or do
11 you want to see the paper?

12 A. I will agree.

13 Q. Okay. 1958.

14 I'm terrible with math, but that's 17 years
15 before Roundup got on the market?

16 A. Well before Roundup was on the market, you're
17 right.

18 Q. And the Weires paper -- all right. I want to
19 make sure I get this right.

20 The Weires paper, they started looking at
21 people -- hang on. Oh, yeah -- 1958 as well, right? Or
22 do you want to look at the paper?

23 A. 1958 through what?

24 Q. Point well taken.

25 From '58 to 2006.

1 A. Right. So some were prior to and some were
2 after the availability of Roundup.

3 Q. Start date, we agree, 1958, right?

4 A. Fine. Uh-huh.

5 Q. But even the Weires paper said, even starting
6 in '58, they're starting to see a novel cluster of
7 non-Hodgkin's lymphoma.

8 Do you remember them saying that?

9 A. They may have been. There was no increased
10 risk statistically among those spouses.

11 Q. Right. The good news for us is there was a
12 study done right here in Berkeley, California, of
13 concordance among spouses that started after Roundup was
14 on the market. You're aware of that, aren't you?

15 A. Which study did you mean?

16 **MR. ISMAIL:** Objection, Your Honor. Lacks
17 foundation.

18 **THE COURT:** Well, if you can lay the
19 foundation, that's fine.

20 **MR. MILLER:** All right, Your Honor.

21 **BY MR. MILLER:**

22 Q. Have you heard of the Freeman study?

23 A. You'll have to show it to me. I don't
24 remember off the top.

25 Q. Okay.

1 Here's a copy of the Friedman study. And it's
2 Exhibit 2335.

3 **A.** Thank you.

4 **Q.** Yes, ma'am.

5 Did you review this?

6 **A.** Yes.

7 **Q.** In fact, we showed it to you at your
8 deposition, right?

9 **A.** I believe so, although I'm not sure.

10 **Q.** And, now agree with me, it was done here in
11 Berkeley, California?

12 **A.** Yes, it is. Oakland, California, actually.

13 **Q.** Oakland. Excuse me. That's right.

14 Published to the American Cancer Society?

15 **A.** Published in a journal called "Cancer," which
16 is published by the American Cancer Society. Yes,
17 you're right.

18 **Q.** And that's a peer-reviewed journal?

19 **A.** Yes, it is.

20 **Q.** By Dr. Friedman?

21 **A.** Yes.

22 **Q.** And a Dr. Queensberry, right?

23 **A.** Right.

24 **Q.** At the Division of Research, Kaiser Permanente
25 Medical Care, right?

1 **A.** Yes.

2 **Q.** Okay. And let's look at it for a second.

3 First let's go to the heart of the matter and
4 come back and look.

5 What they did, they followed -- I'm on page
6 2414.

7 They followed 25,000 married couples who were
8 in the membership database as of June each year starting
9 in 1976, right?

10 **A.** Correct.

11 **Q.** Right after Roundup came on the market, right?

12 **A.** Correct.

13 **Q.** Okay.

14 **MR. ISMAIL:** Your Honor, for optional
15 completeness, counsel is skipping the first part of the
16 method section, "subjects were selected."

17 **MR. MILLER:** Speaking objection, and we'll be
18 happy to get to it.

19 **THE COURT:** So just state the objection. If
20 you need a sidebar, we can do that.

21 **MR. ISMAIL:** Under optional completeness,
22 reading the first part of the method section, which
23 references the subjects.

24 **THE COURT:** Okay. That's not an objection.
25 But if you want to read it, go ahead;

1 otherwise, we'll do a sidebar.

2 MR. MILLER: I'll be more than happy to.

3 MR. ISMAIL: Thank you.

4 MR. MILLER: Sure.

5 BY MR. MILLER:

6 Q. Let's put it up on the ELMO. And we'll make
7 sure to explain it all.

8 If we could put up 2535. Let's go back to the
9 front page.

10 And then, like most papers, it has a method
11 section, right?

12 A. Yes.

13 Q. And it says "The authors identified 25,670
14 cancer-free married couples in Northern California,"
15 right?

16 A. Yes.

17 Q. And what they did, they followed them from
18 1976. But what counsel wants me to point out to you,
19 and I will, "subjects were selected from among persons
20 who had received multiphasic health checkups between '64
21 and '72."

22 Do you see that on top?

23 A. Yes, I do.

24 Q. "Because the extensive data collected during
25 the checkup would permit investigation" --

1 Do we have that? It's on page 2. Let's go to
2 page 2. All right. There we are.

3 -- "would permit investigation of the reasons
4 for spousal aggregation of cancer if they were present.
5 Of the 175,000 persons who received at least one checkup
6 during an eight-year period, 175,000 were identified as
7 being free of cancer" -- right? -- "except for
8 nonmelanoma skin cancer" -- right?

9 **A.** Yes.

10 **Q.** -- "at the time of the first checkup using
11 cancer occurrence data described below. Follow-up was
12 considered ended if a person either left the program or
13 died of another cancer," right?

14 **A.** Yes.

15 **Q.** "The study was narrowed down to 25,600 married
16 couples, who were identified as follows: For persons
17 who were in the membership database, which consists of a
18 list of subscribers as of each June for a year of" --
19 starting when? When did they start?

20 **A.** 1976, it says.

21 **Q.** Right. And they followed them for 31 years
22 after that, right?

23 I'll show you.

24 Let's go down to about -- four sentences down,
25 "Follow-up ended when a subject developed cancer or when

1 a subject was no longer in our membership database or on
2 November 30th, 1995, whichever first occurred."

3 A. Okay. It says that.

4 Q. So they started following them in '76, and
5 they followed them right through 1995, right?

6 A. That's what it says.

7 Q. Let's continue. Let's go back to the first
8 page.

9 Let's go to the first sentence. Keep going.

10 "Cancer is known to have many environmental
11 causes."

12 That's true, isn't it?

13 A. Yes.

14 Q. Okay. "Because married couples share at least
15 their home environment, usually for many years, the
16 study of spousal aggregation of cancer might provide
17 clues to unsuspected etiologic factors."

18 That's true, isn't it?

19 A. It says that, yes.

20 Q. Sure. And how many years did Al and Alberta
21 Pilliod share a home?

22 A. Many years. I don't recall when they were
23 actually married.

24 Q. A long time?

25 A. A long time.

1 **Q.** Okay. Let's look at what they find.

2 Table 1, if we could, please.

3 In this only marital concordance study done
4 after Roundup was on the market, they show, quote, an
5 association of cancer occurrence within married couples,
6 right?

7 **A.** Yes.

8 **Q.** And let's go down and look at what they find
9 for non-Hodgkin's lymphoma.

10 Non-Hodgkin's lymphoma. All right? That's
11 what we're dealing with here, isn't it, non-Hodgkin's
12 lymphoma?

13 **A.** Well, we're dealing with a very specific
14 entity within that. We're dealing with diffuse large
15 B-cell lymphoma. There are at least 60 different kinds
16 of lymphoma.

17 **Q.** This will be the easiest question I ask all
18 day. Did Al Pilliod have non-Hodgkin's lymphoma?

19 **A.** Yes, he did.

20 **Q.** Did Alberta Pilliod get non-Hodgkin's lymphoma
21 four years later?

22 **A.** Yes, she did.

23 **Q.** Okay. Non-Hodgkin's lymphoma, they find a
24 relative risk of 2.78, right, Doctor?

25 **A.** That's what it says, yes.

1 **Q.** Statistically significant, right, Doctor?

2 **A.** Yes.

3 **Q.** It's almost tripling of the risk, isn't it?

4 **A.** That's what they show.

5 **Q.** All right. And, in fact, they point out that
6 "one of the couples with non-Hodgkin's lymphoma had
7 lived in Mexico for many years" --

8 If we could pull that out. Thank you.

9 -- "for many years, and both husband and wife
10 were said to have been exposed there to pesticides, a
11 suspected cause of lymphoma."

12 Do you see that?

13 **A.** I do.

14 **Q.** Okay. So of all the cancers they looked at,
15 they only found concordance in four types, right?

16 **A.** Well, they found concordance in follicular
17 lymphoma in the couple that you just described.

18 Is that what you mean?

19 **Q.** Well, I'll go to -- if we could, to page 2416.

20 In the discussion section, second paragraph,
21 "For all cancers combined, there was no evidence of
22 spousal concordance. The only cancer sites which
23 statistically significant concordance was noted were the
24 tongue" -- right?

25 **A.** Yes.

1 Q. -- "stomach and non-Hodgkin's lymphoma,"
2 right?

3 A. That's what they say, right.

4 Q. And that makes sense because, if they both
5 smoke, they could both get tongue cancer, right?

6 A. It's conceivable. Sure.

7 Q. Sure. All right. Okay.

8 Well, how come the Friedman study didn't get
9 on your blowup -- we could go back to the ELMO -- of
10 marital concordance studies?

11 A. Simply because these people did not have the
12 same disease that Mr. Pilliod did. Lymphoma is not one
13 disease; it's at least 60 different diseases.

14 Q. Gotcha. Two more.

15 I'm going to do this real quick because the
16 jury will start throwing stuff at me if I don't. But
17 the Zhang study. All right? Just last topic.

18 Exhibit 2333, you've read it, right?

19 A. I did.

20 Q. It came out in February, right?

21 A. Yes.

22 Q. And you told us that what the EPA did was
23 important to you. Remember that general conversation?

24 A. Yes.

25 Q. You know that -- I'll hand you a copy of it,

1 2333. Here you go.

2 A. Thank you.

3 Q. Yes, ma'am.

4 The jury could probably tell us all three
5 authors right now, but I need to go over it anyway.

6 These three authors were on the scientific
7 advisory panel for the issue of Roundup and
8 non-Hodgkin's lymphoma, weren't they?

9 A. Yes.

10 Q. Okay. And after they were on that panel, they
11 wrote a really long report. It looks like it's over
12 50-some, 60-some pages, right?

13 A. Yes.

14 Q. Peer-reviewed?

15 A. Yes.

16 Q. Okay. And it was published in February 2019.

17 Again, one of the scientists -- that's where I
18 got Oakland and Berkeley mixed up. Right here in
19 Berkeley, right?

20 A. Yes.

21 Q. Right down the road.

22 And what they say -- just to cut to the chase,
23 if we could go to page 3. All right. "We documented."
24 If we could start there.

25 "We documented further support from the

1 studies of malignant lymphoma incidence in mice treated
2 with pure glyphosate as well as potential links between
3 glyphosate-based exposure and immunosuppression," right?

4 A. That's what it says. I disagree.

5 Q. They saw a potential link between
6 glyphosate-based formulas and the cause of
7 immunosuppression in some.

8 That's what they report.

9 A. They did. I disagree.

10 Q. I know you do.

11 And they report genetic alterations that are
12 commonly associated with non-Hodgkin's lymphoma, right?

13 A. That's what they say, but I disagree.

14 Q. I know you do. Okay. All right.

15 "Overall, in accordance with evidence from
16 experimental animal and mechanistic studies" -- and
17 again, just to remind ourselves, you didn't look at the
18 animal or mechanistic studies before you wrote your
19 report in this case, right?

20 A. I have reviewed them carefully at this point.

21 Q. At this point, right.

22 A. Yes.

23 Q. Okay.

24 A. And to some extent when I wrote the paper. I
25 had more months. I read it more, read it over. But I

1 read them before.

2 Q. What these scientists who were on the SAP and
3 attacked by the EPA for that and gone on to do their own
4 study say, "Overall, in accordance with the evidence
5 from experimental animal and mechanistic studies, our
6 current meta-analysis of human epidemiologic studies
7 suggest" what?

8 A. Do you want me to read it?

9 Q. Please.

10 A. "Suggest a compelling link between exposure to
11 GBHs and increased risk for NHL." That's what it says.

12 Q. And you and I can agree that they spent a lot
13 more time looking at this issue than you have.

14 MR. ISMAIL: Objection, Your Honor.

15 THE COURT: Argumentative, Counsel.

16 BY MR. MILLER:

17 Q. Let's look at a couple more points here, and
18 we'll move on. All right.

19 Let's go to page 32 on the bottom right.

20 On that page, these scientists, who studied
21 this issue, say -- regarding immunosuppression, right?
22 They talk about immunosuppression. "Strongest factors
23 known to increase non-Hodgkin's lymphoma are congenital
24 and acquired states of immunosuppression. Several
25 studies suggest that glyphosate alters the gut

1 microbiome, cytokine IFN- γ and IL-2 production."

2 These changes could impact the what?

3 **A.** It says, "These changes could impact the
4 immune system, promote chronic inflammation, and
5 contribute to susceptibility of invading pathogens, such
6 as *H. pylori*."

7 **Q.** So page 34. Almost done. The last sentence
8 these authors say, quote, the overall evidence.

9 Do you see that?

10 **A.** I do.

11 **Q.** "The overall evidence from human, animal, and
12 mechanistic studies presented here supports a compelling
13 link between exposures to glyphosate-based herbicides
14 and increased risk for non-Hodgkin's lymphoma."

15 You disagree with them?

16 **A.** Yes, I do. I certainly know that they said
17 that, but I do disagree.

18 **Q.** Okay. Okay. All right.

19 Well, so I don't know if you looked at the
20 Leon study that came out since we started this trial.

21 **A.** Yes.

22 **Q.** Can we agree, without pulling the study out,
23 that, in fact, it shows a statistical increased risk of
24 non-Hodgkin's lymphoma for diffuse large B-cell
25 lymphoma?

1 **A.** No, I think we should look at it.

2 **Q.** All right. Let's look at it. Here we go.

3 All right. All right. Here we go. Exhibit 294.

4 **A.** Thank you.

5 **Q.** Yes, ma'am.

6 You reviewed it, right?

7 **A.** Yes, I did.

8 **Q.** Let's take a look at it real quick, then. We
9 don't need -- we know what it's about. Let's go to
10 Table 2.

11 This is a table where they talk about ever
12 use. Just ever use, not 1400 times, but ever using any
13 one of these 14 pesticides. And they tell you what they
14 found. If you go down to glyphosate, right?

15 **A.** Yes.

16 **Q.** For glyphosate, ever used it, 36 percent
17 increased risk, right?

18 **A.** That's what it says, but I don't agree with
19 the methodology that led to that statement.

20 **Q.** All right. You can agree that this is a
21 peer-reviewed paper, right?

22 **A.** Yes, it is.

23 **Q.** By one, two, three, four -- 17 scientists?

24 **A.** Yes.

25 **Q.** Who are all published in the area of pesticide

1 and its causes on non-Hodgkin's lymphoma?

2 A. I disagree that we actually know who was
3 exposed to glyphosate and who was not exposed.

4 Q. I'm sorry. I didn't hear you.

5 A. I disagree based on the fact that we don't --
6 you said we agree that we know the people exposed to
7 glyphosate and this is what the outcome was, and I don't
8 agree that we know who was actually exposed to
9 glyphosate.

10 Q. All right. Have you looked at the Lamure
11 paper that came out while Dr. Nabhan was here visiting
12 us?

13 A. Which one? I'm sorry.

14 Q. Lamure study. It's Exhibit 3104.

15 Just real quick. While Dr. Nabhan -- the same
16 scientists, some of them who were on this last paper --
17 at least Dr. Baldi, published in JAMA.

18 That's a good journal, right?

19 A. Yes, it is.

20 Q. It's is Journal of the American Medical
21 Association?

22 A. Yes.

23 Q. All right. And let me get you a copy, and
24 just a few questions, and we'll wrap up. Exhibit 3104.

25 A. Thank you.

1 **Q.** All right.

2 **MR. MILLER:** Permission to publish. It's been
3 previously published.

4 **THE COURT:** This has been previously
5 published?

6 **MR. MILLER:** Yes, it has.

7 **THE COURT:** What hasn't?

8 **MR. MILLER:** Right?

9 **THE COURT:** I'm sorry.

10 **BY MR. MILLER:**

11 **Q.** All right. This paper, published April of
12 '19, Journal of American Medicine. Have you reviewed it
13 before?

14 **A.** Yes, I have.

15 **Q.** What it tells us is -- this is kind of a segue
16 into damages, but I want to ask you about this first.

17 It says, "Professional use of pesticides is a
18 risk factor for non-Hodgkin's lymphoma."

19 **A.** That's what it says.

20 **Q.** It's true, isn't it?

21 **A.** Some of them, yes.

22 **Q.** Yeah. And one of the professions it talks
23 about is gardening.

24 Are you aware of that?

25 **A.** Yes.

1 **Q.** The heart of what they're really studying here
2 in this paper that came out two weeks ago is whether
3 people who get non-Hodgkin's lymphoma from exposure to
4 Roundup have as good a prognosis as people who get their
5 non-Hodgkin's lymphoma from some other source.

6 That's generally what they're inquiring about,
7 right?

8 **A.** Yes.

9 **Q.** And, unfortunately, they find that it's more
10 refractory; that is to say, it simply doesn't do as well
11 as people who get their non-Hodgkin's lymphoma from some
12 other source.

13 **A.** Well, that's what it says. But, luckily,
14 Mr. Pilliod didn't read this. He's done really well.

15 **Q.** He has. And you and I -- we'll all keep our
16 fingers crossed. His odds of getting non-Hodgkin's
17 lymphoma again are small. We both agree with that,
18 right?

19 **A.** Yes.

20 **Q.** Great. We hope that happens.

21 But, I mean, let's not kid ourselves. His
22 whole body was riddled with non-Hodgkin's lymphoma,
23 right?

24 **A.** He had Stage 4 in his bone, bone marrow, and
25 lymph nodes.

1 Q. Right. It was in his bones. It was in his
2 bone marrow. It was in his lymph nodes. Right?

3 A. Yes.

4 Q. And he had to have what we call R-CHOP, right?

5 A. He had R-CHOP, chemotherapy and immunotherapy.

6 Q. Yes, ma'am. This is not something you would
7 give somebody unless they were -- they needed it, right?
8 You don't like to give R-CHOP to people?

9 A. I like to give it because it is capable of
10 curing malignant diseases that are very difficult. So I
11 love R-CHOP, to be very honest with you.

12 Q. I think you misunderstood my question. I love
13 it too, and I think Mr. Pilliod loves it more than any
14 one of us.

15 I didn't say I didn't like it. I said there
16 are risks to drugs, and there's big risks to these
17 drugs, but you have to do it, right?

18 A. Absolutely. Sure. You're right.

19 Q. What are some of the risks of R-CHOP?

20 A. Well, one could have lowering of the red blood
21 cell count. You could be anemic, and you might need a
22 transfusion.

23 The concept is with the chemotherapy, it's
24 very nonspecific. It kills any cell that divides
25 quickly. So the bone marrow cells, red cells, platelets

1 that make your blood clot, white cells that prevent
2 infection, they will all go down because they divide
3 very, very fast. Hair cells divide fast enough that
4 they're going to be affected by the chemo, and that
5 could be a side effect. A drug called Oncovin can cause
6 peripheral neuropathy, numbness and tingling in the
7 fingers and toes.

8 There are many side effects of each of these
9 drugs.

10 Q. Sure. But if he didn't take R-CHOP, he would
11 have died?

12 A. I expect that he would, statistically.

13 Q. Sure.

14 And I know Mr. Pilliod's neurologic problems,
15 they're not at all related to the chemotherapy. Nobody
16 is trying to say they are, right?

17 We've looked at some records that show he had
18 some problems beforehand, right?

19 A. Yes.

20 Q. Sure. But there is this thing called chemo
21 brain, isn't there?

22 A. Yes, there is.

23 Q. Sure. If I were to go to your website, that
24 is City of Hope, I would be able to learn about chemo
25 brain, right? It's on your website.

1 **A.** Yes.

2 **Q.** Explain to us what chemo brain is.

3 **A.** It's kind of interesting because there's no
4 real definition of what chemo brain is. During
5 chemotherapy, the patients can -- certainly some drugs
6 directly affect neurologic function in a certain sense.
7 Prednisone. Some people go kind of goofy. They don't
8 think necessarily properly on prednisone.

9 So during chemotherapy or immediately after,
10 there might be a sense that you're not just quite the
11 same. Not like a stroke or a seizure; you're just not
12 quite the same.

13 And in time, that basically goes away. There
14 was one story published, actually, with R-CHOP looking
15 carefully at neurologic function and this chemo brain.
16 And they found in that particular study no evidence of
17 change before or after.

18 I think the most important is that Mr. Pilliod
19 had significant brain dysfunction that was proven way
20 before he ever got the chemotherapy.

21 **Q.** You say "significant." Was Mr. Pilliod able
22 to sale to Maui and back by himself?

23 **A.** I believe he was.

24 **MR. MILLER:** Listen, I thank you for your
25 time, and I thank you for your patience.

1 **THE WITNESS:** Thank you very much.

2 **THE COURT:** Redirect?

3 **MR. ISMAIL:** Yes, Your Honor.

4 **REDIRECT EXAMINATION**

5 **BY MR. ISMAIL:**

6 **Q.** Okay, Dr. Levine. We'll get you back home
7 treating your patients here momentarily.

8 **A.** I'm getting nervous.

9 **Q.** Okay. I'm going to go essentially in reverse
10 order from what Mr. Miller covered.

11 Any indication you saw in the medical records
12 that suggest this concept of chemo brain was operating
13 with respect to Mr. Pilliod?

14 **A.** Absolutely not. He had several episodes of
15 brain trauma starting when he was young. He had
16 concussions. He lost consciousness. We know from the
17 football players and so forth that that in itself is an
18 issue. He had much more than that. No, this is not
19 chemo brain.

20 **Q.** Did you look at medical records from as
21 recently as last year where his physicians are working
22 him up for his complex epilepsy and what that is doing
23 to the structure of the brain?

24 **A.** Yes, I've seen that.

25 **Q.** What was the results of that workup?

1 **A.** The result is they believe that his seizure
2 disorder, his abnormalities in the temporal lobes in his
3 brain are a result of the herpes simplex infection
4 repeated over time; that the major cause of the
5 neurologic dysfunction related to five different
6 episodes of very severe brain infection, one of which
7 put him comatose for an entire month, apparently.

8 **Q.** Were those before he ever had non-Hodgkin's
9 lymphoma?

10 **A.** Those were way before he ever had
11 non-Hodgkin's lymphoma.

12 **Q.** So Mr. Miller asked you about the Leon paper
13 that came out recently.

14 **A.** Yes.

15 **Q.** And he directed your attention to Table 2.

16 **A.** Yes.

17 **Q.** I want to go over some of the information he
18 didn't show you. I believe this is the data from that
19 table. Okay?

20 **A.** Yes.

21 **Q.** So they have a column here for non-Hodgkin's
22 lymphoma malignancies overall.

23 **A.** Correct.

24 **Q.** Do you see that?

25 And with respect to glyphosate -- and this was

1 data published last month -- what was the hazard ratio
2 for glyphosate?

3 A. The hazard ratio was less than 1. It was
4 0.95.

5 Q. And what is the significance, if any, to you
6 that this large recent study showed a hazard ratio of
7 .95?

8 A. It means to me that this large study has not
9 been able to show a statistically significant
10 relationship between glyphosate use and subsequent
11 development of non-Hodgkin's lymphoma.

12 Q. And with respect to the diffuse large B-cell
13 number that he directed your attention to, is that even
14 statistically significant by traditional statistical
15 measures?

16 A. No, it isn't. The confidence interval starts
17 at 1.00. So the most you can say is it's gray or
18 equivocal. It's a soft finding.

19 Q. Have you looked at other data on DLBCL and, in
20 fact, showed the jury this morning, in addition to the
21 Leon study, that looked at this question of DLBCL?

22 A. Yes, I have.

23 Q. Is there any indication of an increased risk
24 with that subtype?

25 A. No, not at all. Eriksson was mentioned as a

1 reference in one of the papers that I was asked, and
2 that paper was very clear. There was no statistical
3 incidence -- increase of diffuse large B-cell lymphoma.

4 Q. With respect to the methodology of looking at
5 epidemiology, would you just look at one number to the
6 exclusion of all the other studies that you reviewed?

7 A. No. These are really complicated areas. I
8 feel badly for anyone who has to look at this. It's
9 hard. And, really, you have to look at the entirety of
10 everything. Any one study doesn't mean a lot. You have
11 to look at all of it together, decide which was best
12 done, which was most valid, which wasn't. And it's the
13 entirety that gives you the idea of what the truth might
14 be.

15 Q. Was that your approach here?

16 A. Yes, it was.

17 Q. Mr. Miller asked you about the Zhang paper?

18 A. Yes.

19 Q. Now, the Zhang paper, is -- is that new data
20 or is that looking back at older data?

21 A. It's looking back at older data. It's not new
22 data.

23 Q. You talked about this morning the importance
24 of looking at adjusted data when adjusting for other
25 pesticide use?

1 **A.** Yes.

2 **Q.** With respect to some of the conclusions that
3 Mr. Miller spoke about, do the Zhang authors limit
4 themselves to just adjusted data in their review?

5 **A.** No. It's mixed up. Some of this is adjusted,
6 some isn't, and it makes the whole thing less than I
7 would want for real validity.

8 **Q.** Do the Zhang authors include the entirety of
9 the Agricultural Health Study?

10 **A.** No. It says it does, but, really, the Zhang
11 went up to -- I believe it was 2010, 2011. So it's a
12 portion. It wasn't the updated Agricultural Health
13 Study database set.

14 **Q.** Do the Zhang authors include the Leon finding
15 of .95 that is reflected here?

16 **A.** Yes.

17 **Q.** I'm sorry. Does the Zhang study include the
18 updated Leon paper that just came out last month?

19 **A.** Oh, I see. No. I'm sorry.

20 **Q.** So continuing forward, counsel asked you some
21 questions about the spousal concordance paper, Friedman?

22 **A.** Yes.

23 **Q.** Do you recall that?

24 **A.** I do.

25 **Q.** There was what? Four couples in that paper?

1 **A.** Yes, there was four couples.

2 **Q.** And the studies that you talked about with the
3 jury showing no spousal concordance, were those larger
4 analyses?

5 **A.** Yes. Those were large population-based
6 studies.

7 **Q.** With more couples that they were analyzing?

8 **A.** Yes, with many more couples.

9 **Q.** Is there increased reliability when you're
10 looking at larger and larger pools of data than, say, a
11 four-person or four-couple study like Mr. Miller was
12 talking about?

13 **MR. MILLER:** Your Honor, I object. Leading.

14 **MR. ISMAIL:** I'll rephrase, Your Honor.

15 **THE COURT:** Rephrase, please.

16 **MR. ISMAIL:** Sure.

17 **BY MR. ISMAIL:**

18 **Q.** Doctor, based on your experience reviewing
19 epidemiology studies, can you tell us about the
20 importance of study size when interpreting the results?

21 **A.** If you're looking for a rather unusual
22 outcome, you really need large numbers to be able to see
23 it and to find it.

24 **Q.** And with respect to the papers that he showed
25 you, I think he only wrote the start years on the slide.

1 Do those papers continue to follow those
2 patients over time?

3 A. Yes. They continued to follow the patients
4 over time after the time that glyphosate would have been
5 available.

6 Q. Thank you.

7 Now, he asked you about the SEER data, and he
8 gave you -- if I can find my copy. Uh-huh.

9 So first of all, you -- this was the graph
10 that you talked about with the jury?

11 A. Yes.

12 Q. Where did the line that you reported for
13 non-Hodgkin's lymphoma come from?

14 A. That comes from the SEER database and the
15 National Cancer Institute as well.

16 Q. And is this how the SEER database reports
17 their data?

18 A. Yes. They report it per 100,000 persons.

19 Q. Is there any dispute in the lymphoma
20 scientific community that the rate of non-Hodgkin's
21 lymphoma has plateaued in this country?

22 A. There's no question at all. It was a very
23 interesting finding and exciting one. It has clearly
24 plateaued.

25 Q. And with respect to the usage of glyphosate,

1 where was that source from?

2 A. I got that from the data from the EPA. They
3 gave year by year the amount of glyphosate that was
4 used.

5 Q. And is this exactly how they report that data?

6 A. Yes. That's why I made it that way.

7 Q. What do you think about what Mr. Miller did,
8 changing the scale to change the slope of the curves?

9 A. I don't think that's valid. You can't do
10 that. That's just not valid. You're changing what the
11 data showed and trying to make it look a different way.

12 This is how it was reported. And so that's
13 how we -- I wanted that to be shown in that way.

14 Q. And so when -- is this a fair look at the
15 incidence rate of non-Hodgkin's lymphoma, the one that
16 Mr. Miller showed you?

17 A. I need to see it again. I'm sorry.

18 Q. Sure. I can put it on the ELMO.

19 So when Mr. Miller changes the scale here, is
20 this a -- did it come up?

21 **THE COURT:** It did. It doesn't want to stay
22 up.

23 **BY MR. ISMAIL:**

24 Q. By changing the scale, Doctor, is this a fair
25 look at the data?

1 **A.** Well, I really don't think so. Could you pull
2 it up a little bit on the -- so I can see the bottom of
3 the slide? I just want to see the years.

4 Yeah, I don't think it's a fair
5 representation. One small point is that it looks to me
6 as if the incidence of lymphoma is slightly going up
7 again. I don't believe that's true. That's one thing.

8 But, again, if you're looking on a scale, it
9 should be from 0 to 100. That's what it's supposed to
10 be. You can change the way it looks, but the data are
11 continuous, whether you graph it or not. What's
12 happened in lymphoma is a tremendous increase early in
13 the '80s, leveled off a bit in the '90s. By the 2000s,
14 it's flat; it's not increasing.

15 But at the same time -- just forget the curve.
16 At the same time, the use of glyphosate in the United
17 States is growing. It's more and more and more.

18 So however you want to put that on a graph,
19 lymphoma is not increasing and glyphosate use is.

20 **Q.** Thank you, Doctor.

21 Counsel showed you this article by Song on the
22 risk of developing other cancers following a nonmelanoma
23 skin cancer.

24 **A.** Yes.

25 **Q.** It's Exhibit 3157. And I just want to direct

1 your attention to what these authors say in their
2 conclusion here.

3 Trying to do this upside down is never a good
4 idea.

5 **MR. EVANS:** Your other left.

6 **BY MR. ISMAIL:**

7 **Q.** Let me back up here. We've --

8 Actually, can you pull up Exhibit 3157. Turn
9 to page 7 of the article and call up the last paragraph
10 above "References."

11 Does it say "We cannot estimate the recurrence
12 rate of nonmelanoma skin cancer or subsequent cancer
13 risk among people with multiple nonmelanoma skin cancers
14 because we only recorded the first report of each type
15 of skin cancer in both cohorts"?

16 **A.** Yes, that's what it says.

17 **Q.** Does that describe Mr. Pilliod?

18 **A.** No. He had 22 -- well, he had 21 nonmelanoma
19 skin cancers; he didn't have one.

20 **Q.** And when you were looking at the data, did you
21 report on studies that showed what happens if you have
22 multiple skin cancers and the risk of non-Hodgkin's
23 lymphoma?

24 **A.** Yes. As the numbers of basal cell cancers, as
25 an example, goes up, the lymphoma risk goes up. And

1 it's not shown here. But, after 12 basal cells, it was
2 even a higher risk in that particular paper.

3 Q. And, Doctor, counsel asked you about red hair
4 and blue eyes.

5 By any measure of those additional demographic
6 factors, is 22 skin cancers an unusual finding?

7 A. Yes, it is an unusual finding.

8 Q. Now, he asked you about CD4 count.

9 A. Yes.

10 Q. Is that the only measure that you would look
11 to to understand whether a patient's immune system is
12 functioning?

13 A. No. So the CD4 count would tell me the number
14 of CD4 cells. It doesn't tell me the function of those
15 cells, just the number. And his number was normal.

16 But the more important issue is that there are
17 many, many, many components of the immune system. And
18 the CD4 cell, the T4 cell, is only one example.

19 So I will say that the number of his T4 cells
20 is normal. I don't know about their function. And I
21 don't know that he's ever been studied for any of the
22 other immunologic abnormalities that might be really
23 underlying this.

24 Q. Okay. So counsel -- almost done here.

25 Counsel asked you about this Chang paper.

1 Do you recall that?

2 A. Yes.

3 Q. So, first of all, he directed you to a
4 particular sentence here about B-cell lymphomas.

5 Do you recall that?

6 A. Yes, I do.

7 Q. What do these authors say immediately under
8 that?

9 A. They say "Bias and confounding may account for
10 the observed associations." Right in the abstract,
11 they're saying that this could be due to chance or bias
12 alone.

13 Q. And what do these authors say on their final
14 conclusion based on their review of this meta-analysis
15 data?

16 A. Their conclusion is "Thus a causal
17 relationship has not been established between glyphosate
18 exposure and risk of any type of lymphohematopoietic
19 cancer"; i.e., lymphoma would be in that category.

20 Q. And he asked you about B-cell lymphoma in this
21 study. But did they also report on diffuse large B-cell
22 lymphoma in this study?

23 A. Yes, they did.

24 Q. And if you turn to page 15, what was the data
25 they reported here for diffuse large B-cell lymphoma?

1 **A.** They reported that, for diffuse large B-cell
2 lymphoma, the meta RR was 1.1, but the 95 percent
3 confidence interval showed that this was not
4 significant.

5 **Q.** And so when we're talking about Mr. Pilliod's
6 risk, Doctor, is it more important to look at the type
7 of cancer he had, diffuse large B-cell, or this
8 heterogeneous cancer called B-cell lymphoma?

9 **A.** I said it at the beginning. And I can't even
10 emphasize it enough. Lymphoma is not one disease. And
11 to say lymphoma is associated with X, Y, Z, that's one
12 piece of information.

13 But he has a very specific disease: diffuse
14 large B-cell lymphoma. And it's important to know that
15 these are different diseases. And we need to
16 concentrate on what Mr. Pilliod had.

17 **Q.** Thank you, Doctor. A couple last topics real
18 quick.

19 Mr. Miller asked you some questions about
20 surfactants and their role in formulating a product.
21 You told us that Roundup is an herbicide; is that
22 correct?

23 **A.** Yes.

24 **Q.** So, with respect to the role of surfactants
25 and what they do, would that relate to the efficacy or

1 the effectiveness of it as a herbicide?

2 A. Yes, because it can get into the leaves of the
3 plants, for example.

4 Q. Is that what you were referring to earlier
5 about getting into the body of the leaf?

6 A. Yes. That's what I meant, the leaf.

7 MR. MILLER: Objection. Leading.

8 BY MR. ISMAIL:

9 Q. Can you talk to us about that?

10 A. It's used in agricultural use. And it stops
11 the plants from making certain proteins, amino acids.
12 And the ability to get this into the plant leaf would
13 be -- or into the plant itself would be important for
14 that product.

15 Q. Does it have anything to do with getting it
16 into a person?

17 A. No. It's hard to get through the skin of
18 people, actually, glyphosate.

19 Q. Okay.

20 So, with respect to what Mr. Miller wrote up
21 here -- I think he wrote it up here.

22 I have no idea whether he wrote it up here,
23 but thank you for that clarification.

24 Last topic, Doctor. With respect to the
25 things that Mr. Miller wrote up here on this chart -- I

1 don't know if you can still see it -- you wrote down a
2 couple of the factors he talked about on direct
3 examination.

4 Did he leave off a very important risk factor
5 that you talked with the jury about?

6 A. Immunity, I guess. But it's hard for me to
7 read. I can't read his handwriting.

8 Q. I can't either. I think that says "obesity,"
9 actually.

10 A. Okay.

11 Q. But let me ask it this way: What was
12 Mr. Pilliod's most significant risk factor for
13 developing NHL?

14 A. There's just no question in my mind. Taking
15 the whole totality of this, his immune system was
16 clearly abnormal. He had an autoimmune disease where
17 his own immune system thinks that his colon is foreign
18 to him. He had severe infections of the brain, five of
19 them, due to the virus that causes cold sores in most of
20 us. He had 22 skin cancers. And multiple skin cancers
21 is a risk factor for eventual development for lymphoma.

22 All of these working through the immune system
23 in a sense.

24 Q. And Mr. Miller asked you whether it's true
25 that, anytime people develop the cancer, there's some

1 failure of the immune system to protect that person.

2 A. Yes.

3 Q. Is it something different when we're talking
4 about Mr. Pilliod with respect to his immune system?

5 A. Yes. Mr. Pilliod's immune system has been
6 abnormal at least since his 20s, developing diseases
7 that just don't occur in -- over and over again, and so
8 forth.

9 Age was mentioned. And age is a risk factor
10 for cancer. Our immune systems, all of us, the immune
11 system gets weaker as we age, not enough to cause
12 opportunistic infections and so forth, but weak enough
13 to get some of us in trouble with cancer and not
14 recognizing the cancer.

15 Q. And you told the jury that, because
16 Mr. Pilliod doesn't have one of the known causes of
17 cancer, you'd characterize it as idiopathic.

18 A. That's correct.

19 Q. And what percentage of DLBCL patients have
20 idiopathic cancers?

21 A. 90 percent. Some people say as high as 95
22 percent.

23 Q. So, with respect to what he wrote here,
24 "Dr. Levine did not know what caused Al Pilliod's NHL,"
25 where would that put Mr. Pilliod in the population of

1 patients who develop his type of cancer?

2 A. It would put him within 90 percent of all
3 patients with lymphoma. None of us know. We don't know
4 what that cause is in the vast majority, in 90 percent
5 of people.

6 And that's true with him. His abnormal immune
7 system -- whatever caused this, his abnormal immune
8 system would have truly allowed this to occur, without
9 question.

10 Q. Would that increase his risk?

11 A. It would increase his risk substantially.

12 MR. ISMAIL: Thank you.

13 Your Honor, no further questions.

14 MR. MILLER: Real quick.

15 REXCROSS-EXAMINATION

16 BY MR. MILLER:

17 Q. It sounds like you think Mr. Pilliod is more
18 susceptible to getting non-Hodgkin's lymphoma because of
19 his immune system.

20 MR. ISMAIL: Objection.

21 THE COURT: I'll allow it.

22 BY MR. MILLER:

23 Q. So are you saying that his immune system
24 problem was a substantial contributing factor to causing
25 non-Hodgkin's lymphoma or not? Or are you saying you

1 don't know the cause?

2 Which is it?

3 **A.** I'm saying we don't know the cause in
4 Mr. Pilliod or in the other 90 percent of people who
5 have diffuse large B-cell lymphoma. We don't know.

6 I don't know what his specific mutation -- his
7 specific type of mutation was. I don't know what it
8 was.

9 I do know that his very abnormal immune system
10 would not have allowed him to recognize the first
11 malignant cell as foreign, and it would have been
12 allowed to continue.

13 **Q.** Have a safe trip back to Los Angeles.

14 **A.** Thank you very much.

15 **THE COURT:** Thank you, Dr. Levine.

16 **THE WITNESS:** Thank you.

17 **THE COURT:** So, ladies and gentlemen, we
18 are -- I'm sorry.

19 We're done for the day. Hold on just a
20 second.

21 We're done for the day. We are not going to
22 be in session tomorrow because I need to talk to the
23 lawyers about a number of issues to get prepared for
24 closing and submission of final evidence. So we will
25 not be in session tomorrow. We will start at 9:00 on

1 Wednesday morning with jury instructions and closing
2 arguments.

3 Keep in mind we will not be here on Friday,
4 even though you will begin deliberating before Friday,
5 because we have that day off. I think we discussed
6 that. So we're not going to be in session this Friday.
7 So we will be in session Wednesday and Thursday.

8 So, while we have completed the evidence, you
9 have not heard any jury instructions. I don't want you
10 to begin thinking about all of the evidence yet until
11 you've heard the jury instructions and the closing
12 arguments of both plaintiff and defense counsel. So
13 hold on for one or two more days, and then you can talk
14 away about the evidence.

15 I'll see you on Wednesday morning at 9:00.
16 Thank you.

17 (The following proceedings were heard out of
18 the presence of the jury:)

19 **THE COURT:** How about 10:00 tomorrow morning?
20 Does that work for everybody to start working on
21 finishing up the jury instructions? I assume you guys
22 need to meet and confer about evidence or to make final
23 decisions about what's going to be admitted?

24 **MR. EVANS:** Yeah, there are a few defense
25 exhibits that we've been back and forth on we probably

1 will have to raise with Your Honor. There's not too
2 many, I don't think.

3 **MR. ISMAIL:** So we didn't formally rest, Your
4 Honor; but, if we did, it would be subject --

5 **THE COURT:** You didn't actually rest. I just
6 was talking to the jury about kind of where we were in
7 terms of --

8 **MR. ISMAIL:** Subject to the admission of
9 exhibits.

10 **THE COURT:** Sure. No, no, I'm not resting for
11 you.

12 All right. So I'll see you guys tomorrow
13 morning at 10:00.

14 **MR. WISNER:** And I think, Your Honor, based on
15 your ruling today, we don't anticipate calling any
16 rebuttal testimony. We're ready to go for closings.

17 **THE COURT:** Why don't I get an estimate on the
18 time -- are you closing?

19 **MR. WISNER:** Yes, your Honor.

20 **THE COURT:** I want to get an idea of how long
21 your closing is going to be. If we're really going to
22 finish closing on Wednesday -- and I don't think the
23 jury instructions are going to take too, too long,
24 because there aren't that many. We'll probably have to
25 have some hard stops. So figure out exactly how much

1 time plaintiffs will get and defense will get.

2 **MR. WISNER:** And for budgeting time, should we
3 assume an hour for housekeeping and jury instructions?

4 **THE COURT:** You mean tomorrow morning?

5 **MR. WISNER:** Wednesday morning.

6 **THE COURT:** I think housekeeping needs to
7 happen tomorrow. Hopefully, we're going to start with
8 jury instructions right away on Wednesday morning.

9 **MR. WISNER:** Okay.

10 **THE COURT:** So once we finish up, I'll have
11 copies of the instructions. Once we get a final set, I
12 guess what will have to happen is, once I make all my
13 final rulings, somebody will have to clean them up and
14 send them back. I will make copies for the jurors.

15 **MR. MILLER:** We were going to request --
16 there's been a large demand for public attendance at the
17 close -- if it was possible to consider a larger
18 courtroom for closing argument.

19 **THE COURT:** There's no larger courtroom
20 available. I'll try to set up a few extra chairs like I
21 did for opening. But that's the best I can do.

22 **MR. MILLER:** Understand.

23 **THE COURT:** Sorry.

24 **MR. MILLER:** Thank you, Your Honor.

25 **MR. WISNER:** Thank you.

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THE COURT: I was going to say something else,
but now I've forgotten. I'll remember tomorrow. We'll
chat tomorrow morning.

(Proceedings adjourned at 3:58 p.m.)

1 State of California)
2 County of Alameda)

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I, Lori Stokes, Court Reporter at the Superior Court of California, County of Alameda, do hereby certify:

That I was present at the time of the above proceedings;

That I took down in machine shorthand notes all proceedings had and testimony given;

That I thereafter transcribed said shorthand notes with the aid of a computer;

That the above and foregoing is a full, true, and correct transcription of said shorthand notes, and a full, true and correct transcript of all proceedings had and testimony taken;

That I am not a party to the action or related to a party or counsel;

That I have no financial or other interest in the outcome of the action.

Dated: May 6, 2019



Lori Stokes, CSR No. 12732